JYVÄSKYLÄ STUDIES IN BUSINESS AND ECONOMICS 35

Ari Paloviita

Matrix Sustainability: Applying Input-Output Analysis to Environmental and Economic Sustainability Indicators

Case: Finnish Forest Sector

Esitetään Jyväskylän yliopiston taloustieteiden tiedekunnan suostumuksella
julkisesti tarkastettavaksi Villa Rana -rakennuksen Blomstedt-salissa
lokakuun 30. päivänä 2004 kello 12.

Academic dissertation to be publicly discussed, by permission of
the the School of Business and Economics of the University of Jyväskylä,
in the Building Villa Rana, Blomstedt Hall, on October 30, 2004 at 12 o'clock noon.

UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ 2004

Matrix Sustainability: Applying Input-Output Analysis to Environmental and Economic Sustainability Indicators

Case: Finnish Forest Sector

JYVÄSKYLÄ STUDIES IN BUSINESS AND ECONOMICS 35

Ari Paloviita

Matrix Sustainability: Applying Input-Output Analysis to Environmental and Economic Sustainability Indicators

Case: Finnish Forest Sector

UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ 2004

Editors
Tuomo Takala
School of Business and Economics, University of Jyväskylä
Pekka Olsbo, Marja-Leena Tynkkynen
Publishing Unit, University Library of Jyväskylä

URN:ISBN 9513919897
ISBN 951-39-1989-7 (PDF)

ISBN 951-39-1895-5 (nid.)
ISSN 1457-1986

Jyväskylä University Printing House, Jyväskylä
and ER-Paino Ky, Lievestuore 2004

ABSTRACT

Paloviita, Ari
Matrix Sustainability: Applying Input-Output Analysis to Environmental and Economic Sustainability Indicators. Case: Finnish Forest Sector.
Jyväskylä: University of Jyväskylä, 2004, 216 p.
(Jyväskylä Studies in Business and Economics
ISSN 1457-1986; 35)
ISBN 951-39-1989-7
Finnish Summary
Diss.

Pre-requisite for all sustainability actions in business is accurate measurement of economic, environmental and social performance. Sustainability indicators, or indicator sets, are then the tools, which simplify the complex sustainability information applicable for management processes, decision-making and communication. Measuring business sustainability is not an easy task, especially while simultaneously considering macro-level sustainability. Indicators should somehow capture the corporate/ industry contributions to sustainability and increase the understanding on the link between business performance and macro-level concerns. Hence, traditional macro-level tools from the field of economics may be borrowed in order to illuminate sustainability issues in the broader context. The purpose of this study is to describe how input-output analysis can be used in industry-level and site-level sustainability indicator design. The research methods applied are secondary data analysis (theoretic-conceptual approach) and a case study (empirical approach), which consists of 1995 input-output tables of the Finnish economy with disaggregated forest sector (27 industrial branches). Conceptual/ methodological development of sustainability indicators is demonstrated with empirical data. Environmental and economic sustainability aspects considered are global warming potential, acidification potential, value added, operating surplus, number of employees and working hours. Input-output tables and input-output analysis are used in calculating and presenting industry-level absolute and integrated sustainability indicators related to these aspects. Eco-efficiency and labour productivity of three industrial branches are compared. Hybrid indicators are presented as an example of combination of site-specific data and average input-output-based data. The study suggests that sustainability indicators based on input-output analysis can provide deeper understanding on the upstream supply chain system related to an industry or a site. Empirical study also shows that indirect impacts within the upstream supply chain system are often more significant than the direct contribution of business entity.

Keywords: sustainability indicators, macro-level, industry-level, site-level, input-output tables, input-output analysis, hybrid indicators

Author's address

Ari Paloviita
School of Business and Economics
University of Jyväskylä, Finland

PO Box 35 (MaE)
40014 University of Jyväskylä
Finland
phone: +358-14-260 3350
E-mail: atpalovi@econ.jyu.fi

Supervisor

Professor Tapio Pento
School of Business and Economics
University of Jyväskylä, Finland

Reviewers

Docent, Dr. Ilmo Mäenpää
Thule Institute
University of Oulu, Finland

Dr. Stefan Seuring
Supply Chain Management Center
Institute of Business Administration
Carl von Ossietzky-Universität Oldenburg
Oldenburg, Germany

Opponents

Docent, Dr. Ilmo Mäenpää
Thule Institute
University of Oulu, Finland

Dr. Stefan Seuring
Supply Chain Management Center
Institute of Business Administration
Carl von Ossietzky-Universität Oldenburg
Oldenburg, Germany

ACKNOWLEDGEMENTS

Number of inputs from many different people has been required to produce this desirable output, doctoral thesis. First of all, I would like to thank Tapio Pento, who has acted as my supervisor. He provided me a unique opportunity to start this "marathon" project in 1999. Tapio fed me with valuable criticism and encouragement throughout the process, which both have been necessary to reach the finish line. I would also like to thank Eero Paloheimo and Olavi Holmijoki of the Helsinki University of Technology, where I worked as a researcher till the end of 2000. The work with Eero and Olavi laid a solid empirical foundation for my further efforts.

I am grateful to my official examiners, Ilmo Mäenpää of the University of Oulu and Stefan Seuring of the University of Oldenburg, whose advice and suggestions on the thesis have been very valuable. I am also grateful for Tuomo Nenonen, who, together with Ilmo, acted as an examiner of my licentiate thesis last year. In addition, I am very thankful to Hanna-Leena Pesonen, who has carefully commented on and discussed all parts of my thesis. Hanna-Leena and other staff of Corporate Environmental Management have created a very nice atmosphere for doing and learning.

I have been very lucky to study and work at the School of Business and Economics in the University of Jyväskylä. I have had excellent research facilities and great colleagues first at Asemakatu Street in the downtown of Jyväskylä and then in the beautiful area by the Jyväsjärvi lake in Mattilanniemi. I have also been lucky to meet so many wonderful people during my time as a doctoral student at the faculty. We have had fun not only in the office, but also on football fields, tennis courts, dance floors, horse tables and wherever.

I am grateful for the financial support I have received from Academy of Finland, Foundation for Economic Education, Finnish Cultural Foundation, University of Jyväskylä, Kauppalaisseuran Säätiö and Marcus Wallenberg Foundation. Especially the travel grants for international scientific conferences related to my research topic have been extremely important.

Finally, I wish to thank my parents Matti and Arja as well as my sister Maria and my friends for their support.

Jyväskylä, September 2004

Ari Paloviita

ABBREVIATIONS

A	Direct requirements matrix (matrix of input coefficients)
AP	acidification potential
CEFIC	the European Chemical Industry Council
CH_4	methane
CHDI	Corporate Human Development Index
CO_2	carbon dioxide
CMU-ET	toxicity weighting scheme by Carnegie Mellon University
CSI	Corporate Sustainability Indicators
DPR	Drivers-Pressures-Responses
DPSIR	Drivers-Pressures-State-Impact-Responses
E	total of required primary inputs
EBIT	earnings before interests and taxes
ECOPUS	eco-efficiency assessment per unit of service
EEA	European Environment Agency
EEMA	Environmental and Economic Material Flow Analysis (project)
e.g.	exempli gratia (for example)
EMI	environmental management indicators
EMS	environmental management system
ECI	environmental condition indicators
EPI	environmental performance indicators
ER	Dutch Emission Registry
EU	the European Union
FFIF	Finnish Forest Industries Federation
FIM	Finnish markka (former currency of Finland, 1 FIM ≈ 0,168 euro)
FS	forest sector
GDP	gross domestic product
GEMI	the US Global Environmental Management Initiative
GRI	Global Reporting Initiative
GWP	global warming potential
HUT	Helsinki University of Technology
I	identity matrix
$(I-A)^{-1}$	Leontief inverse matrix
i.e.	id est (that is)
IHA	integrated hybrid life cycle assessment
IO	input-output
IOA	input-output analysis
IOA-LCA	input-output hybrid life cycle assessment
ISIE	International Society of Industrial Ecology
ISO	International Organization for Standardization
KCL	Finnish Pulp and Paper Research Institute
l	litre

L	matrix of input coefficients from primary inputs to economic sectors
LCA	life cycle assessment
LCI	life cycle inventory
M	multiplier matrix
MEMA	monetary environmental management accounting
MEPI	Measuring Environmental Performance of Industry
MFA	material flow analysis/ material flow accounting
MIET	Missing Inventory Estimation Tool
MIPS	material intensity/ input per unit of service
MJ	megajoule
MPI	management performance indicators
NAMEA	National Accounting Matrix with Environmental Accounts
NGO	non-governmental organization
N_2O	nitrous oxide
NO_x	nitrogen oxides
NPI	Australian National Pollutant Inventory
OECD	Organisation for Economic Co-operation and Development
OPI	operational performance indicators
OSHA	Occupational Safety and Health Administration
PEMA	physical environmental management accounting
PERI	Public Environmental Reporting Initiative
PIOT	physical input-output tables
PMRP	Pollutant Monitoring and Reporting Programme
PSR	Pressures-State-Impact
PWBLF	Prince of Wales Business Leaders Forum
RCRA	Resource Conservation and Recovery Act
SAM	Social Accounting Matrix
SEEA	System of Integrated Economic and Environmental Accounting
SETAC	Society of Environmental Toxicology and Chemistry
SFA	substance flow analysis
SNA	System of National Accounts
SO_2	sulphur dioxide
SVN	Social Venture Network
TRI	U.S. Toxic Releases Inventory
UN	United Nations
UNEP	United Nations Environment Programme
WBCSD	World Business Council for Sustainable Development
WCED	World Commission on the Environment and Development
VTT	Valtion Teknillinen Tutkimuslaitos
X	vector of the output of the economic sectors
Y	the transaction from the economic sectors to the final demand

CONTENTS

1 INTRODUCTION

"Unfortunately, no one can be told what the Matrix is. You have to see it for yourself."
(Morpheus in the movie "Matrix")

1.1 Background

In its 1987 report, "Our Common Future", World Commission on Environment and Development (WCED) chaired by the former Norwegian Prime Minister Gro Harlem Brundtland developed and championed the concept of "sustainable development" (WCED 1987). It was followed by Agenda 21 initiative, based on the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, which provided a comprehensive plan of action to be taken globally, nationally and locally by organisations of the United Nations systems, governments and major groups in every area in which there are human impacts on the environment (Kuhndt et al. 2002). The potential risks to ecology and long-term economic and social development created by current patterns of industrialization, population growth and social inequality were highlighted in the conference (DeSimone & Popoff 1997). In this 1992 Earth Summit, also business wanted to be involved, partly to protect its own interests (Holliday et al. 2002).

At the company level, integration of the economic, ecological and social aspects in a "triple-bottom line" has been introduced (Elkington 1997). Companies are increasingly being expected to engage in the macro-economic targets such as protection of scarce resources, poverty eradication or education, which are conventionally considered as pure government issues (Kuhndt et al. 2002). The role of business in sustainability is discussed by Atkinson (2000) as follows: "From society's point of view the interesting question can be thought of in terms of the contribution of a given entity (e.g. business or sector) to sustainability defined in the wider sense (e.g. nation). From the entity's own perspective, the extent to which its contribution impinges on the sustainability

of its own activity will also be of concern." This is in line with Burritt et al. (2002), who divide environmental impacts related to company activities into two main groups: environmentally related impacts on the economic situation of companies and company-related impacts on environmental systems.

Although sustainability can be measured and implemented at site-level, industry-level, division-level, product level, regional level, national level and global level, sustainable development is mainly a macro-level concept. For example, the main conclusion as regards future work of the European Environment Agency (EEA) was that monitoring eco-efficiency on the macro-level is necessary in order to make sustainability accountable (EEA 1999a). Thus, businesses should consider the micro-macro link seriously and think their own contribution to sustainability at different levels. Macro-level impacts have an impact on company performance and company-related micro-level impacts have an impact on regional, national and global level. In practice, implementation of micro-macro sustainability links requires dialogue, co-operation and networking within and between macro- and micro-level actors. From company perspective, sustainability of the firm itself and sustainability of the broader system it is part of, are the key sustainability issues.

Lin & Polenske (1998) note that in addition to measuring the short-term direct impacts, companies now need means to assess also the indirect impacts and long-term performance of the firm in the broader regional, national and global arena. Business management is frequently criticised for adopting a short-term perspective, as financial markets and shareholders are looking for quick profits (Burritt et al. 2002). Also Helminen (1998) emphasizes the importance of micro-level decisions, as they feed forward to the macro-level. Environmental issues in particular are generally considered to be long term (Burritt et al. 2002). It can be argued that sustainability cannot be achieved, if companies are not willing to adopt a long-term macro-level perspective. On the other hand, Welford (2002) has stated that currently dominating environmental management techniques, environmental management systems (EMS) and the concept of eco-efficiency, may lead to some rather restrictive outcomes. These techniques may enhance the sustainability of the firm itself, but not necessarily sustainability defined in the wider sense. Hence, life cycle thinking and wider system boundaries are needed in corporate environmental management.

It is said that you can't manage what you don't measure. Number of initiatives has been provided by many different organizations for measuring sustainability and for managing and reporting sustainability issues. Global Reporting Initiative (GRI) is one of the leading organizations in developing guidelines for measuring all three dimensions of sustainability. Environmental management and eco-efficiency have been introduced as concepts, which integrate economic and environmental goals in companies. Thus, in the conceptual framework of corporate environmental management and in environmental management systems (EMS), environmental performance measurement has a central role. In order to measure environmental performance, environmental accounting practices and sustainability indicators

have been developed in order to provide information on environmental issues for management and stakeholders. In environmental management accounting, environmentally related impacts on economic systems are reflected through monetary environmental information (MEMA), whereas related impacts of corporate activities on environmental systems are reflected in physical environmental information (PEMA) (Burritt et al. 2002).

As mentioned above, companies and industries contribute to sustainability directly and indirectly. Companies contribute to sustainability directly through their own activities and processes, and indirectly through their suppliers, suppliers of suppliers and so forth. Suppliers of a company or a production site are also part of the contribution. In addition, products of a company or a production site cause environmental, economic and social impacts beyond the company borders and factory gates. Upstream impacts are caused by the raw material and energy acquisition, materials processing, goods creation and transport (product creation phase, production). Downstream impacts are caused by delivery, product use, product maintenance, disposal and recycling (product use phase, consumption). According to White (2001), sustainable production and sustainable consumption are two sides of the same coin, which means, that they should not looked in isolation, but rather as parts of the whole market system.

Companies can measure their indirect contribution to sustainability by applying life cycle approaches, which enable to expand the system boundary beyond the company walls. Life cycle inventories do have a long term focus (Burritt et al. 2002). However, conventional life cycle approaches do not provide micro-macro link, as they remain micro-level applications. Hence, sustainability indicators based on life cycle assessment (LCA) are micro-level indicators, which can describe sustainability of partial system only. In addition, Schaltegger (1997) criticises present LCA approach and calls for simpler and cheaper tools.

System boundary determines how far a company/ an industry wishes to go in measuring sustainability (Veleva & Ellenbecker 2000). However, measurement of various impacts outside the company, related to supply chain and product life cycle, is often very difficult. In addition, data collection from many different sources requires time, money and resources. These are general problems also in the methodology of life cycle assessment, which traces environmental impacts of the product along the whole life cycle. Sustainability indicators often ignore indirect upstream and downstream impacts, which may have a major contribution to total impacts. In addition, comparison of business entities with different system boundaries is not accurate. Hence, system boundary definition is a crucial part of sustainability indicator design.

Measuring complex relationships in economic system requires a mathematical approach. Input-output analysis (IOA) has proven useful in demonstrating the meaning of economic interdependency, as it spans microeconomics and macroeconomics by covering the entire economy at an intermediate level of detail (Duchin 1998). Sector or industry contribution to

macro-level sustainability is easier to measure, as national macro-level accounts are based on industry surveys. This enables the development of macro-level sustainability indicators, which describe industry contribution at national level. In addition, industry-level indicators are appropriate in enhancing the dialogue between micro- and macro-level, as they can be used in developing industries in sustainable manner by actions taken at company-level and political level. On the other hand, companies should not use obscure industry-average data as a basis for corporate environmental management and they should concentrate on site-specific tools and information (Schaltegger 1997). Recently introduced hybrid approaches (see e.g. Suh 2004) combining site-specific data and industry-level input-output data might provide a solution for more efficient tools.

Matrix sustainability as the title of this thesis refers to economic and environmental sustainability of an industry or a production site in the upstream supply chain system from cradle to factory gate. In principle, interdependencies in the upstream supply chain system are infinite. Infinite loop includes both direct and indirect effects in the system, related to manufacturer and its suppliers of different orders. In this thesis, matrix refers to mathematical representation of sectoral monetary transactions, describing complex interdependencies of industries within a national economy. In other words, the matrix describes the upstream supply chain system. It should be noted, that mathematical matrix representation is sometimes used also in life cycle inventory (LCI) phase of LCA, describing physical interdependencies of processes. Hence, matrix representation itself defines the system boundary for the analysis, whether national economy or other.

Based on various matrices, input-output analysis is applied in calculating direct and upstream supply chain economic and environmental sustainability indicators of an industry. Application of input-output analysis to site-level hybrid indicator is also demonstrated. From managerial perspective, it is essential to link site-level sustainability information to the broader sustainability context. Contribution of a single entity to sustainability becomes transparent in the matrix presentation of input-output analysis. The aim of the study is to increase understanding in designing more comprehensive sustainability indicators, which could more efficiently describe the contribution of a given entity to sustainability at the macro-level, i.e. on the national/global level. These indicators might provide valuable information for different stakeholders, including business actors, public policy makers and other external stakeholders.

1.2 Purpose of the study

This study aims to describe the use of input-output analysis in industry-level and site-level economic and environmental sustainability indicator design and

demonstrate that design with empirical case study. Economic and environmental sustainability indicators based on input-output analysis are conceptually developed in the theoretical chapters of the thesis and they are applied with empirical data. Industry-level economic and environmental sustainability indicators are derived from conventional input-output analysis, whereas input-output-based hybrid method is applied in deriving site-level environmental sustainability indicators. Thus, the study deals with methodological development of industry-level and site-level economic and environmental sustainability indicators.

Measuring business sustainability is a new field of study, which still requires methodological development. Although there are numerous data sources available as a basis for measuring economic and environmental sustainability, the actual sustainability indicators and their design require special attention. Input-output tables and input-output analysis provide a consistent and well-formulated methodological framework for measuring direct and indirect economic and environmental impacts of an industry sector. Input-output-based hybrid analysis, in turn, enables measurement of site-level direct and indirect economic and environmental impacts. The study aims to describe and demonstrate the usefulness of industry-level economic and environmental sustainability indicators based on input-output analysis in enhancing the dialogue between micro- and macro-level actors. In addition, the study aims to describe and demonstrate the usefulness of site-level environmental sustainability indicators based on input-output-based hybrid method in including macro-level perspective into managerial decision-making. The aim is not to substitute the existing industry-level and site-level economic and environmental sustainability indicators, but rather to complement them with supporting or supplemental indicators. As Baumann and Cowell (1999) suggest: "Rather than developing new tools for environmental management, it may now be appropriate to focus on practical integration of existing approaches for different applications". Research questions and methodology of the study are elaborated more deeply in the following sections.

1.3 Research questions

As presented previously, the purpose of this study was to describe the use of input-output analysis in industry-level and site-level economic and environmental sustainability indicator design and to illustrate that design with an empirical case study. Thus, the study was based on literature in two domains: input-output analysis and sustainability indicators. Three main research questions mirror the subsequent chapters as follows:

1. *What are the advantages and disadvantages of using input-output analysis in measuring economic and environmental sustainability?*

2. *How can input-output analysis be used in designing economic and environmental sustainability indicators relevant for corporate environmental management?*
3. *How can sustainability indicators based on input-output analysis be used in describing sustainability performance of industries or production sites in the Finnish forest sector at the national level?*

To elaborate two main research questions further, more detailed sub-questions were derived based on the literature review.

Sub-questions for Chapter 2 (main research question 1):

1. How does input-output analysis follow the life cycle approach? How does it deal with system boundary issues?
2. How does input-output analysis take into account economic and environmental dimensions of sustainability?
3. What is the availability and accuracy of data in input-output tables? What are the uncertainties in input-output analysis?

Sub-questions for Chapter 3 (main research question 2):

4. What are the main characteristics of sustainability indicators at different levels?
5. How can sustainability indicators based on input-output analysis relate the activity of an industry or a production site to the larger economic and environmental systems?

Sub-questions for Chapter 4 (main research question 3):

6. How can relative economic and environmental sustainability performance of industries be compared with indicators based on input-output analysis in the Finnish forest sector?
7. How do indicators based on input-output analysis reflect the contribution of an industry or a production site to sustainability in the Finnish forest sector?

Thus, three main research questions were explored by answering seven related sub-questions. The first question reflects the importance of life cycle approach and system boundary definition in sustainability indicators. Life cycle approach is needed, when indirect impacts of a product, a site or an industry are taken into account. System boundary defines how far a company/ an industry wish to go in measuring indirect economic and environmental impacts. Mathematical solution provided by input-output analysis is discussed. The second question emphasizes the treatment of economic and environmental issues in input-output analysis with discussion on economic and environmental applications of input-output analysis. The third question tackles the data availability and accuracy of the data of input-output tables, as well as uncertainties related to input-output analysis. This is mainly answered by exploring the literature on input-output analysis, but also by describing the empirical data. The fourth

question aims to highlight characteristics of sustainability indicators at different levels, including different initiatives, accounting units, types, frameworks and system boundary issues. The fifth question relates to the actual merging of input-output analysis into sustainability indicator framework. It is answered by conceptual/methodological development of sustainability indicators based on input-output analysis. Sub-questions 6 and 7 are answered in the empirical chapter focusing on the Finnish forest sector as a case study. Here, sustainability indicators developed conceptually in the previous chapters are applied with empirical data. Sub-question 6 tackles the *comparison of sustainability performance of industries* in the Finnish forest sector, whereas sub-question 7 deals with the *contribution of an industry and a production site to sustainability* in the larger system. In this case, the larger system refers to upstream supply chain system within the national economy.

1.4 Methods

In this thesis, the quantitative "method", i.e. input-output analysis, is in fact the topic of the study. I became excited about the possibilities of input-output techniques prior to generating the research problem, as I was working in the research project dealing with input-output method. Traditionally, input-output analysis has been a tool of economists in different fields of economics, including environmental economics and ecological economics. In business studies, however, input-output methodology has been rarely used. Even then, the studies are often conducted by input-output specialists, not by academics in the field of business studies. Thus, there is a need for studying input-output analysis from non-economist point of view. In fact, input-output analysis has been used and studied by environmental scientists in their system-wide analyses. As the aim of corporate environmental management is to combine both economic and environmental perspective, the natural choice for the study was to look at the possibilities of input-output analysis in industry-level and site-level economic and environmental sustainability indicator design, as indicators are accepted as management tools in order to achieve business goals. Hence, this study is not an econometrics study, although it includes input-output analysis with empirical case study. The theories on economic and environmental sustainability indicators and on input-output analysis form the basis of this study. Indicators are recognized as important management tools and reporting/ communication tools. Input-output analysis, in this context, is a tool for calculating sustainability indicators at industry-level and at site-level.

This study employs secondary data analysis, i.e. theoretical-conceptual approach and case analysis as methods in order to answer the research questions. Theoretical-conceptual approach is employed in chapters 2 and 3, in which the concepts and the models of the research area are discussed. Case study can be used to test the theory, to create the theory or it can be used for

descriptive purpose (Järvinen & Järvinen 2000). The concepts and the models discussed in chapters 2 and 3 are combined and described with empirical case study of chapter 4. According to Yin (1989), case studies are found also in economics, where the structure of a given industry, or the economy of a city or a region, may be investigated using a case study design. Input-output tables, which form the case of this study, are always related to the structure of the national economy. Moreover, case studies can include, and even be limited to, quantitative evidence (Yin 1989). Case study in this research relies mainly on quantitative evidence derived from input-output tables and input-output analysis. In order to answer the research questions, however, discussion on the qualitative structure of the quantitative results is needed. As Yin (1989) notes, case studies rely on analytical generalization, not on statistical generalization. Case study can include a single case or multiple cases. According to Yin (1989), the main rationale for a single case is the revelatory case. This situation exists when an investigator has an opportunity to observe and analyze a phenomenon previously inaccessible to scientific investigation. Input-output tables investigated in this study were not available for scientific research before.

1.5 Scope

The literature review, the theoretical part, of the study covers discussion on development and design of economic and environmental sustainability indicators on other, and discussion on applicability of input-output methodology to economic and environmental issues on the other hand. Since input-output analysis is primarily a quantitative tool, the scope of the study was delimited to design of quantitative sustainability indicators. However, it is clearly recognized that qualitative sustainability indicators are required as well in a comprehensive sustainability indicator framework. It is also clearly recognized in the study, that social indicators are required in overall sustainability indicator design. However, this study focused on the design of quantitative sustainability indicators, which cannot be applied to social issues as readily as to economic and environmental issues. Hence, only economic and environmental dimensions of sustainability were included in the study. Economic dimension was delimited to four financial/ non-financial economic aspects: value added, operating surplus, number of employees and working hours. Environmental dimension was delimited to two environmental aspects: global warming potential (GWP) and acidification potential (AP). It is clearly recognized that there are several other economic and environmental aspects, which are relevant to sustainability indicators. However, since this study aims to describe and demonstrate the methodology of input-output analysis in sustainability indicator design, the selected aspects were seen representative enough.

Moreover, sustainability indicator design in this study was limited to industry-level and site-level sustainability indicators. Input-output tables provide directly industry-level data, so application to industry-level sustainability indicators was a natural choice. Since production site is a basic unit of industry-level data, designing site-level sustainability indicators were the most natural step from industry-level sustainability indicators towards micro-level sustainability indicators in input-output accounting framework. An alternative focus could be product-level sustainability indicators, but that would require data also on downstream economic and environmental impacts, which were not available in this study. Although this study focuses on production side of the whole market, it is recognized that consumption side is equally important. The empirical part consists of a case study, which was used to demonstrate the applicability of input-output methodology in sustainability indicator design.

The scope of empirical part is strongly depended on practical reasons. First, only Finnish input-output tables were used. This means that the demonstration of input-output analysis is based only on national input-output tables instead of multi-national input-output tables. Since input-output accounting framework is very data-intensive (as can be seen in the appendices of the thesis) and the input-output data collection work is very labour-intensive, this delimitation was seen acceptable. In addition, very large input-output tables are technically difficult to manage. Secondly, economic and environmental sustainability indicators were derived only for industries of the forest sector instead of all industries of the Finnish economy. This decision stems from the fact, that there were no disaggregated input-output tables available for other sectors than the forest sector. Hence, the extensive data collection work of the project "Total value of wood-based products in the forest sector" was fully utilized in this study. In addition, disaggregated input-output tables provide more detailed industry classification and enable better basis for designing site-level sustainability indicators.

Input-output tables in this study are temporally delimited to year 1995. It is recognized, that representative economic and environmental sustainability indicators require time series of several years. However, one year provides an accurate basis for demonstrating the relevant methodological issues of sustainability indicator design in this study. Moreover, this study is delimited by the use of monetary input-output tables. This is a limitation especially in designing environmental sustainability indicators, while environmental burdens change proportionally to monetary values in monetary input-output table framework. However, there were no physical or mixed-units input-output tables available for the Finnish forest sector. With respect to site-level data, confidentiality of the data delimits the demonstration of site-level sustainability indicators. Hence, it was not possible to demonstrate site-level sustainability indicators as extensively as industry-level sustainability indicators with the case study. Site-level data used in this study was based on site-level figures in environmental report 1999 of the Finnish Forest Industries Federation.

Complete demonstration of site-level sustainability indicators would require data on specific input structure of the site and on specific suppliers of the site. Hence, three Finnish sulphate pulp mills were selected. Site-level data on production amounts (tons) and CO_2 emissions (tons) were available. These data were combined with industry-level GWP data, and the corresponding environmental sustainability indicators were presented.

1.6 Validity and reliability

The quality of the study may be assessed in terms of validity and reliability (Yin 1989). Validity means that the study measures what it is intended to measure. Validity can be tested in terms of construct validity and external validity (Yin 1989). Construct validity refers to appropriate measurement operation and delimitations, whereas external validity concerns the extent to which findings may be generalised beyond the scope of the study. Reliability, in turn, refers to the internal consistency of the study: whether it, when repeated, would produce similar results.

Construct validity in this study refers to use of input-output analysis in sustainability indicator design. Construct validity was increased by presenting all the empirical results graphically, which enabled various comparisons, such as: 1) relative sustainability performance between industries/ sites, 2) proportional share of direct and indirect impacts in total upstream supply chain, 3) direct and upstream supply chain indicators, 4) contribution of different supplier industries in the upstream supply chain impact and 5) contribution of iterative supplier tiers. Thus, case study illustrated the use of input-output analysis in sustainability indicator design.

Concerning external validity, this study aimed at analytical rather than statistical generalization (Yin 1989). Because of the limited scope of the study (see section 1.5.), the findings of this study may serve sustainability indicator design and development at more general level. Also apparent source data uncertainties affect on external validity of the study. Hence, quantitative results of the case study should not be used as such in reporting or decision-making. However, the findings highlight the importance of different components of sustainability indicators and their contribution in comparisons. Methodology of the illustrated indicator design may be generalised in any sector and it may also increase understanding on the complexity of sustainability issues.

The only alternative to describe input-output analysis empirically is the use of empirical input-output tables. Thus the case in this study referred to these specific input-output tables. Empirical input-output tables used in this study were based on national input-output tables of the Finnish economy. However, since the disaggregated data was available only on the forest sector, the forest sector was selected for a case instead of all industries or some other specific sector. When the required data are available, input-output analysis can

be applied to any sector, although compilation of disaggregated input-output table may require more efforts in the sectors, which are more heterogeneous with respect to their product range.

Reliability of the study is hard to assess. The study can be repeated with any spreadsheet environment (e.g. excel, as in this study). All the data are publicly available. Publications of the "Total value of the wood-based products in the forest sector" –project were published in 2002, with extensive quantitative input-output data and environmental data. Part of the environmental data used in this study is available from the Statistics Finland. With respect to transparency, all the data used in the study (supply tables, use tables, use tables for imports, industry-by-industry input-output tables, direct requirements matrix and multiplier matrices) were presented as appendices of the report. Thus, the results of quantitative input-output analysis would probably not change in a repeated study. However, choosing product-by-product table instead of industry-by-industry table would lead to slightly different results. Results of the input-output analysis are so presented, that they provide a meaningful basis for answering the initial research questions. Conclusions depends more on the researcher's own interpretation and intuition. However, I think that some important pieces of the "truth" were provided in this study, with rather pragmatic approach.

1.7 Outline of the thesis

This thesis is structured as follows:

Chapter 1 provides an introduction to the topic. It is explained why it is important to measure sustainability and which are the crucial elements of sustainability. Importance of macro-level perspective in corporate environmental management is highlighted. Also the need for dialogue on sustainability between macro-level and micro-level actors is emphasized. The chapter also includes the presentation of the purpose of the study, research questions, methods and scope of the study as well as the discussion on validity and reliability of the study. Outline of the thesis is presented in the final section.

Chapter 2 forms the first part of the literature review. It focuses on input-output analysis and on its applicability to analyse economic and environmental aspects at different levels. Input-output tables, environmental input-output analysis and their methodological features are discussed in the chapter. In the end of the chapter, empirical input-output data used in this study are presented. Input-output accounting framework is described in detail with references to extensive appendices of the study. The chapter includes description on the research project "Total value of wood-based products in the forest sector", which provided the major part of the data for this research.

Chapter 3 deals with sustainability indicators on the basis of the literature review. Different types of indicators, measurements behind the indicators and the role of sustainability indicators in corporate environmental management is explained. The chapter focuses on methodological aspects of sustainability indicators. The limitations of business sustainability indicators are also discussed. In the end of the chapter, selected empirical sustainability indicators are presented.

In Chapter 4, input-output analysis and input-output-based hybrid analysis are empirically applied to industry-level and site-level economic and environmental sustainability indicators. Industry-level sustainability indicators of 27 industries of the Finnish forest sector are calculated with input-output analysis and presented. The results include quantitative indicators for economic and environmental aspects of sustainability, including global warming potential (GWP), acidification potential (AP), value added, operating surplus, number of employees and working hours. Absolute, integrated and hybrid indicators are presented. Integrated indicators include cross-cutting indicators and systemic indicators. Direct and indirect contributions are presented separately. In addition, explicit composition of indirect contribution is presented by iterative tier and by supplier industry. Site-level environmental sustainability indicators of three Finnish sulphate pulp mills are calculated with input-output-based hybrid analysis.

In chapter 5, conclusions from empirical case study are drawn. Conclusions reflect the research questions presented in Chapter 1 and also the theoretical framework presented in Chapters 2 and 3, as well as the empirical part. Main findings and contribution of the study are highlighted in this chapter. Potential areas for further research are suggested.

2 INPUT-OUTPUT ANALYSIS

Input-output analysis (IOA), or interindustry analysis, is a quantitative method, which was pioneered by the American economist Wassily Leontief. The first input-output tables were compiled in 1923-24 in the Soviet Union (Forssell 1985). Leontief completed the first input-output table for the U.S. economy in 1936 and made the first practical quantitative analysis in 1941. Leontief was awarded the 1973 Nobel Prize in Economic Science for his model of input-output economics. Now IOA is a standard conceptual and applied tool in economic accounting and analysis. Input-output tables are calculated in most industrialized countries as part of National Accounts. National input-output tables are typically compiled in monetary units, but in some countries also physical input-output tables have been compiled. The economic system to which IOA is applied may be as large as a nation or the entire world economy, or as small as the economy of a metropolitan (regional) area or even a single enterprise (Leontief 1986). IOA forms the starting point for many general equilibrium models and macroeconomic models (Fankhauser & McCoy 1995). Duchin (1998) notes, that input-output economics makes the mainstream economist uncomfortable, since it is sometimes classified as part of microeconomics and sometimes as part of macroeconomics.

Since late 1960's, economists, including Leontief himself, have applied input-output analysis also for environmental issues and problems. Hence, basic monetary (or physical) input-output accounting framework is extended with environmental data. There are many environmental-economic models based on IOA, which have been applied worldwide. Besides economists, environmental scientists have also adopted IOA recently. Environmental input-output models are applied for example in LCA. Input-output models are gaining momentum in scientific communities such as International Society of Industrial Ecology (ISIE) and Society of Environmental Toxicology and Chemistry (SETAC). In addition, the first meeting of European Network of Environmental Input-Output Analysis (Input-Output based Life Cycle Inventory) was hold in 2001 (Suh 2001).

Basic unit in IOA is a sector, an industry or a product (group). Thus input-output tables provide a description of the sectoral structure of the economic system, whereas input-output models enable an analysis of sectoral changes within the system. This chapter provides an overview on supply and use tables, input-output tables, primary inputs table and input-output analysis. Treatment of environmental and non-financial economic data in input-output accounting framework is also discussed. Applications of input-output analysis to life cycle assessment and other environmental issues are presented and discussed. Uncertainties related to input-output analysis are discussed in the final section of the chapter.

2.1 Input-output accounting framework

2.1.1 Supply and use tables

Input-output accounting framework is a description of the physical or monetary flows between different sectors within the national economy (Leontief 1986). Temporally, it is a description of the flows during one year. Input-output tables are derived from supply and use tables, which are provided by the national statistical authorities regularly. The supply and use table framework was developed by Richard Stone, for which, together with his efforts on the Social Accounting Matrix (SAM), he received the Nobel prize in 1984 (Suh & Huppes 2002). This framework provides an explicit distinction between industry output and product. Product-by-industry supply table describes industry outputs: the value of each product produced by each industry. Product-by-industry use table, in turn, describes industry inputs: the value of each product/ primary input used in the production of each industry's output. (Statistics Finland 1999.) Supply and use tables are calculated in most industrialized countries, but there are national differences in input-output accounting systems. In addition, Eurostat is planning to build the first official European input-output table from 2002, which will be 60 x 60 table for 15 EU countries (Huppes 2001).

Entries in input-output accounting framework represent transactions of whole industry classes, and are aggregated over the product range and several numerous producers in the respective class (Lenzen 2001b). However, industries can be disaggregated into smaller groupings in input-output tables. Disaggregation level of input-output tables differs in different countries. In the U.S., for example, national economy is divided into 500 industries in input-output tables (see e.g. Joshi 2000). Theoretically, input-output table could represent every single product (Joshi 2000). In practice, however, it would be impossible to deal with such an enormous table.

Monetary values in input-output accounting framework are typically based on net producer's prices, i.e. so called "farm or factory gate prices" or

basic values. Calculation process from net producer's price values to consumer's price values requires data on retail and wholesale trade margins, transportation cost, value added tax and other product taxes and subsidies, which are also provided by statistics centres (Statistics Finland 1999).

2.1.2 Input-output tables

Input-output tables are symmetric presentations of supply and use tables. Symmetric means that input-output tables are either industry-by-industry input-output tables or product-by-product input-output tables (Konijn & Steenge 1995). Input-output tables are mathematically converted from supply and use tables. As use tables, input-output tables consist of rows and columns, where inputs to industries are depicted in the columns and outputs from industries are seen in the corresponding row. Industry-by-industry table describes the value of all products of each industry used in the production of each industry's output. Product-by-product table, in turn, describes the value of each product used in the production of each product's output. Hence, industry output includes both primary products and secondary products produced by industry, whereas product output includes only primary products. The problem with product-by-product table is that all the other statistical information is based on industry classification. As Thage (2002) states, industry classification in industry-by-industry table is compatible with all national accounts data classified by industry, thus enhancing its analytical usefulness. Using product-by-product table thus requires allocation of industry-based data to products. Any allocation method (or model) needed to construct product-by-product table rely on technology assumptions, which, according to Thage (2002), are very strong assumptions. By using industry-by-industry table, also allocation problems can be avoided. In addition, Thage (2002) points out that it has not been demonstrated that product-by-product tables should be superior to industry-by-industry tables for analytical purposes.

2.1.3 Primary inputs table

The simplified form of the complete input-output accounting framework is presented in figure 1. Figure 1 shows that input-output accounting framework includes also final use table (on the right side) and primary inputs table (below). In the columns of final use table, private consumption, government consumption, capital formation and exports of the products of each industry are presented. In the rows of primary inputs table, compensation on labour (wages and salaries, employer's social contribution) and compensation on capital (consumption of fixed capital) of each industry are presented. Consumption of fixed capital basically consists of buildings, durable machinery, transport equipment, area, waters as well as civil and hydraulic engineering. Also value added tax, product taxes, product subsidies, other taxes on production less subsidies, operating surplus/ mixed income (net) and value added at producer's price (gross) are expressed in rows of input-output accounting

framework (Statistics Finland 1999). Intermediate use table describes transactions of monetary or physical flows between domestic industries within the national economy. Imports can be described as primary inputs in the row of primary inputs table. Alternatively, imports can be added to intermediate use table, which means that total intermediate inputs from both domestic and foreign industries to domestic industries and domestic final use are summed up. Intermediate use table for imports is often provided by national statistics centres.

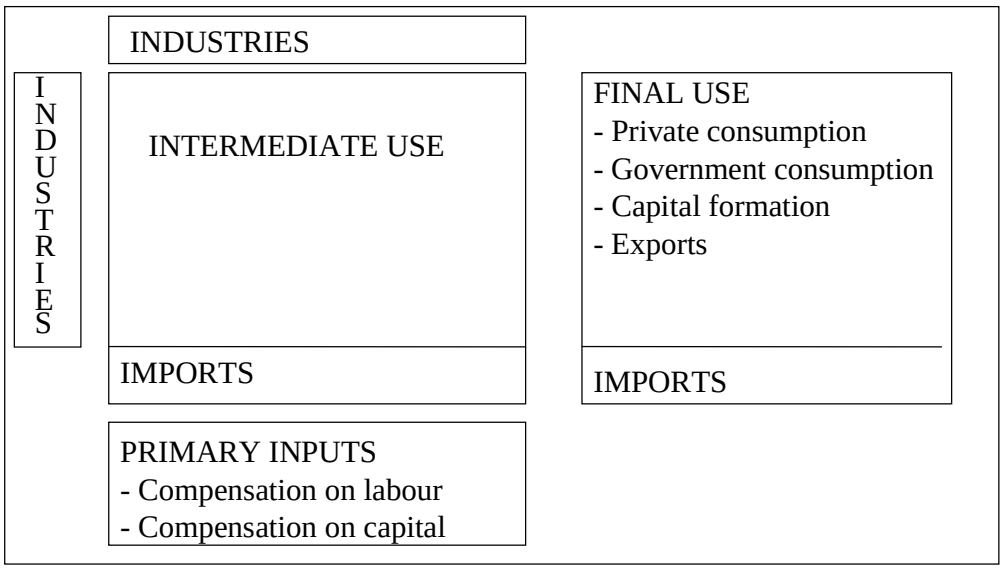

FIGURE 1 The simplified form of the input-output accounting framework (adapted from Mäenpää & Juutinen 2000)

2.1.4 Additional environmental and non-financial economic data in input-output framework

Environmental burdens of industries can be added to conventional input-output accounting framework. However, environmental interventions per sector are not directly available. Data are often based on national greenhouse gas emission inventories, national emission registries and other diverse data and modelling (Huppes & Suh 2002). Internationally, these include for example U.S. Toxic Releases Inventory (TRI), Australian National Pollutant Inventory (NPI), Pollutant Monitoring and Reporting Program (PMRP) and Dutch Emission Registry (ER). National Accounting Matrix including Environmental Accounts (NAMEA) is provided in more integrated format, but it includes less environmental variables. In descriptive sense, environmental inputs, such as energy, raw materials, land, air and water, should be presented as rows in basic inputs table. Consequently, environmental outputs, such as discharges to air, water and land, as well as waste, should be presented as columns on the right side of final use table. Mathematically, however, both environmental inputs and outputs can be treated as basic inputs, and can thus be presented as extra rows in input-output accounting framework. In principle, extra rows of input-output

accounting framework can consist of any other sectoral data in their own natural units, such as number of employees and working hours. This will be elaborated in the next section.

2.2 Mathematical framework of input-output analysis

2.2.1 Direct requirements matrix and mathematical presentation

While input-output accounting framework and input-output tables describe the physical or monetary flows between different sectors within the national economy in absolute measures, input-output coefficient matrices are used for mathematical input-output analysis (IOA). Direct requirements matrix consists of technical coefficients of each industry or product. Technical coefficients are calculated from input-output table. The basic assumption in input-output analysis relies on the observation that each sector has a characteristic mix of inputs per unit of output. The main equation in IOA,

(1) $$X = AX + Y$$

means that demand equals supply (input = output). The components of the first equation are:

AX = the intermediate transaction between economic sectors, where A is the matrix of input coefficients in the economic sectors (so called direct requirements matrix) and X is the vector of the output of the economic sectors. Besides requirements from domestically produced current intermediate demand, direct requirements matrix A can include requirements from domestically produced capital intermediate demand, imported current intermediate demand and imported capital (Lenzen 2001b).
Y = the transaction from the economic sectors to the final demand

The first equation may be rewritten, so that the total supply is a function of the final demand:

(2) $$X = (I-A)^{-1}Y,$$

where the term $(I-A)^{-1}$ is so called Leontief inverse and represents the cumulative direct and indirect use of intermediate products per unit of output. It can be expanded to the infinite series of intersector transactions:

(3) $$X = (I + A + A^2 + A^3 ...+ A^{n\rightarrow\infty})Y$$

This equation is useful when calculating cumulative effects tier-by-tier, i.e. 0th order, first order and second order till infinite order. Cumulative effects tier-by-tier are illustrated in figure 2.

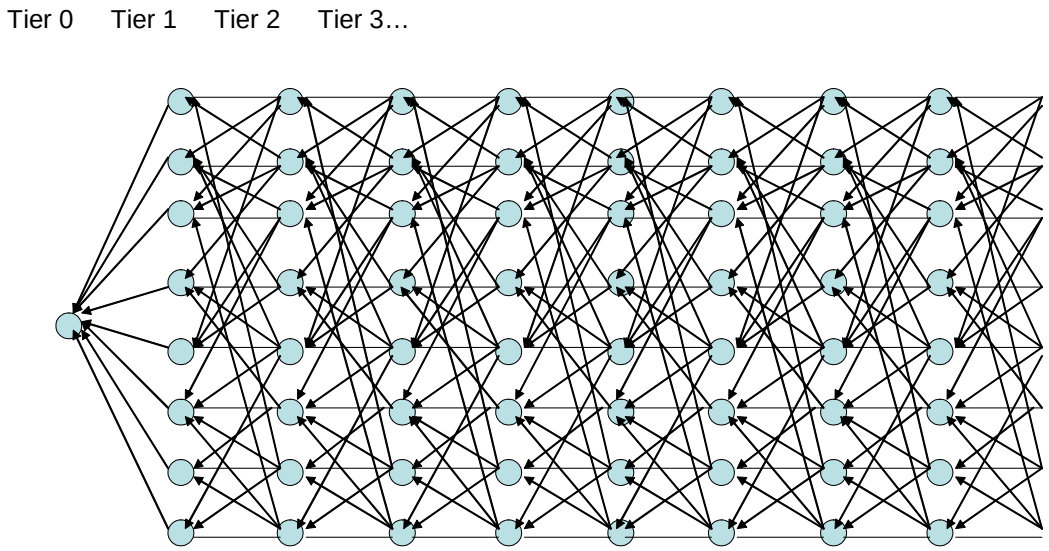

FIGURE 2 Cumulative effects tier-by-tier in input-output analysis.

2.2.2 Total factor multipliers

Based on the second equation and available primary inputs data, total use of primary inputs can be calculated. The total of required primary inputs (E) can be expressed as

(4) $$E = LX = L(I-A)^{-1}Y,$$

where LX is the use of primary inputs to the economic sectors and L is the matrix of input coefficients from primary inputs to the economic sectors. This implies that when the total output (X) changes, the total of required primary inputs (E) changes, and when the final demand (Y) changes, the total of required primary inputs changes via the Leontief inverse $(I-A)^{-1}$. Thus, in input-output models the ratios between inputs and outputs of a sector are constant (fixed technological coefficients). This type of relationship, known as "Leontief production function", assumes constant returns to scale and full complementarity between inputs. The result of this type of IOA is based on total factor multiplier, which describes direct and indirect embodiments of different primary inputs per unit of final consumption of products or per unit of output. Multiplier matrix M shows directly the contribution of each industry to total primary input requirement and it can be calculated from coefficient matrix L and from Leontief inverse $(I-A)^{-1}$.

(5) $$M = L(I-A)^{-1}$$

Based on equation (3), the total factor multiplier can be calculated tier-by-tier, so that indirect embodiments of different primary inputs from suppliers, from suppliers of suppliers, etc, can be calculated:

(6) $$M = L + LA + LA^2 + LA^3 ... + LA^{n \rightarrow \infty}$$

According to Miller and Blair (1985), generalized input-output models incorporate additional information on inputs of production factors into intermediate demand. This additional information on inputs may be economic or environmental. Thus, the total of required primary inputs can be calculated in monetary units (such as value added), in physical units (such as emission tons) or in any other measurement unit (e.g. working hours). However, when non-monetary quantities, such as energy, water, materials or labour are modelled with monetary input-output tables, proportionality between monetary and physical flow must be assumed (Lenzen 2001a). This is a problem, when e.g. energy prices are different for different industries.

As explained above, both environmental inputs and outputs can mathematically be treated as primary inputs, although waste and emissions are clearly undesired outputs in descriptive sense. Thus, with equation (4) the total environmental burden (e.g. CO_2 emissions, use of non-renewable energy) for a specific unit of output or final demand can be calculated. Consequently, based on equation (6), the total environmental burden can be calculated iteratively tier-by-tier, i.e. the contribution of suppliers of different order to total environmental burden multiplier. In addition, multiplier matrix shows directly the contribution of each industry to total environmental burden per unit of output. Hence, the total multiplier covers an infinite order of environmental contributions from upstream production processes.

Composition of direct requirements matrix A has a crucial effect on total environmental burden per unit of output. Coefficients of matrix A increase, if requirements from domestically produced capital intermediate demand, imported current intermediate demand and imported capital are included in the matrix. It is obvious, that production of capital goods, such as durable machinery and buildings, causes environmental burden and labour effects domestically and abroad. However, appropriate capital coefficients are difficult to estimate and national statistics centres do usually not provide capital tables. As Lenzen (2001a) notes, direct requirement matrix typically only describes "current" intermediate, but not capital demand. Similarly, production of imported intermediate products by foreign industries causes environmental burden and labour effects abroad. As mentioned earlier, domestic intermediate transaction table and imports table can be summed together. Indirect impacts related to imports can be found out separately by subtracting domestic multipliers from total multipliers. Similarly indirect impacts related to capital can be found out separately by subtracting current domestic/imports multipliers from total multipliers.

Besides direct requirements matrix, environmental coefficients of matrix L have crucial effect on total environmental burden per unit of output. Environmental coefficients are calculated as a ratio of environmental burden of the industry and unit of industry output (e.g. tons of CO_2 per million euro output). Sectoral environmental data is typically collected from many different sources/ statistics and they are often incomplete. Although IOA enables an analysis of any environmental burden measured in quantitative units, environmental burden data are often limited to air emissions. National statistics centres provide also environmental accounts, which can be used as a data source. Because of rapidly changing technology, environmental burden coefficients may also change rapidly. Investments on environmentally sound technology may enable increasing value of production, while emissions are holding unchanged or even decrease. As Lenzen (2001a) notes, assuming a constant and linear relationship between intermediate inputs and outputs ignores economies of scale, structural changes, technological changes and price changes. In a static framework, however, this is not a problem since multipliers refer to a single base year, and changes in prices, economic structure, technology or output scaling are not appraised (Lenzen 2001a).

2.3 Environmental applications of input-output analysis

Input-output analysis (IOA) is gaining momentum in the field of life cycle assessment (LCA), material flow accounting (MFA) and in the broader contexts of environmental system analysis and industrial ecology. Input-output analysis is technically similar to the material flow analysis (Bouman et al. 1999) and it also combines quite well with the inventory analysis in LCA (Udo de Haes et al. 2000). Input-output analysis takes a top-down linear approach to describe industrial structure at macro-level framework. In addition to direct effects, IOA takes into account other economic activities causing environmental burden indirectly through the input of goods and services, and through the activities of the numerous industries in the national as well as foreign economies. This feature makes IOA appropriate for complementing other tools, which are more limited in scope and in system boundary. As Bouman et al. (1999) note, there are conflicting requirements for tools integrating economic and environmental issues: “On the other hand, the models should be complete, in the sense of covering extraction, production, consumption and waste treatment; resource availability and pollution; bulk material and micro pollutants; and so forth. On the other hand, the models should be operational, in the sense of having a low data demand and being easy to construct and run in practice.” Conventionally, since the late 1960’s, IOA has been used for environmental-economic modelling by economists. In this section, environmental applications of IOA are discussed. Hybrid life cycle assessment, enterprise input-output models, physical input-

output models and global input-output models are conceptually interesting applications from sustainability point of view.

2.3.1 Hybrid life cycle assessment

Any method, which combines input-output analysis and life cycle assessment is called hybrid LCA. There are three types of hybrid LCA's: tiered hybrid, input-output hybrid (IOA-LCA) and integrated hybrid (Huppes & Suh 2002).

- Tiered hybrid LCA, i.e. process-based hybrid analysis, makes a difference between process-based system and input-output-based system. These two systems are analysed separately. The direct and downstream requirements and some important lower-order upstream requirements of the functional unit are examined in a detailed process LCA, while remaining higher-order requirements are covered by IOA (Lenzen 2001). Hence, advantages of both methods, specificity and completeness, can be combined. An example of tiered hybrid LCA is the Missing Inventory Estimation Tool (MIET) introduced by Suh & Huppes (2002). In MIET, the use of input-output based data for major processes is tried to be minimized and it is applied only to the flows located at the margin of the system boundary (Suh & Huppes 2002). Thus, in tiered hybrid LCA, input-output data can be seen as additional source for data collection.
- Input-output hybrid LCA (IOA-LCA) takes starting point in a conventional input-output analysis. In order to overcome the high level of aggregation, a part of input-output table is disaggregated, in case more detailed sectoral monetary data are available. In addition, sectoral input-output data can be substituted with detailed process data or it can be augmented with sectoral physical units data. Augmentation can be done by replacing existing matrix elements in direct requirements matrix with physical units data or by adding physical units data in a separate matrix row. However, substitution, disaggregation, and augmentation of the direct requirements matrix with specific process data can lead to unwanted flow-on effects (Lenzen 2001b). Input-output hybrid LCA implies a data collection strategy, aiming at more efficient use of time in data collection (Nielsen 2001). Thus, IOA-LCA has been generally regarded as a quick screening method that can be used in preparation for a more detailed study (Suh & Huppes 2002). According to Joshi (2000), results from IOA-LCA should be interpreted more as indicators of relative performance in comparing products than as absolute performance indicators.
- Integrated hybrid LCA (IHA) develops process-based system and input-output-based system independently, but merges them systematically into one system (Huppes & Suh 2002). Rationale for integrating the two systems is that systems are intricately looped. Monetary flows in the

input-output system are normalised by total production, while physical product flows in the process-specific part of the LCI technology matrix are normalised by their operation time (Suh & Huppes 2002).

According to Bouman et al. (1999) LCA, in spite of the large system, is primarily a micro-level tool, since only tiny parts of macro-level sectors such as energy and transport are allocated. Process LCA is based on a set of consecutive linear production functions that are arranged into a product-by-product matrix. As in IOA, matrix representation of the data and an inversion of that matrix solve the problem of recursions and loops within the LCA system. However, LCA matrix does not include all the sectors and thus many inputs are also excluded. From that perspective, IOA approach complements LCA adequately as a combination of micro- and macro-level tools. Other motivations for using IOA in LCA relates to problems of subjective boundary definition, inflexibility, high cost, data confidentiality and aggregation in process-based LCAs. Although input-output data is less reliable than process LCA data (Treloar & Love 2000), IO data is more representative, as it considers national industry as a whole.

Economic input-output life cycle assessment model (EIO-LCA) developed at the Carnegie Mellon University is a web-based software in the public domain (www.eiolca.net). EIO-LCA has been applied in several industry level/ product level studies (Lave et al. 1995, Hendrickson et al. 1998, Joshi 2000). EIO-LCA is based on 1992 485 x 485 commodity sector matrix of the US economy published by the U.S. Department of Commerce and it includes electricity use, fuel and ore use, energy use, fertilizer use, conventional pollutant emissions, greenhouse gas emissions, toxic releases, CMU-ET weighting scheme for toxic emissions, RCRA (Resource Conservation and Recovery Act), external costs, water data, OSHA safety data and employment data.

2.3.2 Enterprise input-output models

Although the input-output model is typically used for macro-economic analysis with industry-level data, there are some micro-level applications too. According to Lin and Polenske (1998), input-output tables can be used for three tasks by companies:

- IO tables provide an excellent way to construct a consistent account of the flows from suppliers to users.
- The IO account can be used to identify the structure of production (technology) and changes in it over time. These production structures can be compared with other companies that produce the same or different, but related, products.
- The accounting data can be converted into an enterprise IO model and used for important analytical tasks in the firm, such as forecasting future output and market shares, determining optimal production input structures, calculating the effect of changes in upstream and downstream

direct and indirect requirements and assessing the energy requirements and environmental impact of alternative production techniques.

Most of the existing enterprise IO models are constructed using the framework and convention of national IO tables. The basic units of the enterprise IO model are typically products or branches/ plants within a company, which are treated in the same way as the sectors in national IO tables. The main advantage of this approach is that it is consistent with the national income and product accounts and macroeconomic statistical conventions. Thus the enterprise IO tables can be easily linked to national, regional and industry-level IO accounts and models. Lin and Polenske (1998) identified three main problems related to this approach:

- The relationships among different branches and processes of a company are different from the relationships among different sectors in the national economy. Some processes may have a large number of by-products and different plants and processes may produce the same or similar products.
- If products are used as a basic unit for enterprise IO models, managers may have difficulty interpreting the diagonal elements, which, in the national IO table, show the self-consumption of a sector's own product.
- The national input-output framework may be too comprehensive and, at the same time, too general to be applied to the business setting.

Lin and Polenske (1998) introduced a model with enterprise input-output account, which shows the production processes, resources allocation and internal and external linkages of a company. This kind of account includes all inputs of production and records material flows and financial transactions among different units within the company and between the company and the outside market (Lin & Polenske 1998). Model based on the production processes rather than products or branches provides company-specific information for managers, but the data required for the model is often confidential and cannot be used for external communication. However, integrating micro-level corporate accounts and macro-level national accounts is a challenging field of study. One problem may be the different language of economists and business accountants/ managers. In this case, theoretical development and formulation should be supported with more empirical case studies. Obviously input-output accounting framework provides a potential starting point for further developments in linking microeconomics and macroeconomics.

2.3.3 Physical input-output tables and models

Modelling related to material flow analysis (MFA) and substance flow analysis (SFA) is based on input-output analysis and thus MFA/SFA modelling is sometimes referred to as environmental input-output analysis (Bouman et al.

1999). In fact, Leontief's input-output model can be considered as the first material flow model, since the intersectoral flows in the model can be thought of as being measured in physical units, such as bushels of wheat, yards of cloth etc. Since the mass balance principle is the core rule in MFA/SFA, physical input-output models and physical input-output tables are applied instead of monetary input-output models. Thus the SFA matrix of coefficients is not drawn up on a sector-by-sector basis, but on physical commodity-by-commodity basis. In MFA, in turn, introduction of input-output framework may be used in allocating material flows to economic sectors. This generates information about the "embodied material flows" of final demand and provides a linkage of materials flows to economic activities (EEA 1999b).

Accounting in physical units can only deal with disaggregated flows of a single, homogeneous product or material (Kandelaars 1999). Thus, each ecological good is dealt with separately and the laws of thermodynamics are applied (Schroder 1999). However, it can be argued that if all physical units are measured in kilograms, the rows and the columns may be added and the totals balance (Kandelaars 1999). Konijn et al. (1997), for example, used input-output analysis of material flows with application to iron, steel and zinc. In their study, physical input-output tables were connected to a detailed monetary input-output table so that material and energy intensities of the final products could be calculated. The work by Ayres and Kneese (1969) is considered as the first systematic framework in integrating economic and ecological analysis and indicators, being an input-output model based on the explicit representation of material balances. Also numerous energy analyses of whole economies, specific sectors, or tasks have been carried out using input-output analysis with the representations of energy balances. Hannon and Puleo (1975) for example, evaluated the energy savings that might be associated with the use of buses rather than cars.

A physical input-output table is a macroeconomic activity-based physical accounting system. Physical IO table comprises the product flow of the standard IO table in physical units and also material flows between the natural environment and the economy. In the physical IO tables the flows of the materials through the economy are described in detail: the intake of natural resources by industries, their flows in the processing and refining processes, their final use and further outflow into nature (Mäenpää 2002). Aggregated indicators can be derived from material flow accounts. National physical input-output tables have been/ are constructed in few countries, such as Germany, Denmark and Finland.

The revised version of the System of Integrated Economic and Environmental Accounting (SEEA) 2000 of the United Nations elaborates comprehensively current developments of physical flow accounts and hybrid flow accounts. The term "hybrid flow accounts" refers to a single matrix presentation containing both national accounts in monetary terms and physical flow accounts showing the absorption of natural resources and ecosystem inputs and the generation of residuals (SEEA 2002). In the long run, along the

further development and standardization of physical flow accounts and hybrid flow accounts, physical statistical data on the distribution of the commodities among the individual sectors of the economy will improve the accuracy of environmental input-output analyses, which up to now have been based mainly on monetary accounts. Emergence of physical flow accounts and hybrid flow accounts also highlights the overall flexibility of input-output accounting framework.

2.3.4 Integrated environmental-economic input-output accounting framework

An integrated environmental-economic input-output table includes four flow tables: resources from the environment to the economic sectors, interactions between economic sectors, emissions from the economy to the environment and interactions between environmental sectors (Kandelaars 1999). Moreover, any economic or ecological system can be divided into a number of interacting components or processes that consume, produce and exchange energy, organized material, information and services or commodities (Costanza and Herendeen 1997). Hannon (2001) argues that input-output accounting framework is the simplest method for combining natural and economic processes. According to Hannon, this can be done in a single matrix representation. Moreover, combined system can provide a means to calculate economic prices for ecological goods and services ("shadow prices"), and a measure for technical efficiency. (Hannon 2001.) However, applications of ecological subtables, i.e. studies of interconnections in ecosystems, have usually not been successful, partly because of the data problems and partly because ecological processes are often too complex to fit into the rigid input-output framework (Fankhauser & McCoy 1995). Thus, the interactions between the environmental processes are often excluded in the integrated framework. Still, one of the first applications of input-output methodology to environmental issues included an entire ecological subtable. In that study, Daly (1968) used the input-output technique to illustrate the interdependence between human activities and the natural world. This technique integrated the pure economic sectors (human production, consumption and exchange with market price) with the pure environmental sectors (ecological commodities with no market price).

2.3.5 Global input-output models

"At the level of whole globe, there is effectively only one net input – sunlight."
(Costanza & Hannon 1997)

Since globalization and trade flows are increasing and many environmental problems are global in nature, some world level input-output analyses have been made. World level input-output models include national economic activities and also monetary transactions related to international trade. COMPASS/ GLODYM model by Meyer and Uno (1999) distinguishes 66 countries/ regions, up to 36 economic sectors, depending on the country. The

calculation of direct and indirect flows of traded goods and the attribution of primary material inputs to final demand is then carried out according to monetary structure of interindustry deliveries and cross-country trade flows (Hinterberger et al. 2003). The model thus allows the assessment of all direct and indirect, domestically extracted or imported, flows related to production and consumption activities. Besides monetary input-output tables, the model requires global database for primary material inputs.

The World Model based on static input-output model (input-output model of the world economy) was designed by Wassily Leontief and it is described in Leontief, Carter and Petri (1977). Duchin and Lange (1994) used World Model and World Data Base for comparing a reference scenario with no technological change with those of an "Our Common Future" scenario that includes technological development. Technological choices for each sector were described in "engineer-like" physical terms and physical changes were then related to material inputs and to the generation of pollutants and other wastes. The model divided the world into sixteen geographic regions, each described in terms of about 50 interacting sectors (Duchin and Lange 1994).

In 1999, an international consortium for environmentally extended international input-output table was launched. Currently the tables of Australia, Japan, Netherlands and US are being linked together with trade flows. The international table is supposed to be used for identification environmental effects of international trade, supporting data for LCA, regionalised global inventory, international comparison, analysis of third world problems etc. (Huppes 2001.) In the future, the model should include 20 countries covering 80% of global GDP.

Costanza and Hannon (1997) applied 9-sector (nine process by nine commodity), global input-output model, which included both ecological and economic sectors and an analysis of their interdependencies. Their so called global multicommodity flow analysis was used to evaluate the relative solar energy and other net input intensities of commodities at this scale. Ecological commodities included e.g. CO_2, water, light energy and nutrients. Ecological processes, in turn, included e.g. the surface ocean, photosynthesis and atmosphere. For further analysis, process-by-process or commodity-by-commodity matrices could be derived.

2.3.6 Other environmental applications

There are numerous other applications of input-output analysis to environmental issues. Although physical input-output tables and material balance approach provide a better basis for environmental and material flow analysis, applying monetary input-output tables is still the most common approach. The material balance approach is rarely followed. In addition, applications are usually conducted at national level with industry level detail. Disaggregation of industry level data in IO tables to single products or individual companies is difficult, but theoretically possible. Because of the fixed coefficients and monetary presentation, technological change, substitution and

recycling are generally not included in monetary IO models. Although the introduction of recycling sector in IO table is possible, substitution between new and recycled inputs does not exist in IO models (Kandelaars 1999).

Environmental input-output model by Leontief and Ford (1972) was the first approach, in which emissions of pollutants per industrial sector were calculated in physical units related to monetary outputs and where the pollutants were simply shown as extra rows in the matrix. In addition to conventional economic sectors, they provided a set of pollution-abatement sectors as columns in the IO table of the US. Most of the environmentally related input-output studies have followed this approach. Diverse set of input-output based environmental applications, both static and dynamic, is listed in the following:

- Analysis of 35 different emissions (heavy metals, acids and bases, organic compounds, pesticides etc.) and sectoral contribution to emissions in the Norwegian economy by Forsund and Strom (1976).
- Ecological footprint in New Zealand by Bicknell et al. (1998): requirement of ecologically productive land per year per current level of consumption of average citizen and impact of international trade.
- Development planning in Indonesia by Lange (1998): forecast on natural resources with dynamic model.
- Waste management in Japan by Nakamura & Kondo (2002): LCA of waste management and dynamics of waste treatment with waste input-output model.
- Forest degradation in Indonesia measured by rates of soil erosion and deforestation by Hamilton (1997): projections of the growth of demand for logs with dynamic model.
- Australia's ecological footprint based on actual land use and land disturbance by Lenzen and Murray (2001).
- Environmental-economic cycle for nitrogen in Denmark based on nitrogen input and output from different economic sectors by Wier and Hasler (1999): IO model with nitrogen mass balance.
- Energy consumption and air emissions in Finland by industry and by commodity (Mäenpää 1998).
- Evaluation of available greenhouse abatement strategies in Germany and the UK by Proops et. al (1993): contribution of each sector to total emissions and carbon dioxide emission changes under various development scenarios.
- Comparison on GWP emissions of Swedish and U.S. industries by Finnveden et al. (2001). U.S. data were aggregated into industries comparable to the Swedish data. U.S. environmental data were based on CO_2 equivalents, whereas Swedish data was based on CO_2 emissions only.

2.4 Uncertainties in input-output analysis

Lenzen (2001b) studied potential errors in the results of input-output analysis. He pointed out seven main sources for uncertainty in input-output analysis.

- Source data uncertainty
- Imports assumption uncertainty
- Estimation uncertainty of capital flow
- Proportionality assumption uncertainty
- Aggregation uncertainty
- Allocation uncertainty
- Gate-to-grave truncation error

Proportionality assumption, allocation uncertainty and gate-to-grave truncation error are also pointed out by Gronow (2001), who claims that it is illogical, that price levels affect the estimation of emissions and the use of virgin materials. He reminds that for example in forest industry, the wild price swings have no effect on the amount of emissions per ton of products made in the industry (Gronow 2001). In a static framework, however, average prices are used as a snapshot and price changes are not appraised. In principle, proportional uncertainty can be overcome by replacing monetary entries in input-output tables with entries in physical units, e.g. in MJ for energy industries and in l for water supply (Lenzen 2001b). In practice, however, physical data are often unavailable and many industries are too heterogeneous with regard to their primary product range (Lenzen 2001b). Mixed-units input-output tables then include both monetary units and physical units.

Moreover, Gronow (2001) criticizes the aggregation in many input-output models, in which forest industry is included as a single sector. Aggregation over different products ignores the diversity of different products or product groups. Disaggregation of input-output tables may lessen this uncertainty. Lenzen (2001a) has assessed uncertainties of input-output multipliers using Monte Carlo simulations and has concluded that allocation and proportionality uncertainties can be of the order of 50%, which is considerably higher than uncertainties due to source data errors. The third drawback of IOA pointed out by Gronow (2001) is that post-consumer recycling and the generation of post-consumer waste are not easy to incorporate in the model. He reminds that the European pulp and paper industry, for example, recycles more than 50 per cent of fibres. Lenzen (2001b) claims that gate-to-grave truncation error can be easily avoided by assessing inputs for downstream phases separately using input-output based multipliers and by redefining the functional unit. However, standard IOA considers factor requirements only for cradle-to-gate period.

Imports assumption brings a validity problem, since national input-output accounts are restricted by national boundaries. Typically in IOA, imported products and services are assumed to be produced using the same technologies

used in the domestic industries. However, indirect effects associated with imports, although purely calculatory, can be interpreted in two alternative ways (Mäenpää 1998):

- Indirect environmental burdens associated with imports = how much imports substitute domestic environmental burdens, i.e. how much more environmental burdens would be required in national economy, if imports were substituted by domestic production.
- Indirect environmental burdens associated with imports = overseas environmental burdens associated with imports, if overseas production technologies are exactly the same as in the national economy

Besides the general uncertainties in static input-output framework, there is a basic question of static versus dynamic models. The results of input-output analysis describe the static situation at a given moment using historical average data. Pento (1998) provides critique related to static material flow models with following aspects:

- Since the basic idea of material flow management is to improve the flows of a system from their current state, static material flow model is not an optimal tool. Static model may exacerbate the problem or create more acute problems elsewhere in the flow system.
- The inputs and outputs associated with a static solution do not necessarily give guidance on how the flows should be improved.

This critique is correct with static input-output analysis, although there are some applications of dynamic input-output models too. A comparative static analysis of changes in state from one year to another can be conducted with static IOA, but the dynamics of the technological change cannot be traced (Duchin 1998). In dynamic IOA, the change of coefficients over time must be estimated in order to make predictions and scenarios. Pesonen (1999), in turn, discusses on what static material flow models *can* do:

- Static models are applicable to environmental planning when identifying the areas of improvement.
- Static models can well be used to improve and compare different product or process variations in order to develop them to be more environmentally sound.
- Static models can provide an inventory to assess the environmental impacts of a company's entire production at a certain time.

There are different views about the temporal applicability of input-output tables. James et al. (1978) assume that IO tables can be used for a period of 5 years, but Fankhauser and McCoy (1995) claim that they can be used for 10-15 years. In some industries technological coefficients may change very rapidly,

whereas in some other industries coefficients change slowly. Temporal applicability is a validity issue in IOA, since even the most recent input-output tables and environmental data available are generally several years old.

2.5 Empirical input-output accounts

In this study, extended, disaggregated input-output tables of the Finnish economy were used as the case of the study. Extended input-output table means that traditional monetary input-output tables were extended with environmental and non-financial economic tables. Disaggregated input-output table means that some industry sectors in the national input-output table are disaggregated into more detailed sectors. In this case, Finnish forest sector was disaggregated into 27 industry and product categories, whereas other sectors of the Finnish economy were represented in 25 broader groupings.

2.5.1 Finnish input-output tables and matrix

Original Finnish input-output tables for 1995 published by Statistics Finland (1999) include 33 industries and products. The tables are also available classified according to 68 industries and products, which were used as a basis for classification used in this study. Industry-by-industry input-output table was derived mathematically from supply and use tables. Product-by-industry supply table 1995 at producer's price is presented in appendix 1, whereas product-by-industry use table 1995 at producer's price is presented in appendix 2. Appendix 2 includes both intermediate transaction table, final use table and primary inputs table. Financial economic variables, e.g. value added and operating surplus can be found directly from the primary inputs table. In this study, industry-by-industry input-output tables were used instead of product-by-product input-output tables. Rationale for using industry-by-industry IO-tables is practical one. All data for input-output tables are originally industry-based data. Moreover, all environmental statistics are based on industry classification, not on product classification. Product-by-industry use table 1995 at producer's price for imports is presented in appendix 3. Domestic supply and use tables as well as use table for imports were directly adapted from Holmijoki (2002a, 2002b). Industry-by-industry input-output table 1995 at producer's price is presented in appendix 4. The data are presented as FIM millions.

Coefficients, i.e. industry-by-industry direct requirements matrix is presented in appendix 5, which also includes coefficients for primary inputs, non-financial economic variables and environmental variables. Coefficients in the intermediate transaction table are sums of domestic and imports requirements. All coefficients are expressed relative to million FIM output. Industry-by-industry multiplier matrix 1995 and total factor multipliers excluding imports requirements are presented in appendix 6. The matrix shows

direct and indirect requirements of each industry sector in order to produce worth of million FIM output. In appendix 7, the same matrix is presented with imports requirements. Naturally multipliers are higher in appendix 7 compared to appendix 6. Contribution of industries to domestic value added and domestic operating surplus is presented in appendices 8 and 9. Data on capital coefficients were not available in this study, since Statistics Finland does not provide capital table. Obviously total factor multipliers would be slightly higher with domestic and imported capital multipliers. Industry classification and corresponding product classification used in the study are presented in tables 1 and 2. Lines 1-27 of table 1 describe disaggregated industry and product groups of the Finnish forest sector. Similarly, lines 28-52 of table 2 describe other sectors of the Finnish economy in more aggregate groupings.

TABLE 1 Disaggregated industry and product classification of the Finnish forest sector used in the study (adapted from Holmijoki 2002a, Holmijoki 2002b)

Industry classification		**Product classification**	
1	Forestry	1	Saw log, pulpwood and firewood
2	Sawmilling, planing and impregnation of wood	2	Sawn timber, chips, sawdust and other wood residues
3	Manufacture of plywood and veneer sheets	3	Plywood and veneer
4	Manufacture of particle board and fibreboard	4	Particle board and fibreboard
5	Manufacture of wooden houses	5	Prefabricated wooden houses
6	Manufacture of builders' joinery and carpentry	6	Builder's joinery and carpentry
7	Manufacture of wooden containers	7	Wooden containers
8	Manufacture of other wood products	8	Other wood products
9	Manufacture of chemical pulp	9	Chemical and semi-chemical pulp
10	Manufacture of mechanical pulp and newsprint	10	Newsprint and mechanical pulp
11	Manufacture of uncoated magazine paper	11	Uncoated magazine paper
12	Manufacture of coated magazine paper	12	Coated magazine paper
13	Manufacture of fine paper	13	Fine paper
14	Manufacture of kraft paper and other paper	14	Kraft paper and other paper
15	Manufacture of paperboard	15	Paperboard
16	Manufacture of corrugated board and paperboard containers	16	Corrugated board and paperboard containers
17	Manufacture of paper and paperboard products excluding paperboard containers	17	Paper and paperboard products excluding containers
18	Publishing and printing of newspapers	18	Newspapers
19	Publishing of books, magazines and other printed matter	19	Books, magazines and other printed matters
20	Manufacture of chairs and seats, use of wood	20	Wood chairs and seats
21	Manufacture of office and shop furniture, use of wood	21	Wood office and shop furniture
22	Manufacture of kitchen furniture, use of wood	22	Wood kitchen furniture
23	Manufacture of other furniture, use of wood	23	Other wood furniture
24	Construction of new buildings, use of wood	24	Wood products in new buildings
25	Renovation of buildings, use of wood	25	Wood products in repairs of buildings
26	Do-it-yourself construction and renovation, use of wood	26	Wood products in do-it-yourself buildings and repairs of buildings
27	Electricity and hot water supply, use of wood	27	Electrical energy and heat produced by wood

TABLE 2 Aggregated industry and product classification of the Finnish economy used in the study, excluding forest sector (adapted from Holmijoki 2002a, Holmijoki 2002b)

28	Agriculture, hunting & fishing	28	Products of agriculture, hunting & fishing
29	Mining and quarrying	29	Products from mining and quarrying
30	Manufacture of food products, beverages and tobacco	30	Food products, beverages and tobacco
31	Manufacture of textiles, wearing apparel and leather products	31	Textiles, wearing apparel and leather products
32	Reproduction of recorded media	32	Recorded media
33	Manufacture of coke, refined petroleum products and nuclear fuel	33	Coke, refined petroleum products and nuclear fuel
34	Manufacture of chemicals and chemical products	34	Chemicals and chemical products
35	Manufacture of rubber and plastic products	35	Rubber and plastic products
36	Manufacture of other non-metallic mineral products	36	Other non-metallic mineral products
37	Manufacture of basic metals and metal products	37	Basic metals and fabricated metal products
38	Manufacture of machinery and equipment	38	Machinery and equipment
39	Manufacture of electrical machinery and apparatus	39	Electrical and optical equipment
40	Manufacture of motor vehicles	40	Transport equipment
41	Manufacture of furniture, excluding manufacture of wood furniture, manufacturing n.e.c. and recycling	41	Furniture, excluding wood furniture, manufactured goods n.e.c.
42	Electricity, gas and steam supply, excluding wood-based supply	42	Electricity, gas and steam, excluding electricity and heat produced by wood
43	Collection, purification and distribution of water	43	Water
44	Construction, excluding wood construction	44	Construction work, excluding wood construction work
45	Wholesale and retail trade	45	Wholesale and retail trade services
46	Hotels and restaurants	46	Hotel and restaurant services
47	Land transport; transport via pipelines	47	Land transport services; transport services via pipelines
48	Water transport	48	Water transport services
49	Other transport; post and telecommunications	49	Other transport services; post and telecommunications services
50	Financial intermediation and insurance	50	Financial intermediation and insurance services
51	Real estate, renting and business activities; research and development	51	Real estate, renting and business services; research and development services
52	Community, social and other service activities	52	Community, social and other services

2.5.2 Disaggregation of the forest sector

68 industry classification provided by Statistics Finland includes only six industries which belongs to forest sector as such. Manufacture of furniture, for example, includes all kinds of furniture (wood, plastic, metal). Classification used in this study makes difference between wood-based furniture and other furniture. Similarly, wood-based electricity and hot water supply is separated from electricity, gas and steam supply sector and use of wood in construction and renovation is separated from construction with other materials.

With respect to Finnish forest sector, industry is an appropriate basic unit for an analysis, since disaggregated industries in the forest sector are relatively homogeneous. Table 3 shows that secondary products typically have only a small share of the industry output, while most of the industry output consists of primary products. It can be concluded, that industry output and product output are very similar in the Finnish forest sector, i.e. disaggregated industries can be characterized very well by their primary products. The table also provides an overview on production quantities in monetary terms. Manufacture of chemical

pulp, forestry and manufacture of coated magazine paper are the most important industries in terms of value.

TABLE 3 Industry output divided into primary and secondary products in the Finnish forest sector (adapted from Holmijoki & Paloviita 2002)

FS	Industry classification	Industry output in 1995, mill FIM in producers price			Share of primary product in output, %
		Primary products	Secondary products	Output	
1	Forestry	14 382	0	14 382	100,0
2	Sawmilling, planing and impregnation of wood	12 092	547	12 639	95,7
3	Manufacture of plywood and veneer sheets	2 838	379	3 217	88,2
4	Manufacture of particle board and fibreboard	742	51	794	93,5
5	Manufacture of wooden houses	1 164	152	1 316	88,4
6	Manufacture of builders' joinery and carpentry	2 674	193	2 867	93,3
7	Manufacture of wooden containers	497	37	535	93,0
8	Manufacture of other wood products	238	34	273	87,4
9	Manufacture of chemical pulp	15 356	1 026	16 381	93,7
10	Manufacture of mechanical pulp and newsprint	4 491	671	5 162	87,0
11	Manufacture of uncoated magazine paper	7 271	1 087	8 358	87,0
12	Manufacture of coated magazine paper	12 441	1 859	14 300	87,0
13	Manufacture of fine paper	8 942	1 336	10 279	87,0
14	Manufacture of kraft paper and other paper	7 125	1 065	8 190	87,0
15	Manufacture of paperboard	8 648	1 292	9 941	87,0
16	Manufacture of corrugated board and paperboard containers	2 056	455	2 512	81,9
17	Manufacture of paper and paperboard products excluding paperboard containers	2 384	419	2 803	85,1
18	Publishing and printing of newspapers	3 477	3 346	6 823	51,0
19	Publishing of books, magazines and other printed matter	10 228	2 729	12 956	78,9
20	Manufacture of chairs and seats, use of wood	535	606	1 141	46,9
21	Manufacture of office and shop furniture, use of wood	358	149	507	70,6
22	Manufacture of kitchen furniture, use of wood	785	153	938	83,7
23	Manufacture of other furniture, use of wood	1 155	142	1 256	88,7
24	Construction of new buildings, use of wood	2 290	0	2 290	100,0
25	Renovation of buildings, use of wood	5 649	0	5 649	100,0
26	Do-it-yourself construction and renovation, use of wood	2 721	0	2 721	100,0
27	Electricity and hot water supply, use of wood as fuel	1 116	84	1 200	93,0

I had a possibility to become familiar with these input-output tables in a research project called "Total value of wood-based products in the forest sector", which was conducted by the Helsinki University of Technology. The research project included a research coalition of expert organizations of the Finnish forest sector, which compiled industry-specific environmental data. The project was intended to produce empirical extended input-output tables with disaggregated forest sector and to build a model for decision-making at national level. The project was a part of the Finnish Forest Cluster Programme Wood Wisdom and the project "Environmental and Economic Material Flow

Analysis EEMA" conducted by University of Jyväskylä. As I worked in the project as a researcher, I got all material which was used to compile extended input-output tables. I also had numerous fruitful conversations with my colleague at the Helsinki University of Technology on data collection, compilation of input-output tables and presentation of the results. For this particular research, extended input-output tables produced in the project were used as such. However, some additional data gathering related to environmental variables was needed.

2.5.3 Non-financial economic table and matrix

Appendix 4 also includes sectoral data on non-financial economic variables as extra rows of the industry-by-industry input-output table. In this study, non-financial economic table includes only two vectors: number of domestic employees and domestic working hours (1000 hours). Non-financial economic data were adapted directly from Holmijoki (2002a, 2002b). Coefficients for number of domestic employees and working hours are presented as extra rows of the coefficient matrix in appendix 5. Correspondingly, multipliers for number of domestic employees and working hours are presented in the multiplier matrix in appendix 6. In appendix 7, multipliers include also employees and working hours abroad. Contribution of industries to number of domestic employees and domestic working hours is presented in appendices 10 and 11.

2.5.4 Environmental table and matrix

Appendix 4 includes sectoral data on environmental variables as extra rows of the table. In this study, environmental table includes seven vectors: carbon dioxide emissions from fossil fuels and processes (tons), methane emissions (tons), nitrous oxide emissions (tons), CO_2 equivalent tons, sulphur dioxide emissions (tons), nitrogen oxides emissions (tons) and SO_2 equivalent tons. For industry sectors 1-27 (forest sector) environmental data were directly adapted from Holmijoki & Paloviita (2002). "Total value" –project utilized environmental data collected by several Finnish expert organizations, which are involved with the forest sector. Organizations had common instructions for compiling average site-level LCA for the most common product/ products within each industry, produced by an average technology. Total direct environmental burden by industry was then derived by reconciling total production amounts of primary products and secondary products within each industry. Thus the total direct environmental burden by industry may be based on several average LCA's, depending on the product range of an industry. For industry sectors 28-52 (other sectors within national economy) environmental statistics data were compiled from the electronic file provided by Statistics Finland (2002). Moderate aggregation of Statistics Finland data was required in order to fit the data to 52 x 52 input-output table. Coefficients for GWP and AP are presented as extra rows of the coefficient matrix in appendix 5. GWP and

AP multipliers, in turn, are presented as extra rows of the multiplier matrix in appendix 6. In appendix 7, GWP and AP multipliers include also GWP and AP generated abroad. Contribution of industries to Global Warming Potential (GWP) and Acidification Potential (AP) is presented in appendices 12 and 13.

2.5.5 Source data uncertainty

In this study, source data uncertainty stems from national input-output tables, disaggregated forest sector data, environmental data sources and compilation of environmental data into input-output framework. Data for input-output tables are collected in industry surveys and that data undergo a number of transformations (Lenzen 2001b). Uncertainty of monetary input-output data, which is compiled by Statistics Finland, is therefore difficult to evaluate. Disaggregation of original monetary input-output data into more detailed industry classification of the forest sector also introduces uncertainties. Since disaggregation of input-output data is often very time-consuming effort, number of shortcuts has been made in compilation of disaggregated input-output tables.

Following discussion on disaggregation uncertainty is partly based on conversations with my colleague at the Helsinki University of Technology, who actually carried out the disaggregation. For example, disaggregation of paper industry has been done by using same technical coefficients of primary inputs for manufacture of mechanical pulp and newsprint (industry class 10), uncoated (11) and coated (12) magazine paper, fine paper (13), kraft paper and other paper (14) and paperboard (15). The reason for this is that there were not required data available for disaggregation of primary inputs. Thus relative value added, operating surplus, number of employees and working hours remains the same for all different paper products. Moreover, forestry (1) as one single sector consists of saw-timber and pulpwood. This means that saw-timber worth of million FIM purchased by sawmilling is considered same as pulpwood worth of million FIM purchased for manufacture of chemical pulp. Sawmilling (2), in turn, produces sawn wood as well as chips, bark and sawdust as by-products. This means that sawn wood worth of million FIM purchased by manufacture of wooden containers is considered same as chips, bark and sawdust worth of million FIM purchased for manufacture of chemical pulp. In addition, disaggregation of furniture sector into wood furniture (20-23) and other furniture (41), disaggregation of construction sector into use of wood (24-26) and other materials (44) as well as disaggregation of electricity, gas and steam supply into use of wood (27) and other fuels (42) involves high uncertainties. That's because pure wood-based products are rare and thus they form practically rather hypothetical "industries". Moreover, electricity, gas and steam supply as one sector does not make a difference between different types of energy suppliers.

Annually changing price levels introduce new coefficients in input-output accounting framework. For example, unit value of sawn goods in 1995 was exceptionally low (Metsäntutkimuslaitos 2003), which leads to relatively higher

environmental and employment coefficients in sawmilling in 1995. On the other hand, unit value of sulphate pulp was exceptionally high in 1995 (Metsäntutkimuslaitos 2003), which leads to relatively lower environmental and employment coefficients in manufacture of chemical pulp in 1995. Hence, comparison between different years requires careful consideration of price levels. In this study, however, only static snapshot was conducted and the comparisons were made between industries within one year.

Uncertainty in environmental data depends on the expert organisation, which have produced the data. Organisations are dependent on their diverse set of databases and the modelling methods available. Results concerning environmental burdens of industries in the forest sector were reported in different format by different organisations. In addition, environmental data for industries beyond the forest sector was based on official statistics rather than tailor-made modelling for the "Total value" –project. Compilation of environmental data from hypothetical average production site into industry-level input-output framework is another issue of uncertainty. Industry surveys would probably introduce different environmental data.

3 SUSTAINABILITY INDICATORS

3.1 Business, society and the environment

3.1.1 Economic, environmental and social dimension: the triple-bottom line

The three key players in the field of sustainable development are business, society and the environment. Business includes economic actors, such as companies and industries. Society in large, i.e. citizens, is represented by governments and non-governmental organizations (NGO's). Environment, on the other hand, may or may not be considered as a stakeholder. In fact, business can be considered as part of the society, whereas business and society together can be seen as part of the natural environment. Conventionally economic issues have been raised by business actors, whereas environmental and social issues have been issued by other societal groups. However, in the world of globalization and integration, all three dimensions of sustainable development, economic, environmental and social, have become equally relevant issues for both business and society.

Sustainability is a crucial issue both at global, national and regional level, as well as in business, covering industries, companies, production sites and products. So-called triple bottom-line can be defined as environmental, social and financial accountability of the company, which is related to economic prosperity, environmental quality and social justice (Elkington 1997). According to Elkington (1997) "revolutions" are needed in markets (from compliance with sustainability regulations to market competition in the spirit of regulations), values (other than hard accounting values), transparency (openness), life cycle technology (upstream and downstream in supply terms), partnerships (supply chain, customers, wider community), time (importance of long view) and corporate governance (building triple bottom line into corporate "DNA"). The three dimensions of the triple-bottom-line are inter-related, as shown in figure 3. Dyllick & Hockerts (2002) argue that economic, natural and social capital are relevant within the concept of corporate sustainability, which leads to six

criteria: eco-efficiency, socio-efficiency, eco-effectiveness, socio-effectiveness, sufficiency and ecological equity. Moreover, actions taken at micro-level (e.g. companies) and at macro-level (e.g. governments) are inter-related. Especially sustainability partnerships between business and wider community require effective dialogue and communication, as figure 3 illustrates.

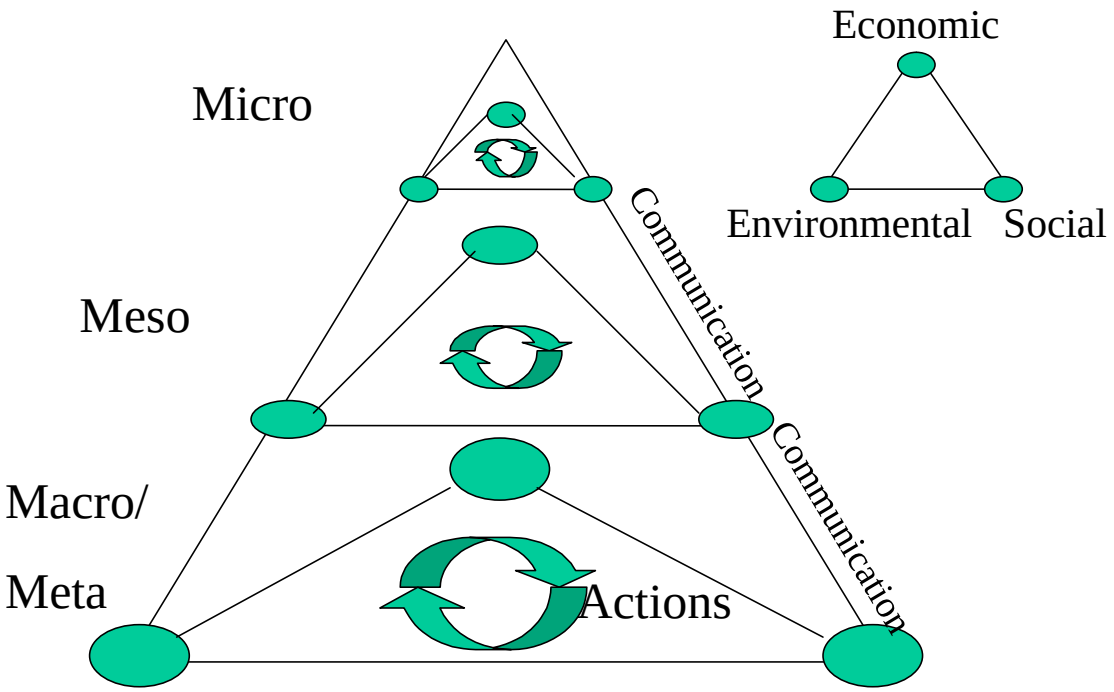

FIGURE 3 Dialogue on sustainability (Kuhndt et al. 2002)

Considering initiatives at different levels improves and enhances the dialogue between actors at micro- and macro-level. Dialogue between business, governments, civil organisations and other relevant stakeholders cannot be effective with one pair of spectacles only. Understanding the links between actions at micro-level and macro-level makes communication easier. Integration of sustainability performance to business practices may enable companies to reduce risks and increase opportunities. Potential cost savings, image improvements and competitive advantage related to environmental and social performance motivate companies to environmentally and socially sustainable development along with economic development.

3.1.2 Sustainability initiatives for business development

There are number of sustainability initiatives, agendas and documents at different levels, which are relevant for sustainable development. Many sustainability initiatives focus either on economic, environmental or social dimension of sustainability. Some initiatives consider two dimensions or all three dimensions. Table 4 provides an overview of selected international

initiatives and documents relevant to sustainable business development and their core mission. Sustainability initiatives in table 4 are all relevant to sustainable business development, although many of them are originally macro-level initiatives. Macro-level initiatives are important to companies, as they address broader sustainability debate at global, national and regional level. Global level initiatives are becoming more and more important because of globalization and multi-national enterprises.

TABLE 4 Selected initiatives/ documents for sustainable business development and their core mission (Kuhndt et al. 2002)

Leading Organization	Initiative/ Document	Core Mission
United Nations (UN)	Agenda 21	-provide a comprehensive plan of action to be taken globally, nationally and locally by organisations of the United Nations Systems, Governments, and Major Groups in every area in which there are human impacts on the environment.
Commission on Sustainable Development (CSD)	Indicators for Sustainable Development: Framework and Methodologies	-provide a framework for the development and selection of sustainability indicators to monitor progress towards sustainable development at the national level -ensure a high level of practicability and acceptance through intensive pilot testing
International Labour Organization (ILO)	ILO Standards	-establish norms covering all aspects of working conditions and industrial relations -ensure that member countries respect, promote and realise these norms, especially the principles concerning the fundamentals rights at work
Organization for Economic Co-operation and Development (OECD)	The OECD Guidelines for Multinational Enterprises (MNEs)	-encourage responsible business practices -enhance MNE's contribution to sustainable development -strengthen government-business relationships
EU Commission	European Commission's Green Paper on Corporate Social Responsibility (CSR)	-initiate a wide debate on CSR at all levels -development of a CSR framework (in the long term)
United Nations (Secretary General)	UN Global Compact	-build the social and environmental pillars required to sustain the new global economy -make globalisation work for all the world's people, based on commitment to universal principles
Global Reporting Initiative (GRI)	Sustainability Reporting Guidelines on economic, environmental and social performance	-forge the link between environmental and economic performance -elevate sustainability reporting to a level equivalent to financial reporting through a standardized reporting framework
International Organization for Standardization (ISO)	ISO 14031	-offer an internal management tool designed to provide management with reliable and verifiable information on an ongoing basis to determine whether an organisation's environmental performance is meeting the criteria set by management
Social Accountability International (SAI)	SA 8000	-improve labour conditions through a human workplace standard, a verification system and public reporting
Accountability. Institute of Social and Ethical Accountability.	AA 2000. Consultation briefing 1	-improve the accountability and overall performance of organizations by increasing quality of social and ethical accounting, auditing and reporting
United Nations Environment Programme (UNEP)	UNEP's Financial Institutions Initiative	-engage a broad range of financial institutions in a constructive dialogue about sustainable development issues -identify, promote, and realise the adoption of best sustainability practice at all levels of financial institution operations

(continues)

TABLE 4 (continues)

Dow Jones Sustainability Group Indexes (partnership of Dow Jones & Company with Sustainable Asset Management (SAM)	SAM Questionnaire	-ranking of sustainability leader companies for investments purposes according to their management of sustainability opportunities and risks
International Chamber of Commerce (ICC)	ICC Business Charter for Sustainable Development	-encourage continuous improvement in environmental management and practice -commitment of the widest range of enterprises to the charter's principles -assist enterprises in fulfilling their commitment
World Business Council for Sustainable Development (WBCSD)	Measuring Eco-Efficiency	-reduce business impact on the environment while continuing to grow and develop
	Corporate social responsibility: making good business sense	-increase the understanding of CSR in the business community, including the following aspects: interdependent nature of the business-society relationship, contribution of CSR to long-term prosperity, the role of stakeholder dialogue -offer a navigator to guide companies in the implementation of CSR in daily business practice
Corporate Social Responsibility Europe (CSR Europe)	Communicating Corporate Social Responsibility	-encourage companies to voluntary external reporting on social and environmental performance across all company operations -encourage companies to use a variety of communication methods -provide a CSR reporting approach
Amnesty International (AI) and Prince of Wales Business Leaders Forum (PWBLF)	Human rights – is it any of your business?	-inform companies on business relevant human rights aspects -assist companies in developing adequate human rights policies

Environmentally sustainable development has been in the headlines since 1987, when the World Commission on Environment and Development of the United Nations, chaired by the Prime Minister Gro Harlem Brundtland, published the report "Our Common Future". It was followed by a summary statement Agenda 21, which was provided by the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. Agenda 21 defined the policy for environmentally sustainable development and became starting point for global and national environmental policies. More recently, many initiatives have broadened the concept sustainable development to cover also socially sustainable development.

At the company level, Agenda 21 directs business operations towards sustainability, and requires environment to be integrated in all decision-making (Helminen 1998). UNEP, GRI, ISO 14031, WBCSD Eco-efficiency project and OECD initiative are typical internationally relevant frameworks, whereas e.g. the initiative of The European Chemical Industry Council is typical sector-specific initiative. Responsible Care Program of chemical industry includes recommendations for environmental, safety and health indicators (CEFIC 2003). Many of the initiatives and guidelines for sustainability listed above are applied only in specific geographic area. PERI and GEMI, for example, are North American initiatives, whereas CEFIC, PWBLF and SVN are European initiatives. Thus, business sustainability indicators are developed simultaneously in different regions by many different business communities

and non-financial organizations. One of the main purposes of initiatives is to provide standards and guidelines to companies/ industries for developing policies, measurement, reporting, implementation of corporate responsibility and improving corporate environmental management.

3.1.3 Sustainability measurement and indicators

Often repeated phrase "You can't manage what you don't measure" is commonly used in the context of sustainability. Sustainability indicators (or indicators of sustainable development) are the main tools in measuring sustainability. According to James (1994), five main driving forces in the pressure for business environmental performance measurement are the biosphere (1), financial stakeholders (2), non-financial stakeholders (3), buyers (4) and the public (5). Many sustainability initiatives also include a selection of sustainability indicators. For example, sustainability indicators are included in sustainability reporting guidelines of GRI. Hart (1999) defines indicator as follows: "Indicator is something that helps us to understand where we are, which way we are going, and how far we are from where we want to be. A good indicator alerts us to a problem before it gets too bad and helps us recognise what needs to be done to fix the problem." On the basis of article 40 of Agenda 21, "Information for decision-making", UN Commission on Sustainable Development started development of indicators in 1995.

Companies themselves are becoming more active in developing their own sustainability indicators. Ranganathan (1998) listed 23 corporate sustainability initiatives, which are relevant for environmental performance measurement, 18 corporate sustainability initiatives, which are relevant for social performance measurement and 6 corporate sustainability initiatives, which are relevant for integrated measures of business sustainability. Global Reporting Initiative (GRI) is one of the initiatives, which is relevant for integrated measures of business sustainability. Dow Eco-Compass and Storebrand Scutter Environmental Value Fund represent company-specific initiatives (Ranganathan 1998). For example, PERI (Public Environmental Reporting Initiative) is developed by a group of companies such as IBM and Nortel. PERI seeks to include concepts from other indicator designs such as GRI in more operational way. Public Environmental Reporting Initiative Criteria include organizational profile, environmental policy, environmental releases, resource conservation, environmental risk management, environmental compliance, product stewardship or product life cycle management, employee recognition and reward programs and stakeholder involvement (IBM 2003).

3.2 Common characteristics of sustainability indicators

As explained above, sustainability indicators have been developed at different levels: global level, national level and company level. Regardless of the level, there are some common characteristics in sustainability indicators, which are discussed in the following.

3.2.1 Economic, environmental, social and integrated indicators

Sustainability indicators are intended to measure the three dimensions of sustainable development: economic, environmental and social. There are more established frameworks for environmental indicators than for economic or social indicators. According to Kuhndt et al. (2002), there is most international consensus on environmental information, because environmental information and indicators have been in public discussions and scientific reviews for over 20 years. Environmental indicators of companies are often presented in environmental reports, separately from annual reports. More recently, corporate responsibility reports have replaced environmental reports in many companies, including information on economic, environmental and social performance.

Modelling framework is required for deriving appropriate sustainability indicators. DPSIR framework (Drivers-Pressures-State-Impact-Responses) and its variants (DPR, PSR) represent a causal framework with a systems analysis view of the relations between the environmental system and the human system (Warhurst 2002, Kuhndt et al. 2002). Social and economic activity exerts pressure (emissions, consumption, health risks) on the environment, causing changes in the state of the environment (concentrations, amounts), which may lead to impacts that require a response. The response (community's response and reactions) modifies the driving forces, reducing pressure and impacts. (Warhurst 2002, Rosenström & Palosaari 2000.) Thus, DPSIR framework is applicable mainly for modelling environmental issues. DPSIR framework has been developed by OECD and various organizations and it is used by European Environment Agency, most nations and international bodies reporting on the environment (Warhurst 2002).

The project level equivalent of the DPSIR framework, Input-Output-Outcome-Impact framework, is used by World Bank and related organizations (Warhurst 2002). Domain-based frameworks, such as the category-aspect approach used by GRI, ISO and the WBCSD, are applicable for all three dimensions of sustainability, i.e. for modelling environmental, economic and social issues (Kuhndt et al. 2002, Warhurst 2002). In category-aspect approach, categories include broad areas of issues, such as air, energy, labour practices and local economic impacts. Aspects, in turn, include information that is related to categories, such as climate change, acidification, financial development and

the workforce. Table 5 shows sustainability aspects, which are included in Sustainability Reporting Guidelines by GRI.

TABLE 5 Sustainability aspects in GRI framework (GRI 2002)

Aspects of economic performance	**Aspects of environmental performance**	**Aspects of social performance**
Customers (e.g. net sales)	Materials (e.g. materials use)	*Labour practices and decent work:* employment, health and safety, training and education etc.
Suppliers (e.g. cost of all goods)	Energy (e.g. direct and indirect use)	
Employees (e.g. total payroll)	Water (e.g. total water use)	
Providers of capital (e.g. interest)	Biodiversity (e.g. land owned)	*Human rights* : strategy and management, non-discrimination, child labour, bribery, corruption etc.
Public sector (e.g. taxes)	Emissions, effluents and waste	
Indirect economic performance	Suppliers (performance of suppliers)	
	Products and services (e.g. impacts)	*Product responsibility* : customer health and safety, products and services, advertising, respect for privacy
	Compliance (incidends and fines)	
	Transport (significant impacts)	
	Overall (env. expenditures)	

So called in-house indicators are typically used by companies responsible for the development of indicators and they are implemented at specific sites or at company level (Warhurst 2002). In-house indicators are also applicable for modelling economic, environmental and social issues.

ISO 14031 (ISO 1998b) standard divides environmental indicators into Environmental performance indicators (EPI) and Environmental condition indicators (ECI). EPIs, in turn, are divided into management performance indicators and operational performance indicators.

- Management performance indicators (MPI) provide information on the organization's capability and efforts in managing matters such as training, legal requirements, resource allocation, documentation and corrective actions.
- Operational performance indicators (OPI) provide information on the consumption of materials, services, resources and energy and on the output of products/ services and waste (e.g. air emissions, water discharge, solid waste, noise, vibrations, odour, light or radiation). OPIs can be further divided into absolute and relative OPIs.
- Environmental condition indicators (ECI) provide evaluation of the condition of the environment that can be influenced by the company's activity and on the changes induced by the company's activity.

Based on initiatives of ISO 14031, GRI and WBCSD, Kolk and Mauser (2002) identified three main components of environmental performance evaluation: environmental management indicators (EMIs), environmental condition indicators (ECIs) and environmental performance indicators (EPIs). These components are shown in figure 4.

Environmental Management Indicators (EMIs):
Includes management efforts to influence an organisation's environmental performance, such as those with regard to:
- Vision, strategy, policy
- Organisational structure related to environmental management
- Management commitment to environmental issues
- Communication to internal and external stakeholders

Environmental Performance Indicators (EPIs):
- *Environmental Operational Indicators*; involves specific actions, such as:
  - Procurement measures
  - Technical product/process measures
  - Product/service use measures
- *Environmental Impact Indicators*; involves 'outputs', for example:
  - Energy consumption
  - Water consumption
  - Greenhouse gas emissions
  - Materials consumption
  - Total waste

Environmental Condition Indicators (ECIs)
Examples include:
- At the local, national or international levels: thickness of ozone layer, average global temperature, size of fish populations in oceans
- At the local or regional levels: concentration of a specific contaminant in air, soil, groundwater or surface water; population density or noise levels in a plant's surroundings

FIGURE 4 Components for environmental performance evaluation (Kolk & Mauser 2002)

Tyteca et al. (2002) developed three main types of environmental performance indicators (EPI) in their MEPI (Measuring Environmental Performance of Industry) project.

- Physical indicators (materials and energy inputs and outputs from production process or product use)
- Business/management indicators (link physical aspects of environmental performance to information on business performance or with indicators describing efforts of environmental management within a firm)
- Impact indicators (relate physical output data to potential environmental impacts)

With respect to economic sustainability indicators, Warhurst (2002) characterises indicators by financial/ non-financial indicators and by principal stakeholders (table 6). This characterization includes same aspects as the GRI aspects shown in table 5. Pure economic indicators are typically presented in annual reports of companies illustrating profitability of operations as well as investments and assets. Accounting at corporate level differs from the accounting at national level, since financial/ economic targets are different.

Shareholders of the company also require specific information. Many conventional economic indicators do not directly indicate sustainability, since they often indicate short term performance and development of share value. However, good economic performance provides a good basis for environmental and social operations.

TABLE 6 Economic indicator characterisation (Warhurst 2002)

Issue categories	**Examples of indicators**	**Financial or non-financial**	**Principal stakeholders**
Financial performance	Profitability	F	Company
	Economic value added	F	Shareholders
Competitiveness	Relative market share	N-F	Company
	Sales growth	F	Shareholders
Quality of service	Reliability	N-F	Company Business customers
Flexibility	Volume and delivery flexibility	N-F	Company Business customers
Resource utilisation	Productivity	N-F	Company
	Resource efficiency	N-F	
Innovation	R&D investment	F	Company
Supply chain impacts	Contribution to supply chain businesses	F	Supplier business Customer businesses
Local economy impacts	Contribution to local economy	F	Local community
Taxation	Contribution to tax revenues	F	Central and local government National and local community
Corporate social investment	Corporate philanthropic donations	F	Local community Other recipients
Employment	Primary employment	N-F	Company employees Supply chain employees Local community

Many initiatives for sustainability indicators have been criticized because of the lack of social dimension (see e.g. Veleva and Ellenbecker 2000). The social dimension concerns an organization's impacts on the social systems within which it operates. However, measurability of corporate social and human capital and socio-economic business performance indicators (Corporate Human Development Index CHDI) have been studied by Spangenberg and Bonniot (1998) at the Wuppertal Institute. In addition, GRI (2002) provides guidelines for measuring social performance, although social performance measurement enjoys less of a consensus than environmental performance measurement. In this study, however, social dimension of sustainability is out of the scope.

Warhurst (2002) provides a summary of indicator types and their applicability to environmental, social and economic issues (table 7). It can be noted that all indicator types in table 7 are applicable to environmental issues. Many indicator types are applicable also for economic issues, whereas only descriptive, performance and economic indicators can be applied to social issues. Hence, descriptive, performance and economic indicators can be

considered as most suitable indicators for measuring sustainability, as they can be applied to economic, environmental and social issues.

TABLE 7 Summary of indicator types (Warhurst 2002)

Indicator type	Overview	Application Environmental	Social	Economic
Descriptive	Descriptive indicators can relate to drivers, pressure, state, impact or response. Quantitative and qualitative indicators describe the factual situation, but do not assess whether this is good or bad - they are in practical terms a statement of fact	Yes	Yes	Yes
Performance	Performance indicators compare the actual situation with targets, allowing progress towards such targets to be measured. Relevant targets include those set at national and international levels, and voluntary targets that relate to more explicitly to sustainable development (SD)	Yes	Yes	Yes
Efficiency	Efficiency indicators provide insights into the efficiency of processes and product use. They are largery limited to environmental applications	Yes	No	No
Sustainable reference values	These relate to target levels of environmental quality set from the specific perspective of SD. At present, only environmental SRVs are available, and these relate to acid deposition and air quality	Yes	No	No
Production	Production-related indicators are drawn from standard engineering approaches to process management and relate to both environmental and economic aspects of production process. These indicators are limited in the scope of their application, representing as they do a narrow focus, largely internal to the company	Yes	No	Yes
Regulatory	Regulatory indicators are drawn from consideration of legal compliance and typically are limited to the environmental dimension. The use of regulatory indicators fails to capture the significance "beyond compliance" and are static relative to the kinetic SD process	Yes	No	No
Accounting	Accounting indicators may be used for internal or external reporting with a focus on liability management, and efficient and transparent tracking of costs associated with waste production, management and disposal	Yes	No	Yes
Economic	Economic indicators can be used to value external environmental and social costs and allow their internalisation. These are potentially powerful tools and are an essential input to any life cycle-based assessment of environmental performance	Yes	Yes	Yes
Quality	Similar to production-related indicators, quality-based indicators have as their focal point waste minimisation during the production process	Yes	No	Yes
Ecological	Ecological indicators relate to the local, regional, national and international impacts on ecosystem health resulting from all aspects of human activity	Yes	No	No

In addition to separate economic, environmental and social indicators, GRI (2002) suggests integrated indicators, namely cross-cutting indicators and systemic indicators. In other words, integrated performance can be seen as a fourth dimension of sustainability. Systemic indicators provide an understanding of the degree to which the organization's performance may influence the performance of a larger system. These indicators are very important in terms of overall sustainability, since companies cannot be looked at independent from the system it operates. Cross-cutting indicators, in turn, directly relate two or more dimensions of economic, environmental and social performance as a ratio (GRI 2002). Systemic and cross-cutting indicators are discussed in more detail in the section "Absolute and relative indicators".

3.2.2 Core and supplemental indicators

There are sustainability indicator initiatives, which can be applied at all levels: global, national, regional, business and product. However, specific indicators at different levels are also needed in order to reflect specific characteristics of specific nations, companies or industries. OECD, for example, divides its environmental indicators into core, sectoral and key environmental indicators.

Core environmental indicators cover major environmental issues, whereas sectoral environmental indicators supplement core indicators and focus on specific sectors e.g. transport, energy, household consumption and agriculture (OECD 2003). Warhurst (2002) divides sustainability indicators more generally "off the shelf" top-down indicators and "tailor made" bottom-up indicators. Off the shelf indicators refer to international or national, generally applicable core indicators, whereas tailor made indicators refer to company-specific, industry specific or site-specific indicators. Global sustainability indicator initiatives, such as GRI, are important, as they provide commonly accepted frameworks and systematic procedures for sustainable development at all levels. International initiatives often provide core indicators or generic indicators, which are applicable everywhere in any business. National and regional initiatives are important, since not all internationally defined indicators are suitable for measuring sustainable development at national level. Accordingly, companies operating in specific countries and regions have to take national and regional sustainability indictor initiatives into account.

3.2.3 Quantitative and qualitative indicators

Accounting frameworks for economic, environmental and social aspects are similar: they measure inputs and outputs of basic accounting unit with different metrics, i.e. units of measurements. For example, indicator may measure greenhouse gas emissions (tons), turnover (€) or number of salaried employees and workers. However, many sustainability issues, especially social aspects, are not easily quantifiable and they thus require qualitative description. Hence, several of the social performance indicators differ considerably in nature from economic and environmental performance indicators (GRI 2002). For example, sustainable development contains qualitative factors such as happiness and satisfaction, which are hard to quantify (Rosenström & Palosaari 2000). In addition, it is very difficult to obtain quantitative data for some aspects. Veleva and Ellenbecker (2000) state, that both quantitative and qualitative indicators should be used to encompass important sustainability issues.

3.2.4 Absolute and relative indicators

Sustainability performance information can be provided in terms of absolute figures and relative measures (definition according to GRI 2002) or adjusted measures (definition by Veleva & Ellenbecker 2001). Absolute figures provide information on the size of an impact, value or achievement, as well as on the magnitude of the reporting organization's contribution to an overall effect (GRI 2002). Relative figures are ratios between two absolute figures of the same or different kind and they allow comparisons of similar products or processes and comparisons of two different firms or industries (GRI 2002). Ratios between two different dimensions are called as cross-cutting indicators (GRI 2002). Cross-cutting indicators provide a ratio of two or more aspects of economic, environmental and social performance. These indicators can measure eco-

efficiency, socio-economic performance or socio-environmental performance. Three general types of ratio indicators are productivity/ efficiency ratios, intensity ratios and percentages (GRI 2002), which are defined as follows:

- productivity/ efficiency ratios: relate value to impacts; increasing ratios reflect improvements in the amount of value received per unit of impact
- intensity ratios: express an impact per unit of activity or unit of value; a declining intensity ratio reflects performance improvement
- percentages: ratio between two like issues, with the same physical unit in the numerator and denominator

Eco-efficiency indicator, for example, links two dimensions of sustainable development: economic and environmental. The World Business Council for Sustainable Development (WBCSD) defines eco-efficiency as the following basic ratio (Lehni 2000):

$$\text{eco-efficiency} = \frac{\text{product or service value}}{\text{environmental influence}}$$

The purpose of corporate eco-efficiency is to provide more value with less environmental impact. Value can be measured as a mass of production, net sales (turnover), profitability, value added (labour and capital), gross margin or EBIT (Earnings Before Interests and Taxes), for example. On the other hand, Pollution Prevention and Control working group of OECD defines eco-efficiency as "a management strategy based on quantitative input-output measures which seeks to maximise the productivity of energy and material inputs in order to reduce resource consumption and pollution/waste per unit output and to generate cost saving and competitive advantage" (KTM 1998, 14).

ISO 14031, in turn, identifies five different quantitative measures: direct, relative, normalized/indexed, aggregated and weighted (ISO 1998b), which are defined as follows:

- direct measures: basic data or information, e.g. tonnes of contaminant emitted
- relative measures: data or information compared to or in relation to another parameter, e.g. tonnes of contaminant emitted per tonne of product manufactured
- indexed: data or information converted to units or to a form that relates the information to a chosen standard or baseline, e.g. contaminant emissions in the current year expressed as a percentage of those emissions in a baseline year
- aggregated: data or information of the same type, but from different sources, collected and expressed as a combined value, e.g. total tonnes of a given contaminant emitted from production of a product in a given

year, determined by summing emissions from multiple facilities producing product
- weighted: data or information modified by applying a factor related to its significance

An example of using weighted eco-efficiency measures is the study of Helminen (1998), in which the eco-efficiency in the Finnish and Swedish pulp and paper industry was studied by using several weighting methods for environmental impacts. Valuation, however, is an issue with highly subjective preferences and values. Specific eco-efficiency indicators in various units have more informational value, and can be used by decision-makers, if number of indicators is reasonably limited. The problem with relative measures, such as eco-efficiency ratios, is that even if an individual company exhibits improvements in eco-efficiency, this says nothing about its sustainability (DeSimone & Popoff 2000). Expanding markets and rapidly growing demand may make system less sustainable, even if eco-efficiency indicators of individual companies exhibit "positive" development. Hence, scale effects are important in measuring overall sustainability and this requires absolute measures.

Systemic indicators can be absolute or relative indicators. Absolute systemic indicators describe an organization's performance in relation to the limit or capacity of the system of which it is a part. On the other hand, a percentage of the total workplace accidents found in the sector within a given country is an example of a relative systemic indicator.

3.2.5 Micro-level and macro-level indicators

Helminen (1998) divides sustainability indicators into three categories: macroeconomic ones only encompassing the ecological dimension, macroeconomic ones encompassing all three dimensions of sustainable development and microeconomic ones measuring environmental performance at the company or production unit level. Macroeconomic indicators typically refer to global or national-level indicators, whereas microeconomic indicators refer to company- or site-level indicators. However, in recent years, sustainability indicator sets encompassing economic, environmental and social dimensions have become more common both at microeconomic and macroeconomic level. This division between micro-level and macro-level indicators can be augmented with meso-level sectoral indicators at the industry level and product level sustainability indicators.

Both micro- and macro-level sustainability indicators are relevant to sustainable business development. As sustainable development is basically a macro-economic concept, company should somehow consider its contribution to macro-level performance. Links between micro-level and macro-level sustainable development have mainly been studied at conceptual level. Spangenberg and Bonniot (1998), for example, applied the basic concept of

sustainability to micro level and developed a proposal for a system of Corporate Sustainability Indicators (CSI), based on the concepts established at the macro level. An example of micro-macro links in environmental reporting can be found in Netherlands, where the largest industrial facilities are required to submit annual pollutant reports, which are made public. According to Ditz and Ranganathan (1998), this kind of merging of the macro-level indicators with a micro-level reporting represents a powerful combination of goal-directed policy and disclosure-based pressure for improvement. In addition, sustainability strategies at company-level cannot be created independently from macro-level indicators. Ditz and Ranganathan (1996) divide micro-scale and macro-scale environmental performance indicators (EPIs) based on their internal or external uses. Micro-scale EPIs are used internally for environmental management, corporate priority-setting and internal benchmarking. Social investing, product marketing and community right-to-know, in turn, are external uses of micro-scale EPIs. Macro-scale EPIs are used internally for corporate strategic planning, benchmarking competitors and identifying global trends. On the other hand, setting policy targets, tracking national progress and cross-national comparisons are external uses of macro-scale EPIs. (Ditz and Ranganathan 1996.)

3.2.6 Bottom up, top down and hybrid indicators

Macro-level indicators can also be considered as top down indicators, whereas micro-level indicators are typically considered as bottom up indicators. Top-down indicators indicate sustainability performance at global, national or industry level, whereas bottom-up indicators consider specific sites, companies and projects. Starting point for the bottom up indicators are often national databases and aggregated data. Bottom up indicators, in turn, rely on process-specific data. Hence, top down indicators aim for completeness, while bottom up indicators aim for specificity. According to Warhurst (2002), top-down approaches are expert derived, while bottom up approaches are more stakeholder scoped. Krugmann (1996) notes that real challenge will be to develop hybrid indicator systems, which combine bottom up and top-down perspectives. These combined indicator sets are possibly opposed, but potentially complementary (Krugmann 1996).

3.3 Applications of sustainability indicators

As division between micro- and macro-level indicators may be too general, more detailed division may be derived from environmental accounting literature. After all, sustainability indicators are based on economic, environmental and social accounting. As sustainability measurement has grown out of environmental accounting (Veleva & Ellenbecker 2000), it is logical to use

environmental accounting concepts as a basis also for sustainability measurement. Burritt et al. (2002) divide environmental management accounting framework into monetary environmental management accounting (MEMA) and physical environmental management accounting (PEMA). Schaltegger (1996) has described different foci and perspectives of PEMA, which are shown in figure 5. Hence, sustainability indicators at different levels can be divided into spatial (global, national, regional, site), business (division, company, industry) and product (from partial to full life cycles), based on the figure 5.

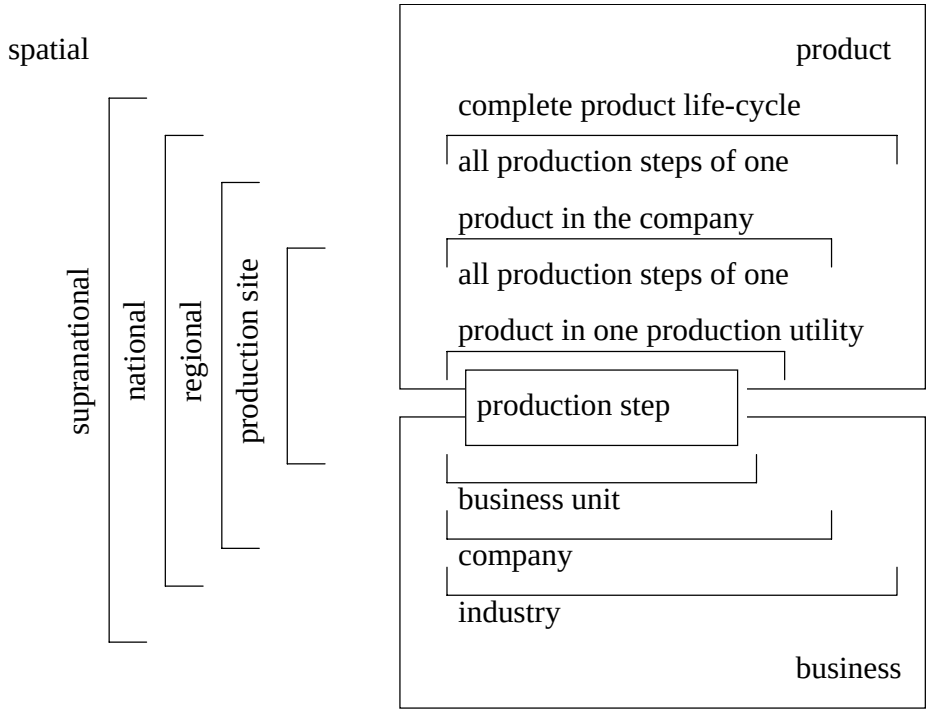

FIGURE 5 Foci and perspectives of PEMA (Schaltegger 1996)

Although many business-related initiatives focus on company-level indicators and reporting, there are other accounting units, which provide valuable information on sustainability for different internal and external stakeholders. Product-level sustainability information is important for consumers and customers, who are interest in sustainable products, as well as for public policy makers. Industry-level sustainability information is mainly used by public policy makers, but since all companies belong to specific industry sectors, average industry level sustainability information should be taken into account also in company-level strategies. Site-level sustainability information is relevant for companies and local community.

3.3.1 Geographical applications: spatial indicators

Clearly sustainability at national level and global level is the original purpose of the report "Our Common Future" by the World Commission on the Environment and Development, chaired by Prime Minister Gro Harlem Brundtland (WCED 1987). Moreover, Schmidheiny and Zorraquin (1996) note that eco-efficiency at the macro-level can be regarded as sustainable development. Eco-efficiency at micro-level may be regarded as sustainable development at company-level, but not necessarily as truly sustainable development because of the lack of macro-perspective. Similarly, in the topic report "Making sustainability accountable" of European Environment Agency (EEA 1999a, 5), it was stated that monitoring eco-efficiency at macro level is necessary to make sustainability accountable. In fact, sustainable development is a macroeconomic concept. However, companies are significant players in sustainable development. Atkinson (2000) argues, that the construction of green accounts and sustainability indicators at both micro and macro levels is a prerequisite to understanding sustainable development.

Global, national and regional sustainability indicators are associated with specific spatial area, bordered by geographic boundaries. Production site is located in specific region in specific country. In contrast to production site, company as a basic unit can be located in many different regions within a country and in many different countries as well. Production site is also a basic unit for industry. Industry, in turn, is an aggregate of production sites within a specific region or a country. GRI guidelines suggest breakdown of indicators by country and region in many aspects. One reason is that legislation, standards and culture vary by country/ region. Broadening focus in spatial perspective leads to macro-level perspective and accounting at macro-economic level (national and supra-national).

At national level, there is an internationally accepted accounting system for monetary flows, SNA (System of National Accounts) which has been widely used in most countries. National supply and use tables are part of SNA. Environmental accounting at macro-economic level consists of monetary flow accounts, physical flow accounts and hybrid flow accounts, which is a combination of monetary flow accounts and physical flow accounts. The London Group of Environmental Accounting is currently forming SEEA (System of Environmental and Economic Accounts) 2000 Revision, which deals with different forms of environmental accounting (see SEEA 2002). Physical environmental accounting consists of physical supply and use tables, which can also be used for material flow accounting (MFA) and physical input-output tables (PIOT). For environmental analysis, physical accounts have been considered more accurate, since there is more obvious link between environmental burden and physical transaction than between environmental burden and monetary transaction. Hybrid accounts, i.e. confronting monetary and physical data, were mentioned already in the 1993 SEEA. One example of hybrid accounts is NAMEA (National Accounting Matrix with Environmental Accounts) developed by Statistics Netherlands (SEEA 2002). Social accounting

approach was pioneered by Nobel laureate Richard Stone, who made many recommendations for improving and extending the United Nations' System of National Accounts with sociodemographic accounts and social accounting (Duchin 1998). Stone arranged accounting data describing demographic characteristics, migration behaviour, education and health into an input-output format (Duchin 1997). Thanks to standardization and broad databases, macro-level accounts provide an appropriate basis for macro-level sustainability indicators.

Testing of the UN indicators during 1996-1999 showed that country-specific indicator collection was needed in Finland. The first national collection of indicators for sustainable development in Finland was published by the Ministry of the Environment in 2000. The Finnish Government's Programme on Sustainable Development was completed in 1998 and now indicators are one of the agreed assessment tools to review the programme. (Rosenström & Palosaari 2000.) The most important ecological, economic and socio-cultural issues of sustainability in Finland are presented in figure 6. Indicator set of Finland is then formed by 83 different indicators (Rosenström and Palosaari 2000).

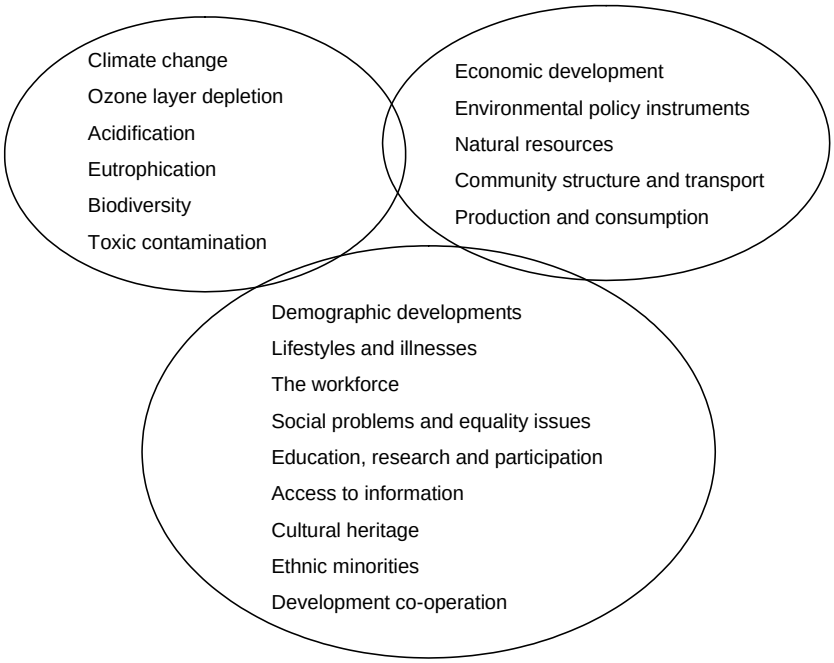

FIGURE 6 The most important entities and key subject areas of sustainable development in Finland (Rosenström and Palosaari 2000)

Spangenberg and Bonniot (1998) have identified the three main purposes for sustainability indicator sets at the macro level:

- summarising analysis: all indicators must be based on world-wide recognized methodologies and valid data
- political guidance: indicators should provide links with players, causes and instruments

- communication: vivid, easily understandable indicators are needed, as few as possible

It can be argued, that sustainability indicators at the macro level should also provide guidance for micro-level players and allow more comprehensive communication with macro-level players.

3.3.2 Product applications: life cycle/ supply chain indicators

Product perspective can also be applied in business sustainability measurement, especially in environmental and social aspects. As table 5 shows, "products and services" is one aspect of environmental category and "product responsibility" is one category in social dimension of the GRI guidelines. The foci in product perspective can be broadened by considering more production steps of a product in one production utility or in one company. The most ambitious approach in product perspective is the complete life cycle of a product, including all upstream and downstream phases besides production steps, such as raw material and energy acquisition, production of intermediate products, delivery, use, maintenance, recycling and disposal. Life cycle inventory (LCI) is "a phase of LCA involving the accounting of inputs and outputs across a given product or process life cycle" (Todd & Curran 1999). However, companies typically have many different products and allocation of impacts to products is difficult if not impossible. Tyteca (1996) notes that "...it would be better, at least with the present state of knowledge, to go on quantifying impacts at the plant level without attempting to separate the contributions of the various products or services a given plant or firm is delivering". At industry level, on the other hand, it is possible to draw the system boundary much wider than a particular production/ product system (Green & Irwin 1996).

3.3.3 Business applications: company and sector indicators

At company level, concepts eco-efficiency and more recently corporate responsibility have been introduced as business links to sustainable development. Business sustainability indicators are associated with decision-making units, bordered by company boundaries or division/ business unit boundaries within the company. Although production site is bordered by spatial boundaries, it can be used as a basic unit also for business sustainability indicators. Environmental management systems, for example, are site-specific. Compared to product-level sustainability information, site-level sustainability information includes less methodological problems related to allocation and system boundaries. As production site is a basic unit of industry sector in compilation of national statistical industry-based data, site-level sustainability information fits quite well to industry-level sustainability information.

The foci in business perspective can be broadened from business unit to whole company and from company to whole industry. On the other hand, one

company can operate in many different industries and in many different countries. For example, Finnish UPM-Kymmene, the world's largest manufacturer of printing papers, has production plants in 17 countries, including China, South Africa and the U.S. (UPM-Kymmene 2003). Different countries may have totally different energy suppliers, transportation systems and technological structure, which all have an influence on direct and indirect economic and environmental impacts. Different industries, in turn, have specific characteristics in terms of sustainability. The problem of company-level measures and indicators, according to Tyteca (1996), is that they are probably not appropriate to any inter-firm or inter-industry comparison, due to lack of standardisation. Although ISO 14031 standard for environmental performance evaluation was verified in 1999, comparison of different companies and industries is difficult. On the other hand, availability and accuracy of sectoral environmental and social data is limited compared to process-level, mill-level or company-level data, since sectoral data must be collected from many different sources.

At company level, sustainability indicators can be used both for external and internal use. As discussed in section 3.2.5, company can use both micro-scale and macro-scale indicators for different purposes. Business, product and spatial indicators provide information for specific purposes. Table 8 shows corporate decision situations requiring sustainability information. It's important to note that different decision situations require different sustainability indicators. Quantitative and qualitative indicators should be used according to situation. Respectively, absolute and relative indicators should be used appropriately. Also system boundary definition depends on the decision situation. Process-specific information is necessary in process development, whereas more aggregate information may be useful in long term strategic decisions.

3.3.3.1 Corporate environmental management

Initially the drive to develop sustainability indicators was from a managerial perspective (Warhurst 2002). Basic argument behind this development is the phrase "You can't manage what you don't measure". As table 8 shows, sustainability indicators can be used at strategic level, tactical level and operational level. Obviously, decisions at strategic level require also macro-level indicators. At tactical level, product-level indicators may be useful. At operational level, such as in communication and marketing, companies may rely mainly on company-level and product-level indicators. However, industry sectors may report on their industry-level sustainability performance using industry-level indicators. In Finland, The Finnish Forest Industries Federation (FFIF) publishes annual environmental reports covering Finnish pulp and paper industry and wood products industry. Indicators are provided both at industry level and at mill level. In addition, industries can compare themselves with each other at national and cross-national level. Kuhndt et al. (2002) note, that sectoral sustainability indicators are crucial to promote sustainable business

development. Sectoral approach may link sustainability initiatives at a macro level with those at micro level, thus enabling communication between the micro, meso and macro level (Kuhndt et al. 2002). They then suggest developing a sectoral sustainability indicator set taking a stakeholder approach, which emphasizes stakeholder participation. The problem with sector-specific indicators is that aggregation to the macro-level is often not possible (Kuhndt et al. 2002).

TABLE 8 Corporate decision situations requiring sustainability information (Kuhndt et al. 2002)

Level of decision	Question type	Examples of decision where sustainability performance information is helpful
Strategic level	1.Strategic planning	▪ Corporate policy development ▪ Long-term strategies for technological development ▪ Strategies for research and development of a sustainable product portfolio
	2.Capital investments and acquisition	▪ Investments in new technologies or product lines improving the sustainability performance
Tactical level	3.Design and development (products/services and processes)	▪ Product and service developments at different levels of improvement ▪ Process development ▪ Technology development
Operational level	4.Communication and marketing	▪ Marketing decisions: sustainability information can be used by companies to advertise their products as "more sustainable" or to protect themselves against adverse claims about products by competitors, NGOs and consumers ▪ Product labelling (ISO 14020, Type III) ▪ Sustainability reporting for external communication, co-operation and networking
	5.Operational management (including operational purchasing and procurement)	▪ Internal monitoring ▪ Identify and prioritise management opportunities ▪ Complaince with existing or upcoming regulation or initiatives (e.g. IPP) ▪ Sustainability management and auditing ▪ Product stewardship and chain management ▪ Supplier choice, especially relevant in view of issues like e.g. chain liability ▪ Benchmarking: companies can compare themselves with each other or may want to monitor their own sustainability performance over time

According to Neely et al. (1995), performance measurement can be defined as the process of quantifying the efficiency and effectiveness of action or as a metric/ set of metrics used to quantify the efficiency and/or effectiveness of action(s). One of the most known performance measurement frameworks is the balanced scorecard (see Kaplan & Norton 1996). One of the greatest advantages of balanced scorecard is its ability to make explicit links between the different dimensions of business performance (Neely et al. 2000). Thus, the balanced scorecard is a promising starting point to also incorporate environmental and social aspects into the main management system of a firm (Figge et al. 2002). The sustainability balanced scorecard (see Figge et al. 2002) can be applied to integrating environmental and social aspects into the implementation of both conventional corporate strategies and explicit corporate sustainability strategies. Thus, sustainability balanced scorecard has also a very tight link to environmental, economic and social performance indicators (Figge et al. 2002).

Other performance measurement frameworks include the performance measurement matrix (Keegan et al. 1989), which seeks to integrate different classes of business performance – financial and non-financial, internal and external (Neely et al. 2000). Seuring et al. (2003) suggested environmental,

economic and social sustainability matrices at the meso-level, which are based on product life-cycle and stakeholder concept. These matrices provide an overview of the sustainability aspects relevant for the industry, which help to identify sustainability assessment fields and related indicators (Seuring et al. 2003). In this study, however, the term matrix is used in purely mathematical context.

3.3.3.2 Sustainability reporting principles

Corporate responsibility reports including triple-bottom-line are becoming more common in business reporting. From communication/ reporting perspective, sustainability indicators should be designed by taking relevant stakeholders into account. Site-level and division-level sustainability indicators are useful for internal reporting within the company, but broader public and external stakeholders may prefer company-level and industry-level sustainability indicators. Sustainability indicators for external purposes should be developed with certain principles and criteria and they should share certain qualities. The qualities of the indicators are related to sustainability reporting principles and their ability to inform decision-makers and relevant stakeholders. Reporting principles provided by GRI (2002) are shown in figure 7.

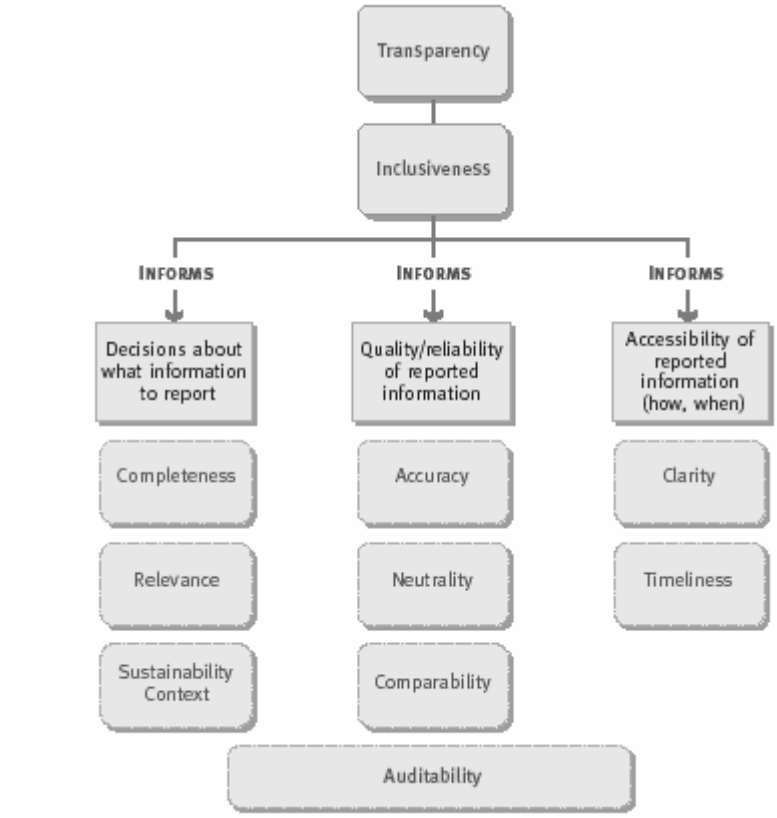

FIGURE 7 Sustainability reporting principles (GRI 2002)

Correspondingly, Veleva and Ellenbecker (2000) have defined desirable qualities for indicators of sustainable production:

1) Appropriateness to the task of assessing of sustainable production
2) Allow comparisons between companies
3) Available and accurate data
4) Verifiable, credibility
5) Set of indicators rather than a single indicator
6) Ability to inform decision-makers
7) Manageable number of indicators, easy to apply and evaluate
8) Balance between simplicity and meaningfulness
9) Both quantitative and qualitative
10) Consistency between facility, local, national and global level indicators

Rosenström & Palosaari (2000, 9), in turn, have defined sustainability indicator selection criteria at national level in terms of reliability and usefulness, which include:

Reliability
- temporally and regionally representative
- scientifically acceptable
- repeatable
- indicator's information does not overlap that of others

Usefulness
- needed by the user
- simple and easy to interpret
- sensitive to changes
- enables anticipating events (time series, predictions)
- includes a target or recommended value
- allows for comparison (also international)
- information available at reasonable cost

Reporting principles, desirable qualities, reliability and usefulness of indicators are all critical in the development of sustainability indicators. Transparency is the focal issue of accountability and it is needed in order to make sustainability accountable. Information on the stakeholder engagement processes used in reports preparation, data collection methods and related internal auditing are examples of transparency (GRI 2002). Transparency is related to reliability, which is a pre-requisite for the credibility. Inclusiveness refers to stakeholder participation in the development process of indicators. Stakeholder participation ensures that indicators are useful for the users. Auditability is related to verifiability of reported data, i.e. how it is recorded, compiled, analysed and disclosed. Completeness includes three dimensions: operational boundary dimension (system boundary), scope dimension (range of aspects) and temporal dimension (short-term/ long-term impact) (GRI 2002). Relevance,

i.e. significance of information, refers the usefulness of the indicator. Information is relevant, if it is needed by the user. Sustainability context principle emphasises the sustainability of the broader natural and human environment within which organisations operate (GRI 2002). This principle is consistent with sustainable development as a macro-economic concept. Accuracy principle may be different for quantitative and qualitative information. Accuracy of qualitative information is related to the degree of clarity, detail, and balance in presentation, whereas that of quantitative information may be determined by the specific sampling methods used to gather numerous data points from multiple operating units (GRI 2002). Neutrality relates to production of unbiased depiction of sustainability performance. Both favourable and unfavourable results should be presented fairly and factually. Comparability principle ensures reliability and meaningfulness of time series information and cross-organisational comparisons. Changes in system boundary, scope and content always have an influence to comparability. Clarity means that indicators are easy and simple to interpret and understand, still sustaining balance with meaningfulness. Timeliness is related to availability of sustainability disclosure to user groups: whether quarterly, monthly, continuously ("real time") or annually available (GIR 2002).

3.4 System boundaries for sustainability indicators

System boundary definition of sustainability indicators refers to completeness of the indicator with respect to operational boundary dimension. Also discussion in section 3.3 on foci and perspectives in PEMA is closely related to system boundary definition. GRI guidelines admit that defining boundary conditions for reporting on economic, environmental and social performance is a complex challenge. Diverse nature of the information and the intimate relationship between the organisation and the larger economic, environmental and social systems within which it operates are the main complicating factors (GRI 2002). Operational boundaries may be defined based on financial control, legal ownership, business relationships, and other considerations (GRI 2002). In the broadest sense, for every demand or function, all processes in the world are involved to some extent, although for most of them it is to an extremely small extent (Udo de Haes et al. 2000). Udo de Haes et al. (2000) suggest that inclusion of processes can be done according to full mode analysis and according to an attribution mode. Full mode analysis includes all flows and related processes to their full extent as present in a specific region of time, as figure 8a illustrates. For example, total flows within the national boundary represent full mode analysis. Attribution mode takes processes into account insofar as these are required for a given social demand, function, or activity, in principle, whenever and wherever these processes take place, as shown in figure 8b. Life cycle

approaches, for example, follow attribution mode, since they are not limited by regional or national boundaries. On the other hand, only the most relevant flows are taken into account and a practical cut-off is needed to make the study feasible. However, it is not always an easy task to define a priori the most relevant processes and flows. Thus it is possible that some important processes and flows are excluded in the attribution mode of study.

Business sustainability indicators typically measure only direct effects of the facility, company or industry sector. However, increasing (supply chain) responsibility of the firm calls for life cycle or system wide approaches. Focus in life cycle approach can be a product, an industry sector or a production site. Life cycle-based sustainability indicators can be derived by life cycle assessment (LCA), which, in principle, takes into account all environmental impacts along the whole life cycle of the product or product group from cradle to grave. Thus, LCA is defined as "compilation and evaluation of the inputs and outputs and the potential environmental impacts of a product or process system throughout its life cycle" (Todd & Curran 1999). According to Tyteca (1996), LCA is the most detailed level for defining environmental performance indicators.

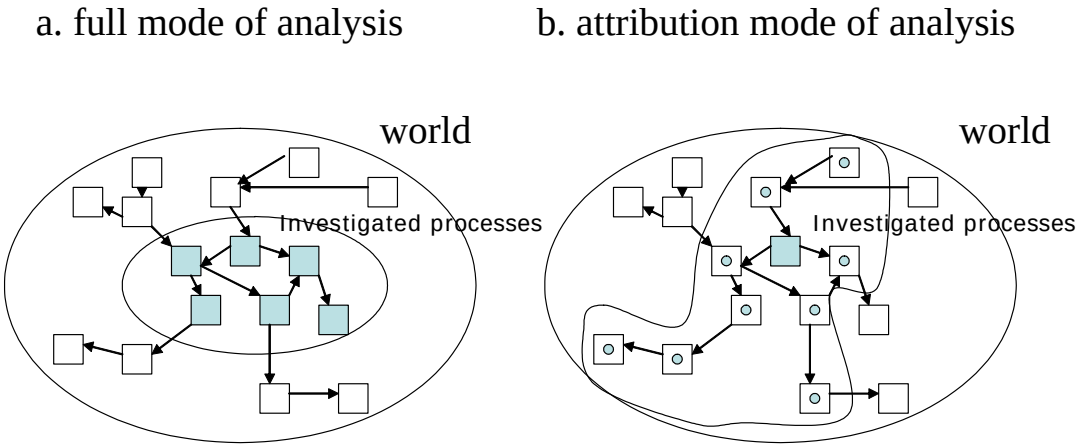

FIGURE 8 Two modes of analysis: a) in the full mode, all unit processes that are investigated are included to their full extent; b) in the attribution mode, one unit process provides the specified function, and all other unit processes contribute partially to that function (Udo de Haes et al. 2000)

From company or site perspective, there are upstream and downstream steps that must be taken into account in life cycle approach. Upstream steps include raw material and energy acquisition, as well as refining steps further downstream till the gate of the site. Downstream steps include delivery from the gate of the site to the final customer, use phase, maintenance, disposal and recycling. Because of the complex relationships between different steps, system boundary definition is an important part of the LCA. Conceptual diagram of life cycle inventory (LCI) is presented in figure 9.

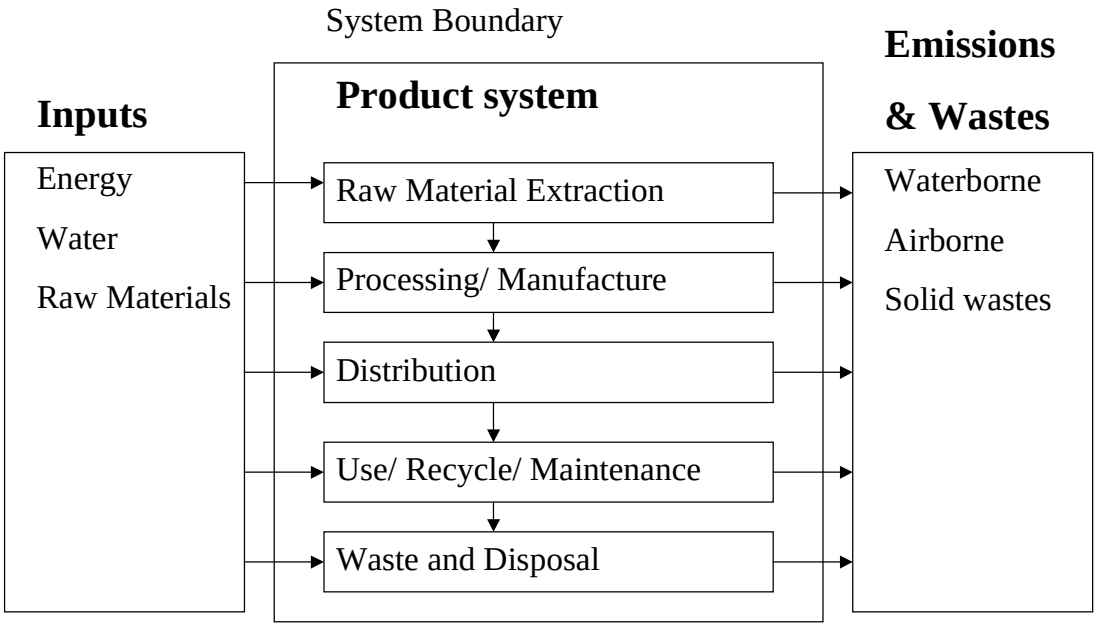

FIGURE 9 Conceptual diagram of life-cycle inventory (LCI) (Owens 1997)

For every step, whether production, use or recycling process, there may be hundreds of different inputs from other processes required. Moreover, these inputs have been produced by using other inputs and so on. Thus, a decision must be made, which processes are included and which processes are excluded in the system considered. However, more processes are considered, more time and money is required for an analysis. Schaltegger (1997) argues that "economic analysis shows that the present approach of LCA is economically inefficient compared with site-specific environmental management, and that is likely to result in ecologically wrong decisions".

There are some techniques, which have been used to solve system boundary problem. Screening LCA is an application of an LCA, which is mainly used "to determine whether additional study is needed and where that study should focus" (Todd & Curran 1999). Input-output analysis is one of the "quick" screening methods. Streamlined LCA, in turn, is "an identification of elements of an LCA that can be omitted or where surrogate or generic data can be used without significantly affecting the accuracy of the results" (Todd & Curran 1999). ISO standards suggest three criteria to identify omitted elements at the start of the iterative procedure: mass, energy and environmental relevance (ISO 1998a).

Life cycle approach has been recognized as important element of sustainability indicators. For example, life cycle approach is used in eco-efficiency assessment per unit of service (ECOPUS) metric to calculate the total environmental burden related to utility, i.e. the core function the product provides to its user (Ranganathan 1998). Dow Eco-compass, in turn, provides a simple, visual summary of the life cycle data analysis (Ranganathan 1998).

Material intensity per unit of service MIPS is also a product life cycle based metric, that quantifies environmental burden in terms of all the direct and indirect material inputs associated with the manufacture and use of a product (Ranganathan 1998). Hence, total material input of a product includes all materials used and the specified "ecological rucksacks" (intensities) of materials (Schmidt-Bleek 1994).

Lowell Center for Sustainable Production indicator framework by Veleva & Ellenbecker (2001) organises sustainability indicators into five levels: facility compliance/ conformance indicators (1), facility material use and performance indicators (2), facility effect indicators (3), supply chain and product life cycle indicators (4) and sustainable systems indicators (5). This reflects the notion, that "organizations need to begin with simple, easy to implement measures of compliance and resource efficiency and move toward more complex indicators, addressing environmental and social effects, supply-chain and life-cycle impacts" (Veleva & Ellenbecker 2001). In their framework, level four indicators measure company/facility production impacts looking at the supply chain as well as product distribution, use and ultimate disposal (e.g. percent of products designed for disassembly, reuse or recycling; embodied energy in key raw materials; percent of suppliers receiving safety training) (Veleva & Ellenbecker 2001). Sustainable systems indicators, in turn, represent the most challenging level of business sustainability measurement. Complete systems indicators require macro-level framework.

Scherpereel et al. (2001) use a three-stage model of corporate strategy with different sets of environmental performance indicators. In their model, crisis-oriented stage relates to output indicators and environmental management indicators directed at compliance. Process-oriented stage, in turn, relates to eco-efficiency indicators at the company level for inputs and for outputs, environmental accounting indicators and environmental management indicators directed at the environmental management system. In the third stage, chain-oriented stage, the company broadens its perspective to product chain indicators and more comprehensive concepts of sustainability. Related EPI's in this stage are input and output indicators on a product chain level as well as social performance indicators. (Scherpereel et al. 2001.) In this model, eco-efficiency is seen implemented within the company's walls. However, there is no reason, why eco-efficiency indicators could not be derived from chain-oriented stage, too.

3.5 Sustainability indicators based on input-output analysis

"The understanding of how best to link organisational performance with macro-level concerns will continue to evolve." (GRI 2002 on *Sustainability context*)

A lot of effort is being devoted to the creation of more comprehensive sustainability indicators. GRI and many other initiatives make valuable work at the field and provide guidelines for measuring economic, environmental and social performance. However, relating the activity of a company or a production site to the larger economic, environmental, and social systems of which it is a part is still in its infancy. GRI (2002) acknowledges that boundary research is "a high priority" in GRI's work programme. Systemic indicators provide understanding of the degree to which the performance of the company or industry may influence the performance of a larger system (GRI 2002). With respect to the environmental measures in the sustainability report, GRI encourages business actors to relate their individual performance to the broader ecological systems within which they operate. Respectively, economic and social performance can be gauged through an analysis of the company's impacts on stakeholders at the local, national and global levels (GRI 2002). The total economic impact of an organisation, for example, includes indirect impacts stemming from externalities that create impacts on communities. The contribution of a sector to Gross Domestic Product or national competitiveness is one example of such externalities (GRI 2002).

It's the sustainability context of indicators, i.e. sustainable development as a macroeconomic concept, which calls for complementary sustainability indicators. Supply chain, product life cycle and systems indicators are needed to helping individual business units and sectors to identify their contribution to sustainability and to realize the inherent economic, environmental and social impacts along the supply chain and product life cycle beyond the company walls and factory gates. However, quantification of those impacts requires specific tools. Process-based life cycle assessment (LCA) provides a bottom up micro-level approach for broadening the system boundary along the product life cycle and supply chain. On the other hand, LCA lacks top-down macro-level perspective, which is required in complete sustainability measurement. For promoting sustainability, Duchin (1998) calls for mathematical model of the economy, which also describes the relationships among the key economic, social and environmental variables.

One option for developing systemic indicators could be the merging micro-level indicators with macro-level accounts. Input-output accounting framework provides a macro-level approach, which describes the complex relationships within national economy in an elegant way. At the same time, it reaches moderate level of detail in terms of industry-level indicators. Sectoral data of input-output accounting framework is based on industry surveys collected from individual sites. Industry-level sustainability indicators based on

input-output analysis may provide a communication tool for the dialogue between different stakeholders at micro-level and macro-level. Information on industry-level upstream supply chain impacts within national economy can be used as a basis for inter-industry co-operation, networking and partnerships as well as for industry-government partnerships. In practice, industries are represented by the companies within the industry. Industry-level economic, environmental and integrated sustainability indicators form the major part of empirical chapter 4.

More sophisticated hybrid indicators, which combine top-down macro-level input-output-based data and bottom-up micro-level process-based/ site-specific data, can be used directly for managerial purposes. This approach may combine the specificity of the company-level/ site-level indicators and the completeness of macro-level accounts. An example of site-level environmental sustainability indicators is presented in the empirical chapter 4. Presentation of hybrid indicators is more limited compared to industry-level indicators, since there are not site-specific data publicly available as much as required.

Input-output analysis is an old model, originally an economic tool for economic modelling, which has been used extensively to analyse economic, environmental and social issues over decades. The first applications of input-output analysis to environmental issues originate from the late 1960's. Input-output analysis can apply both monetary balance principle as well as material balance principle. Environmental applications of input-output analysis include life cycle assessment (LCA), material flow accounting (MFA) and many others. It has also been argued, that input-output analysis should play an increasing role as part of linked economic-environmental systems models for industrial ecology (Matthews and Small 2001). According to Suh & Huppes (2002), "input-output tables with additional environmental data can supply environmental information on economic activities based on relatively complete system, while requiring relatively little time and resources". So, input-output methodology could be seen beneficial also for environmental and economic sustainability indicators at industry-level. In addition, hybrid approaches (Suh 2004) combining industry-level input-output data with more specific process-level data, might be beneficial at product-level and site-level. On the other hand, mathematical economists such as Nicholas Georgescu-Roegen and the father of input-output analysis, Wassily Leontief believe that further effort toward mathematization is counterproductive in sustainability issues (Daly & Cobb 1994, 32). We already have the models. What we need is better understanding of existing models and their applicability. In this thesis, set of economic and environmental sustainability indicators based on input-output analysis are developed and empirically applied.

3.5.1 Economic and environmental data for sustainability indicators

With respect to input-output accounting framework, the number and quality of indicators is directly dependent on available data. It is obvious that the six sustainability aspects included in this study provide only a partial picture of

sustainability. In addition, social aspects are not included, as they are not directly suitable for quantitative model. Moreover, environmental and economic aspects selected are more based on data availability than other criteria, which might be more important. There may be more important and relevant national aspects, industry-specific aspects or site-specific aspects. However, the main purpose of selected aspects in this study is to illustrate sustainability indicators based on input-output accounting framework and input-output analysis. Selected aspects are defined and discussed in the following.

1. Aspects related to environmental dimension

- Global Warming Potential (GWP).
  - measured as carbon dioxide equivalent (CO_2 equiv.) tons
  - includes 3 greenhouse gases: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) from fossil fuels and processes
  - weighting factors: CO_2 = 1, CH_4 = 21, N_2O = 310 (based on the factors provided by IPCC (Intergovernmental Panel on Climate Change) (Ympäristöministeriö 2001)
  - data sources: Helsinki University of Technology (Holmijoki 2002b, Vehmas 2002, Holmijoki and Paloviita 2002), Finnish Pulp and Paper Research Institute KCL (Kutinlahti 2002), University of Joensuu; Faculty of Forestry (Teittinen 2002), Fortum Power and Heat Oy (Heikkinen 2002), VTT Building Technology (Häkkinen et al. 2002), Statistics Finland (2002)
- Acidification Potential (AP)
  - measured as sulphur dioxide equivalent (SO_2 equiv.) tons
  - includes 2 acidifying emissions: sulphur dioxide (SO_2) and nitrogen oxides (NO_x) from fuels and processes
  - weighting factors: SO_2 = 1, NO_x = 0,7 (Mäenpää 1998)
  - data sources: same as for GWP

2. Aspects related to economic dimension

a) Financial economic aspects

- Value added
  - measured as million FIM, gross at producer's price
  - value added = total output at producer's price – intermediate use at purchaser's price
  - the sum of value added of all domestic producers gives the Gross Domestic Product (GDP)
  - the enhancement added to a product or service by a company before the product is offered to customers
  - data sources: Helsinki University of Technology (Holmijoki 2002a, Holmijoki 2002b)
- Operating surplus/ mixed income, net
  - measured as million FIM

    - operating surplus = value added at producer's price – wages and salaries – employers' social contributions – consumption of fixed capital – other taxes on production + subsidies
    - an approximate measure of a company's operating cash flow based on data from the company's income statement; calculated by looking at earnings before the deduction of interest expenses, taxes, depreciation, and amortization
    - data sources: Helsinki University of Technology (Holmijoki 2002a, Holmijoki 2002b)

b) Non-financial economic aspects

- Number of employees
    - measured as number of employees
    - data sources: Helsinki University of Technology (Holmijoki 2002a, Holmijoki 2002b)
- Working hours
    - measured as 1000 working hours
    - data sources: Helsinki University of Technology (Holmijoki 2002a, Holmijoki 2002b)

Global Warming Potential (GWP) and Acidification Potential (AP) are important environmental aspects. Greenhouse gas emissions and acidifying emissions are included in the list of indicators for sustainable development in Finland and they are applied internationally (Rosenström & Palosaari 2000). Greenhouse gas emissions and other significant air emissions by type are also included in environmental performance indicators of GRI (GRI 2002). In the Finnish forest sector, CO_2, SO_2 and NO_x are among the key air emissions monitored (Metsäteollisuus ry 2002a, 2002b). Forest sector accounts for 16% of the total anthropogenic GWP and 15% of total AP in Finland (Seppälä & Jouttijärvi 1997). Global warming is a global effect, but also most of the acidificating emissions generated in Finland drift abroad (Seppälä & Jouttijärvi 1997). Greenhouse gas emissions from bio-fuels are not included in GWP. Greenhouse gas emissions from fossil fuels and bio-fuels are presented separately both in statistical data of Statistics Finland and in average LCA data provided by expert organizations.

Emission data of different industries were compiled from different sources. Direct emissions from forestry (industry class. 1) were calculated by the Faculty of forestry at the University of Joensuu. Direct emissions from mechanical forest industry (industry class. 2-8), wood-based furniture industry (industry class. 20-23) and wood-based construction (industry class 24-26) were calculated by VTT Building Technology. Finnish Pulp and Paper Research Institute KCL provided direct emission data of pulp and paper industry (industry class. 9-17). Direct emissions from the use of wood in electricity and hot water supply (industry class. 27) were compiled by Fortum Power and Heat Oy. Helsinki University of Technology compiled the emission data of publishing and printing (industry class. 18-19) and accommodated all emission

data from different sources to input-output table framework. Emission data from the research coalition were augmented in this study with environmental statistics of Statistics Finland. Statistical data included emissions from other Finnish industries (industry class. 28-52). Then carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) sulphur dioxide (SO_2) and nitrogen oxides (NO_x) were added to use table as extra rows in physical units (tons). Greenhouse gas emissions (GHGs), i.e. CO_2, CH_4, N_2O, were transformed into CO_2 equivalent tons in order to reflect global warming potential (GWP). Acidificating emissions, i.e. SO_2 and NO_x, were transformed into SO_2 equivalent tons to reflecting acidification potential (AP). Although the research coalition compiled a rich set of environmental data for the forest sector, including 12 different air emissions, 7 water effluents, 3 waste categories, 6 raw material categories and 12 fuel/energy categories, the statistical industry-specific environmental data were limited on air emissions. Thus GWP and AP were selected as environmental indicators in this study.

Data for financial economic aspects, value added and operating surplus, were derived directly from primary inputs table, which is a part of the input-output table. Other possible financial economic aspects in the primary inputs table were wages and salaries, employers' social contribution and consumption of fixed capital. The list of national indicators for Finland includes Gross Domestic Product (GDP), which is related to value added (Rosenström & Palosaari 2000). Economic performance indicators of GRI, in turn, include indirect economic impacts, which may be the contribution of a sector to GDP or national competitiveness (GRI 2002). GDP is internationally applied indicator (Rosenström & Palosaari 2000). In addition, GRI (2002) indicators include increase/ decrease in retained earnings, which is related to operating surplus. Data for non-financial economic aspects, number of employees and working hours, were compiled at the Helsinki University of Technology, as extra rows of use table. Economic performance indicators of GRI include employees as monetary flow (financial) indicators, whereas Warhurst (2002) considers employment as non-financial economic indicator. Value added, operating surplus, number of employees and working hours were selected in order to illustrate the applicability of input-output analysis both in financial and non-financial economic sustainability indicator design.

3.5.2 Sustainability indicator design

Input-output accounting framework enables the development of industry-level and site-level indicators. Data in input-output tables describe monetary transactions within national economy in industry-level detail. Hence, industry-level indicators can be derived directly from input-output data. In this study, focus was in the Finnish forest sector, which was disaggregated into 27 more detailed industries/ branches. As industry-level data are based on industry surveys and are collected from individual sites, hybrid approach enables the development of site-level sustainability indicators. Hybrid indicators combine site-specific data and industry-level input-output-based data. Since

comprehensive site-specific data are hard to find, illustration of hybrid indicators was limited to three pulp mills, which represent the industry sector "manufacture of chemical pulp". Product-level indicators based on input-output analysis can be developed by hybrid LCA, but that requires data also on downstream impacts. With respect to company-level indicators reflecting the performance of the whole organization, input-output accounting framework may be too fixed and inflexible.

As input-output analysis is a quantitative tool, it can be applied in the development of quantitative indicators. Hence, this study does not cover social aspects, which are hard to quantify. Quantitative environmental aspects (GWP and AP), quantitative financial economic aspects (value added and operating surplus) and quantitative non-financial economic aspects (number of employees and working hours) were used as examples in illustrating the applicability of input-output analysis in sustainability indicator design. In principle, input-output analysis could be used for measuring any quantitative impact. However, aspects per se are not indicators, and they thus require further design, which is the main aim of this study. In addition, separate aspects can be presented as cross-cutting indicators, which combine two aspects as a ratio.

Input-output accounting framework enables the presentation of both absolute and relative indicators. Absolute indicators can be derived directly from input-output tables as industry-level gross amounts of GWP, AP, value added, operating surplus, number of employees and working hours, caused directly within an industry. Absolute values can also be transformed into relative cross-cutting indicators, in which economic and environmental aspects or financial and non-financial aspects are presented as a ratio. A ratio of economic and environmental aspects reflects eco-efficiency of an industry, whereas a ratio of financial and non-financial economic aspects reflects labour productivity of an industry. Conducting conventional input-output analysis (as discussed in section 2.2) results in total factor multipliers, i.e. relative indicators, in which above mention aspects are presented as ratios per million FIM output. Direct requirements matrix and multiplier matrix were used as a basis for calculations. As explained in Chapter 2, multipliers show direct and indirect upstream supply chain impacts within the national economy, caused by the production of certain amount of output by industry. Eco-efficiency and labour productivity ratios can be derived also for upstream supply chain of an industry. Upstream supply chain eco-efficiency/ labour productivity is a ratio of two total factor multipliers, which reflect the upstream supply chain impacts of an industry. Hence, the crucial characteristic of sustainability indicators based on input-output analysis is the division between direct impact within the industry and indirect impact beyond the industry. Respectively, it is important to make difference between direct eco-efficiency/ labour productivity of an industry and upstream supply chain eco-efficiency/ labour productivity of an industry.

With respect to upstream supply chain, total factor multipliers based on national input-output tables show upstream supply chain impacts within the

national economy. However, as discussed in section 2.2., an imports assumption can be made, that foreign industries exhibit the same technology as domestic industries. This assumption can also be interpreted as additional impacts, if imported products were produced in Finland. Foreign upstream supply chain impacts were derived from direct requirement matrix including domestic and imports coefficients. Foreign upstream supply chain impact was calculated by subtracting domestic upstream supply chain impact from total (domestic and foreign) upstream supply chain impact. Hence, the division can be made between direct domestic impacts, indirect domestic upstream supply chain impacts and foreign upstream supply chain impacts (associated with imports).

Input-output analysis enables also the development of systemic indicators, which describe proportional percentage share of impacts of different parts of the upstream supply chain. Total upstream supply chain can be split into parts in two different ways. First, systemic indicators based on input-output analysis can describe the percentage contribution of different industries to upstream supply chain impacts of specific industry. In this study, upstream supply chain impact can be split into contributions of 52 industries. Although not all the industries are direct suppliers of all other industries, all industries definitely have indirect supplier relationship to certain degree to all other domestic and foreign industries. Second, systemic indicators based on input-output analysis can describe the percentage contribution of different iterative tiers to upstream supply chain impacts of specific industry. In the economic system, direct impacts of an industry can be interpreted as the 0th tier impacts, impacts associated with direct suppliers as the 1st tier impacts and impacts associated with suppliers of direct suppliers as the 2nd tier impacts. Contribution of iterative tiers can be traced till the infinite order, although the contribution of higher order suppliers can be extremely small. In this study, contribution of iterative tiers was traced to the 8th tier suppliers and the contribution of higher order suppliers was presented as a subtraction of total upstream supply chain impact and the contribution of 0-8th order suppliers. These indicators were calculated by iterative tier-by-tier analysis using the supply and use tables instead of total factor multiplier matrix. In addition, systemic indicators describing the percentage contribution of direct impacts as well as contribution related to direct domestic suppliers, higher-order domestic suppliers and foreign suppliers were presented.

Demonstration of site-level hybrid indicators also requires iterative tier-by-tier analysis. First, contribution of upstream supply chain tiers (direct, first order, second order etc.) were calculated. Second, total impact of each iterative tier was split into contributions of supplier industries. Thirdly, it was calculated how contribution of specific industry of a specific tier was distributed to lower-order suppliers. For example, if the contribution of land transport is relatively high in the second order of the upstream supply chain of manufacturing of chemical pulp, it is worthwhile to know, which first order suppliers of manufacture of chemical pulp are requiring land transport supply the most. In

this study, the number of potential supplier contributions in each tier is presented in table 9.

TABLE 9 The number of potential supplier contributions in each tier in the case of the input-output tables used in this study

Tier 0	1
Tier 1	52
Tier 2	2704 (52^2)
Tier 3	140608 (52^3)
Tier 4	7311616 (52^4)
Tier 5	380204032 (52^5)
Tier 6	$1{,}98 * 10^{10}$ (52^6)
Tier 7	$1{,}03 * 10^{12}$ (52^7)
Tier 8	$5{,}34 * 10^{13}$ (52^8)

Table 9 demonstrates the fact that technically it is very difficult to present simple indicators describing the overall data in the supplier industry-level detail, because of the large number of the potential contributions. However, the most important supplier industries of each tier in terms of contribution to upstream supply chain impact can be presented. Another interesting question relates to the specific input paths of the upstream supply chain system. In hybrid indicator it is important to use site-specific data as much as possible, so that indicators would reflect the sustainability of site-specific upstream supply chain system rather than average system. Hence, at least the most important input paths in the average upstream supply chain system should be replaced by site-specific data. In this study, empirical site-specific data was limited to direct GWP intensity data of three Finnish sulphate pulp mills, which belong to the sector "manufacture of chemical pulp". These site-specific data replaced direct industry-level average GWP intensity value in hybrid indicators. However, all data on suppliers relied on average input-output-based data, as site-specific supplier data are not publicly available. Moreover, as tiered hybrid method was applied, input-output-based data was simply added to site-specific data. More sophisticated integrated hybrid approach (Suh 2004) could take into account also the interdependencies between site-specific system and input-output-based system.

All the indicators based on input-output analysis share the general limitations and assumptions of input-output analysis.

4 EMPIRICAL RESULTS

Empirical results of the case, Finnish forest sector, are presented in this chapter. Results are based on aggregated economic and environmental Finnish input-output data and disaggregated input-output data of the Finnish forest sector representing the year 1995. Hence, the results describe and illustrate the design of economic and environmental sustainability indicators based on input-output analysis. Indicator categories defined by GRI are used in structuring the results. All the indicators are presented graphically. First, absolute industry-level economic and environmental sustainability indicators are presented. Absolute indicators are derived directly from input-output tables, primary inputs table and environmental table. Secondly, integrated economic and environmental industry-level sustainability indicators are presented. This category includes cross-cutting indicators and systemic indicators, which are relative ratios derived from input-output analysis. Thirdly, a comparison of three industry sectors, forestry, manufacture of builders' joinery and carpentry and manufacture of chemical pulp, is conducted in absolute economic and environmental performance, eco-efficiency and labour productivity. Finally, illustration of hybrid indicators based on industry-level input-output data and site-specific data is introduced. Presentation of industry-level sustainability indicators contributes more to communication tools for the dialogue between micro- and macro-level actors. Presentation of hybrid sustainability indicators, in turn, contributes more to management tools for understanding the business contribution to sustainability at national level. A framework for the conceptual contribution of the thesis is shown in figure 10.

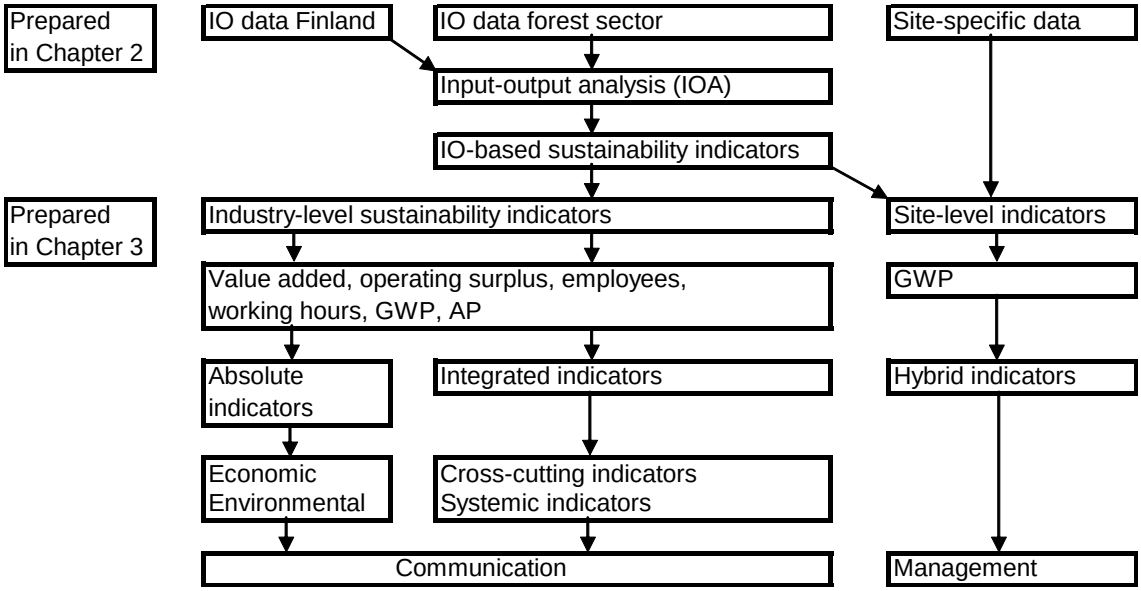

FIGURE 10 A framework for the conceptual contribution of the thesis

4.1 Absolute industry-level indicators

In this section, absolute industry-level indicators are presented. Financial economic indicators include absolute value added and absolute operating surplus. Non-financial economic indicators include absolute number of employees and absolute working hours. Environmental indicators include absolute GWP and absolute AP.

4.1.1 Economic indicators

Figure 11 shows absolute industry output in the Finnish forest sector divided into intermediate use of domestic products, intermediate use of imported products, taxes and subsidies and value added. In principal, absolute industry output equals with absolute industry input. From communication perspective, absolute industry output indicators are useful in comparing monetary output between industries in the forest sector, as well as in comparing proportional share of different types of inputs within industries. Stakeholders can find out the most important industries within the forest sector in terms of monetary value of products. Also absolute amount of imported products as well as absolute amount of value added within each industry provides useful information on industry performance. However, as output value consists of physical output and price, it does not directly reflect the pressure to the environment caused by production. High output value may as well reflect higher prices, not the growth in production. Hence, with respect to eco-efficiency, output value should be increased by higher prices, not by increased

production amounts. Composition of absolute value added is elaborated in more detail in figure 13. Manufacture of chemical pulp has the largest output in terms of value. Value of output is high also in manufacture of coated magazine paper, in publishing of books and magazines and in sawmilling. Most of the output in terms of value is related to pulp and paper industry in the Finnish forest sector. Naturally forestry has a large output, too. Besides sawmilling, output of mechanical forest industry and furniture industry is relatively small compared to pulp and paper industry. Use of imported products is most extensive in pulp and paper industry, although share of imports is relatively small in total output. Forestry output is dominated by value added, of which approximately half is from net stumpage earnings. The share of value added tax, product taxes and product subsidies is very small.

Figure 12 shows how absolute industry output is distributed to domestic intermediate use, domestic final use and exports. Absolute output of industries in figure 12 equals to absolute output indicators in figure 11. Stakeholders may find it interesting to compare, which industries are the most important exporters in the forest sector. In addition, these indicators provide information on proportional share of domestic use and foreign use of products of the forest sector. Products of forestry are mainly used by domestic industries. With respect to environmental issues, high export numbers reflect the importance of downstream phases abroad. Downstream life cycle impacts, such as use phase, recycling and disposal, must be traced abroad in products with high share of exports. Most of the products of paper industry are exported. Much of the products of sawmilling and manufacture of chemical pulp are exported, although they are extensively used also by domestic industries. Domestic final use is the most extensive on the products of publishing and printing, as well as on the products of construction.

Figure 13 shows absolute amount of wages and salaries, employers' social contributions, other taxes on production less subsidies, consumption of fixed capital and net operating surplus of industries in the Finnish forest sector. Total of these factors equals with absolute value added. These figures include only directly generated value added by industry itself. External stakeholders may compare industries within the forest sector in terms of absolute value added they generate. Indicators show which industries contribute most to GDP (Gross Domestic Product). In addition, indicators show how absolute value added is distributed to employees, to capital suppliers and to industry itself. With respect to eco-efficiency, increase in value added is as important as decrease in environmental impacts. In this study, value added and operating surplus are used as numerators in eco-efficiency indicators and labour productivity indicators. Forestry creates the most value added in absolute terms. It is because of the largest operating surplus, which mainly consists of net stumpage earnings. The second largest creator of value added is manufacture of chemical pulp. Absolute consumption of fixed capital in manufacture of chemical pulp is larger than in any other industry. Publishing of books, magazines and other printed matter has the third largest value added. Absolute wages and salaries in

publishing of books, magazines and other printed matter are larger than in any other industry. Factor describing taxes on production less subsidies has a negative value in all industries.

Figure 14 shows absolute number of employees of industries in the Finnish forest sector. These indicators show directly employed workers and related working hours of industries. In contrary to financial economic indicators in figures 11-13, these indicators, as well as indicators in figure 15, are non-financial economic indicators. External stakeholders can find out, which industries contribute most to employment. Indicators in figures 14 and 15 are the denominator part of labour productivity indicators, as well as of eco-efficiency indicators, which describe environmental impact per employee/ working hour. Absolute number of employees is largest in forestry. It is followed by publishing of books, magazines and other printed matter, wood-based renovations of buildings, publishing and printing of newspapers and sawmilling. All these industries employ more than 10 000 employees each.

Figure 15 shows absolute amount of working hours of industries in the Finnish forest sector. Figures are rather similar compared to absolute number of employees. These indicators suggest that there are practically no differences in working hours/ employee in the Finnish forest sector at industry level. A slight difference is that the amount of working hours in sawmilling is larger than in publishing and printing of newspapers, while in number of employees it is vice versa.

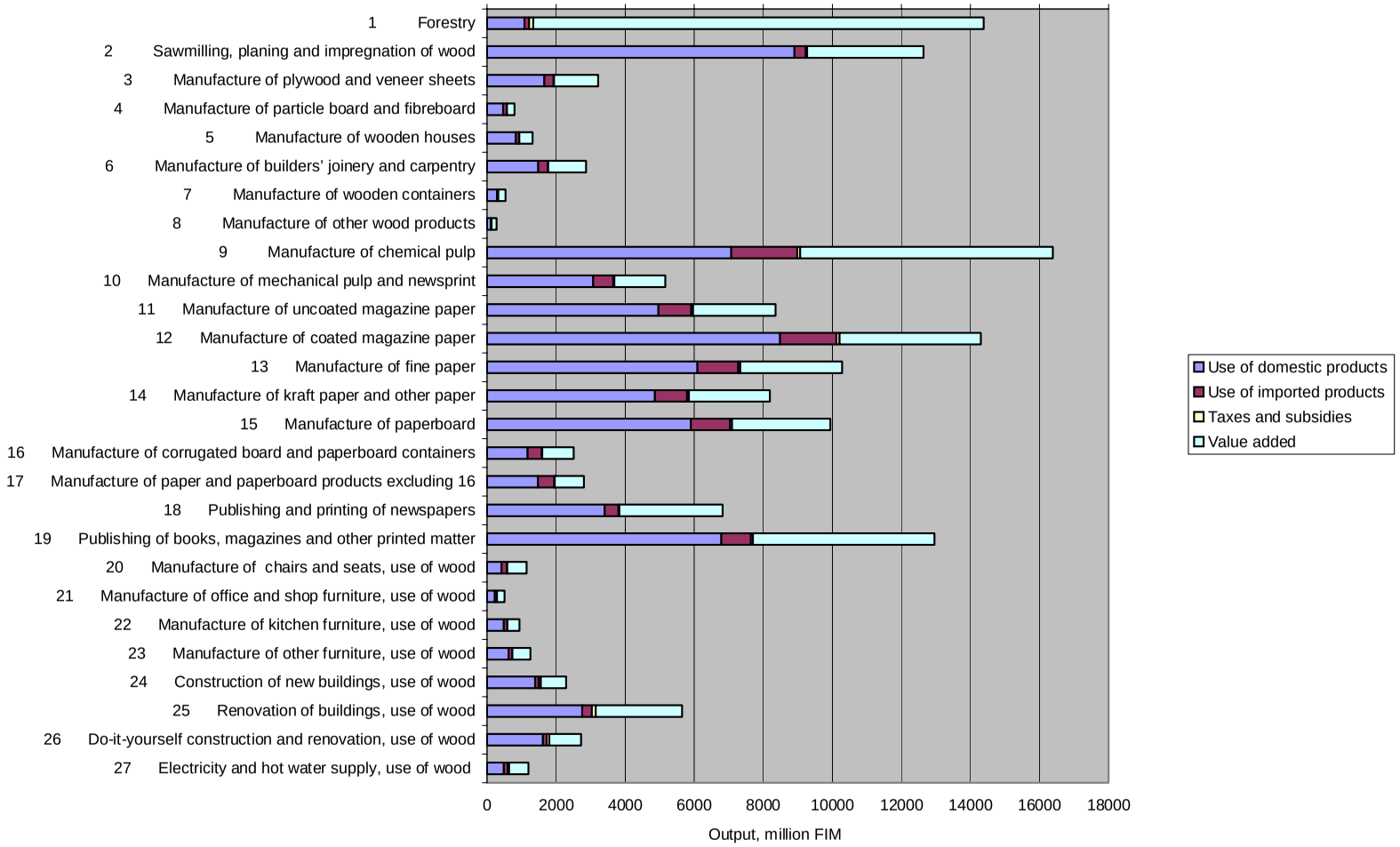

FIGURE 11 Absolute industry output 1995 in the Finnish forest sector, use of domestic products, use of imported products, taxes and subsidies and value added

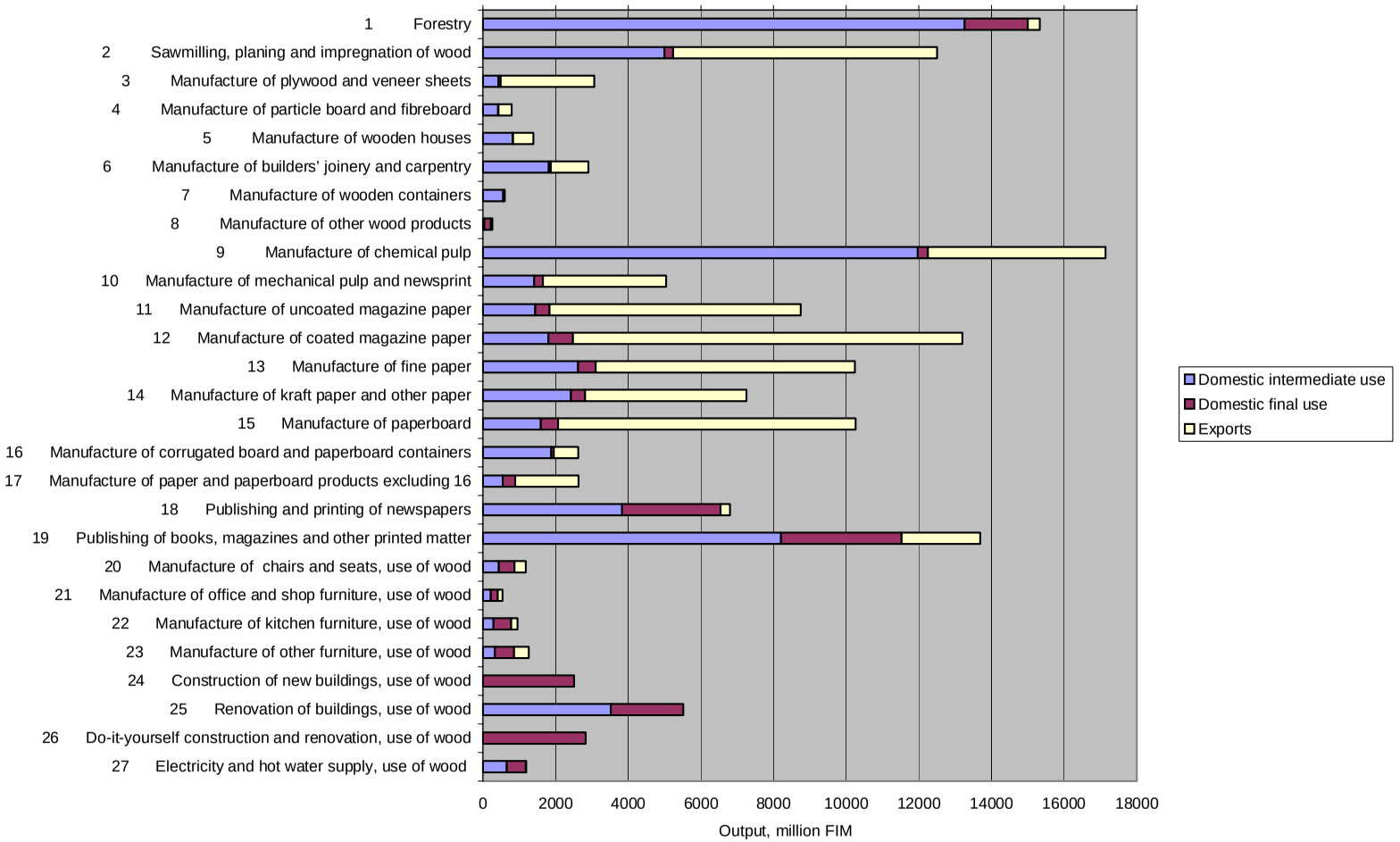

FIGURE 12 Absolute industry output 1995 in the Finnish forest sector, domestic intermediate use, domestic final use and exports

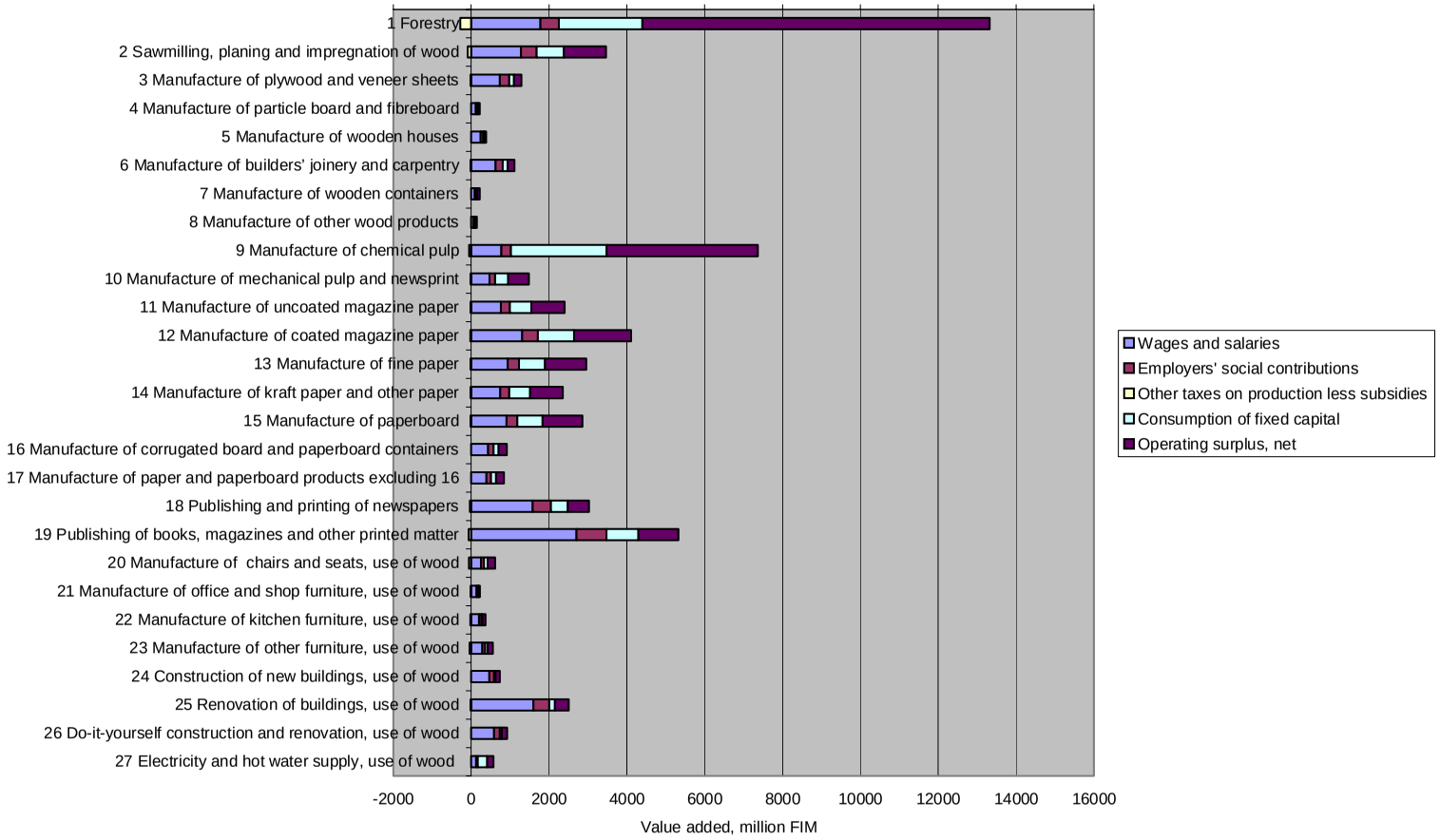

FIGURE 13 Composition of direct absolute value added in the Finnish forest sector 1995

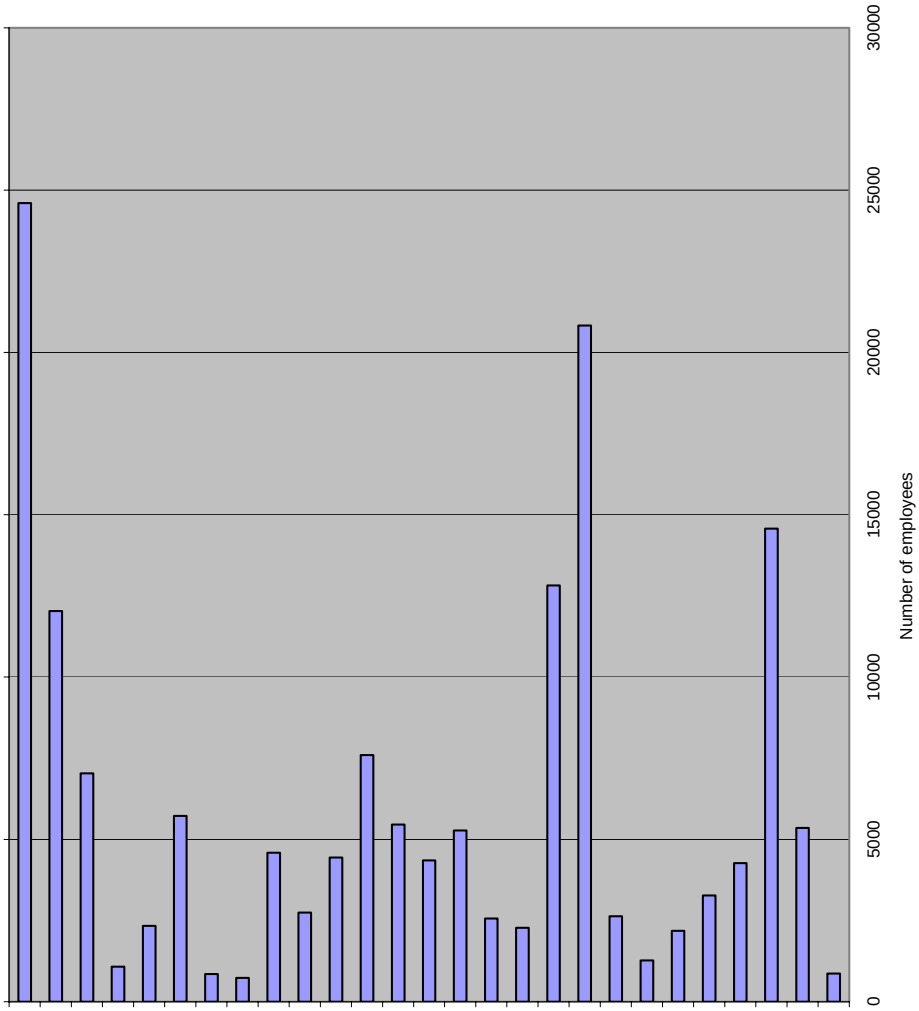

FIGURE 14 Absolute number of employees in the Finnish forest sector 1995

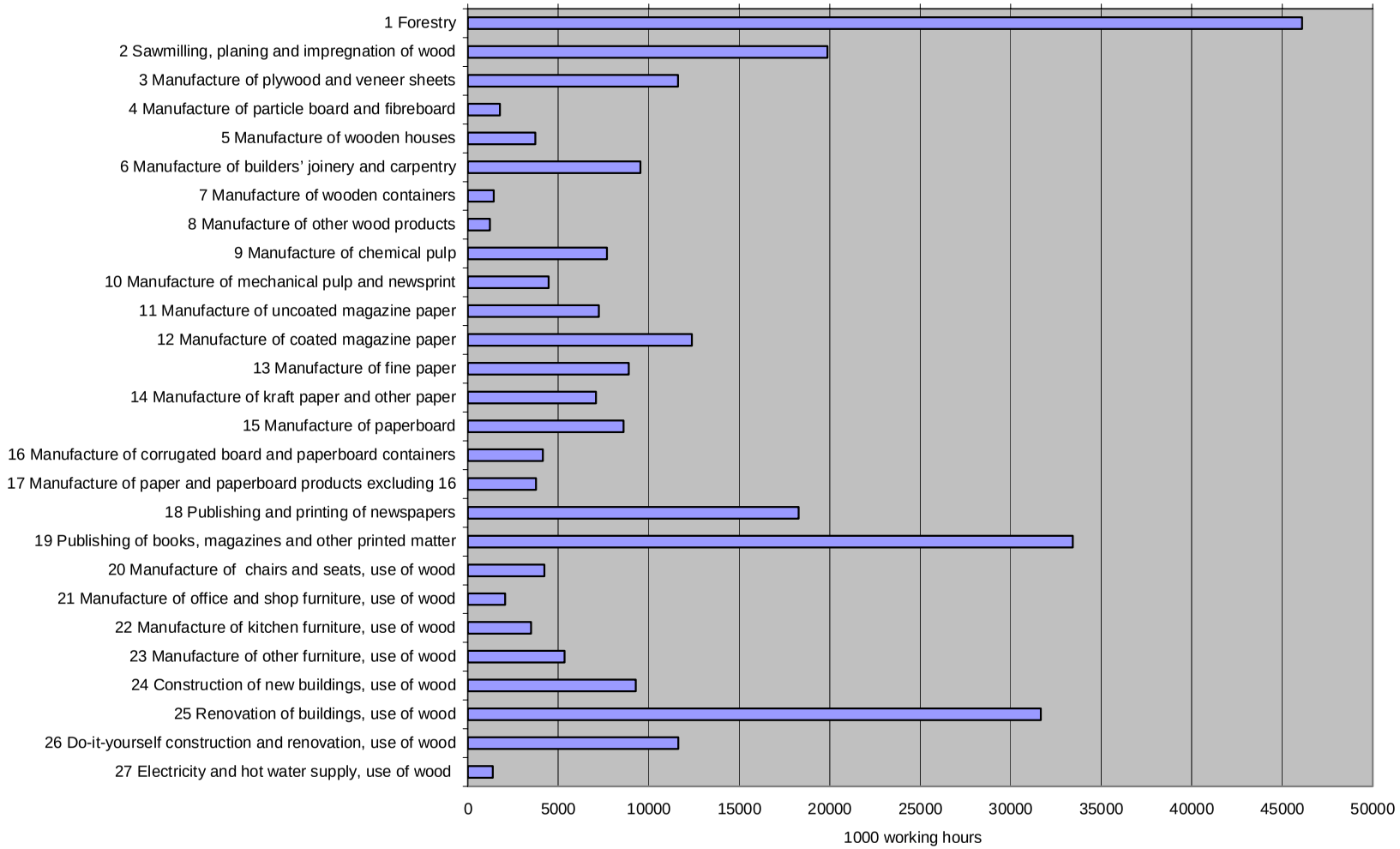

FIGURE 15 Annual absolute working hours (1000) in the Finnish forest sector 1995

4.1.2 Environmental indicators

Figure 16 shows Global Warming Potential of industries in the Finnish forest sector in absolute figures. These figures include direct greenhouse gas emissions of industries. Direct GWP includes greenhouse gas emissions from the use of fossil fuels and from processes. Emissions from bio-fuels are not included. As figure 16 shows, the share of methane (CH_4) and nitrous oxide (N_2O) is marginal. These indicators are calculated by multiplying GWP intensity of "typical" average site of industry with production volume of the whole industry (tons). High GWP of wood-based electricity and hot water supply stems from fossil fuels, which are combusted together with wood (Heikkinen 2002). Hence, it is more reasonable to compare direct GWP performance of manufacturing industries and forestry only. It is well known that most of the GWP is caused by the energy sector. Most of the direct GWP in the Finnish forest sector is related to pulp and paper industry. GWP indicator of manufacture of chemical pulp consists of emissions from production process, whereas GWP indicators of paper industries consist of emissions from own energy production (Kutinlahti 2002). Direct absolute GWP of paperboard manufacturing and coated magazine manufacturing is high because of relatively high production volumes and high emissions per production ton from own energy production (Kutinlahti 2002). GWP indicator of forestry is high, since it includes emissions from all forestry work, fundamental improvement work (clearing, cultivation, draining, construction of forest roads), logging and local transport (Teittinen 2002). External stakeholders can use absolute GWP indicators in recognizing the contribution of each industry to total national GWP. Absolute GWP measures are affected by the production volumes and average technological level of industries. Hence, absolute GWP performance can be improved by decreasing production volumes or/ and developing cleaner technologies within industries. In eco-efficiency indicators, GWP is the nominator of the ratio.

Figure 17 shows direct Acidification Potential (AP) of industries in the Finnish forest sector in absolute figures. Sulphur dioxide (SO_2) and nitrogen oxides (NO_x) contribute rather equally to AP. Hence, it is important to consider both SO_2 and NO_x emissions in AP indicators, whereas GWP can be adequately described by CO_2 emissions only. External stakeholders may recognize the most important contributors within the forest sector to total national AP. Manufacture of chemical pulp has the highest direct acidification potential and its contribution to national AP is relatively more than to national GWP. High direct absolute AP figure of chemical pulp can be partly explained by the high production volumes. AP indicator of chemical pulp is mainly affected by pulp production process, whereas AP indicators of paper industries are caused by emissions from energy production only. Wood-based electricity and hot water supply has also high contribution to acidification potential, although relatively less than to global warming potential. AP is the denominator part of eco-efficiency indicators.

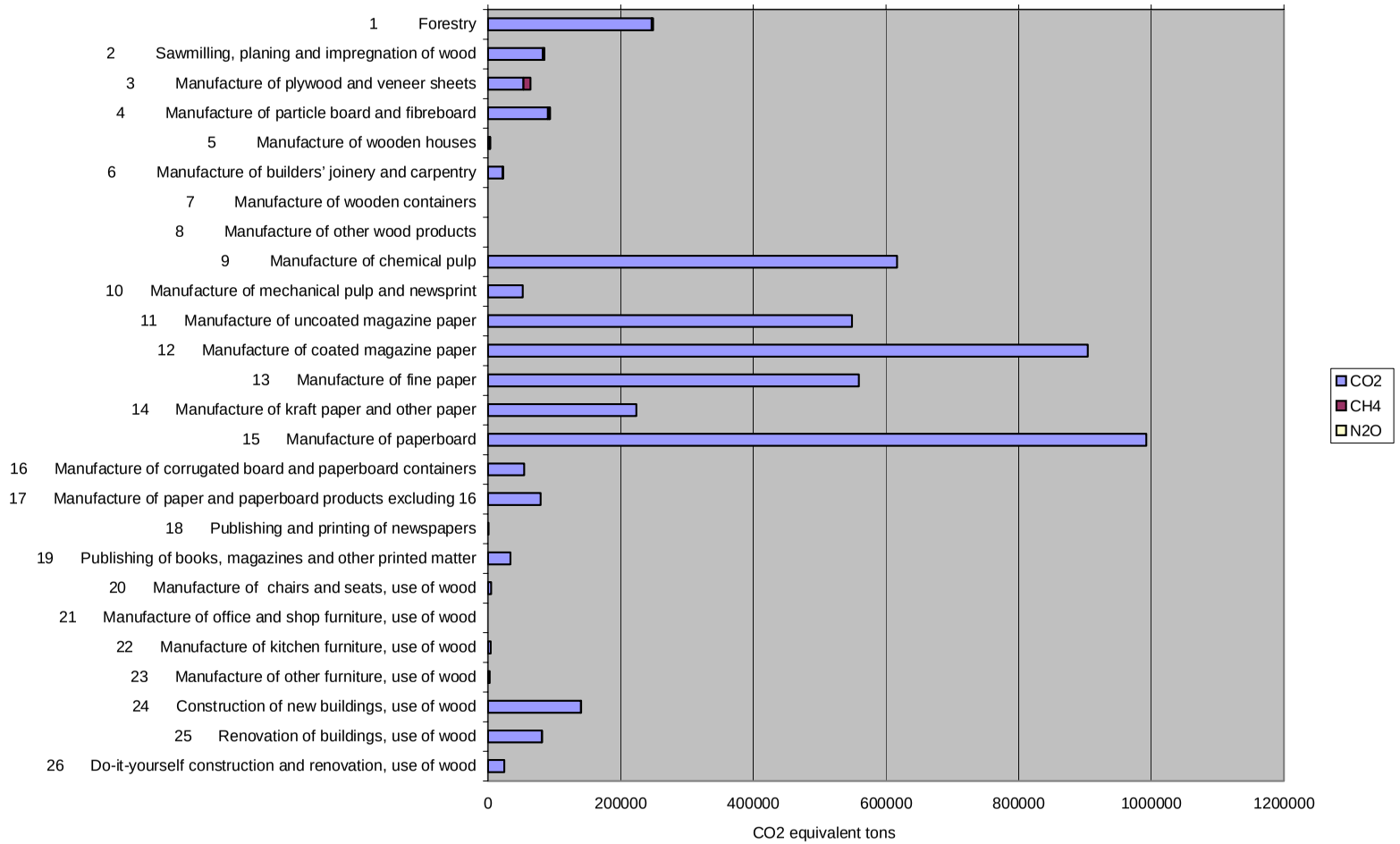

FIGURE 16 Direct absolute Global Warming Potential of industries in the Finnish forest sector 1995 (direct GWP of wood-based electricity and hot water supply: 3 316000 tons of CO_2 equiv. tons)

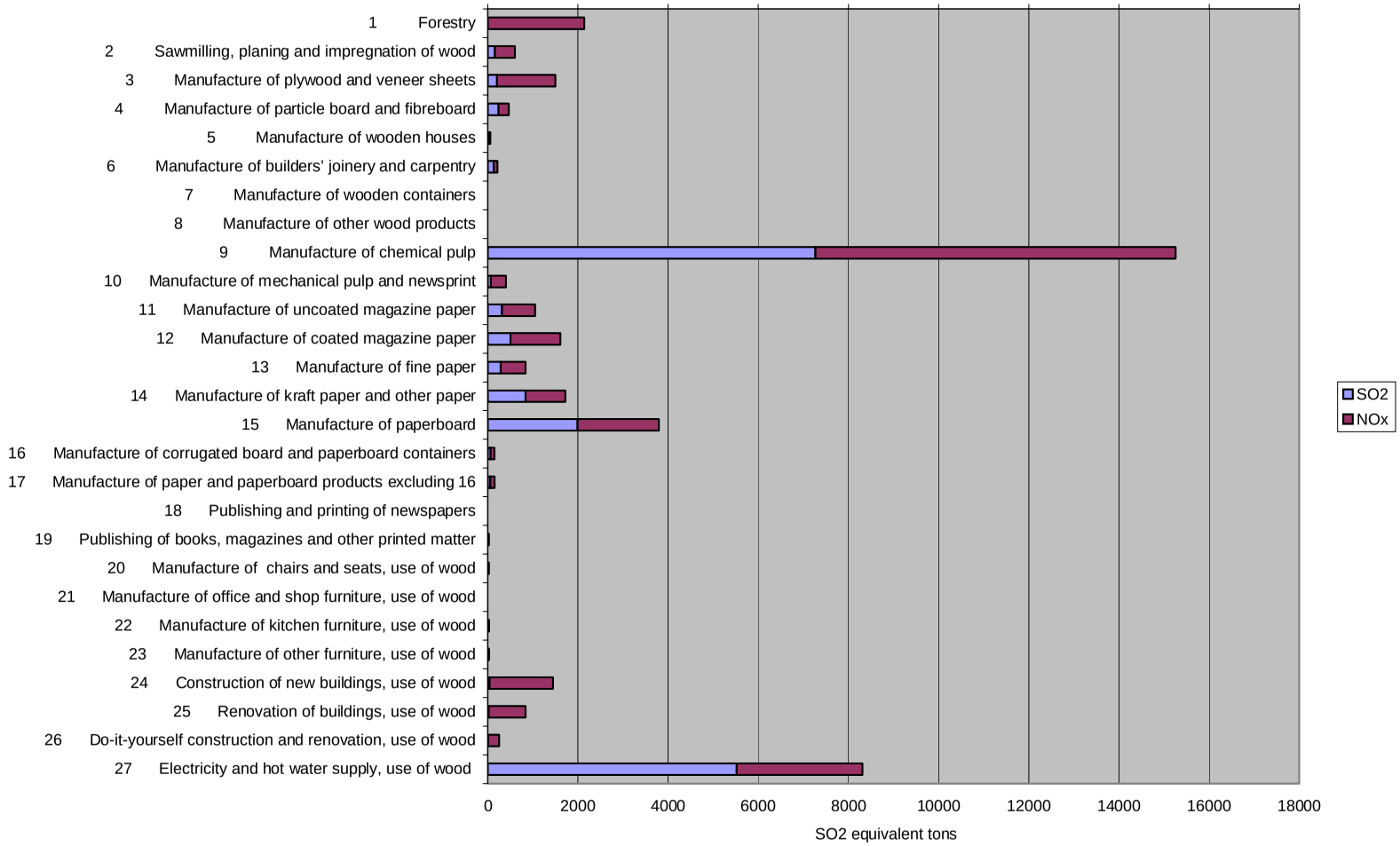

FIGURE 17 Direct absolute Acidification Potential of industries in the Finnish forest sector 1995

4.2 Integrated industry-level indicators

In this section, integrated industry-level indicators are presented. They include cross-cutting indicators and systemic indicators, which are relative figures, presented in ratios or percentage shares.

4.2.1 Cross-cutting indicators

Cross-cutting sustainability indicators directly relate two or more dimensions of economic, environmental and social performance as a ratio. In this study, only economic and environmental performance is considered. Conducting conventional input-output analysis result in cross-cutting indicators, in which economic or environmental factor is the numerator and output value is the dominator. These indicators describe the upstream supply chain impact (value added, operating surplus, employees, working hours, GWP or AP) within the national economy per certain amount of industry output. In this study, upstream supply chain impacts per million FIM industry output are presented. In input-output terminology these ratios are called as total factor multipliers.

Figure 18 shows required direct and indirect economic output in order to produce worth of one million FIM output in each industry as relative figures. Indirect economic output is divided into domestic and foreign output. These indicators enable external stakeholders to compare industries in terms of their economic influence at macro level. High indirect impact reflects high relative contribution at macro level. All industries, except forestry, manufacture of other wood products and manufacture of chemical pulp, have larger indirect economic impact than direct impact. Manufacture of particle board and fibreboard and manufacture of paper and paperboard products have the highest relative economic impact, over 2,5 million FIM per one million FIM direct output. In all industries indirect economic impact related to imports is considerably less than indirect impact related to domestic production. It should be noted, that similar figures in different branches of paper industry are caused by the lack of data in disaggregation.

Figure 19 shows relative value added of industries in the Finnish forest sector. These figures include both directly and indirectly generated value added of industries in upstream supply chain. System boundary of the ratio is gradually extended from direct economic impact to national level and from economy-wide impact to multinational level. In theory, relative value added of the whole supply chain should be same (1 mill. FIM value added/ 1 mill. FIM output) in all industries. Slight differences between industries in figure 19 are caused by errors in data source and in analysis. External stakeholders may use relative value added indicators in comparing proportional share of direct and indirect contribution of industries at macro-level. Especially national policy-makers may be interested in the relative contribution of industries in value added at national level. The highest direct and economy-wide relative value

added is in forestry. In forestry, value added is mainly generated by forestry itself. Forestry also contributes to indirect value added of other industries in the forest sector, as can be seen in sawmilling, for example. When comparing direct absolute value added in figure 13 and direct relative value added in figure 19, it can be seen that forestry exhibit the best performance both in absolute terms and relative terms. On the other hand, manufacture of chemical pulp exhibits better performance in absolute terms than in relative terms. This is caused by high volumes in chemical pulp production.

Figure 20 shows the relative operating surplus of industries in upstream supply chain. As operating surplus is one constituent in value added, indicators in figure 20 provide lower values than indicators in figure 16. Hence, indicators describe value added without wages and salaries, employers' social contributions and consumption of fixed capital. Stakeholders may compare the relative contribution of industries to economy-wide operating surplus. As in value added, forestry has the highest direct relative operating surplus. Adding indirect operating surplus changes the industry ranking. For example, after adding indirect operating surplus, sawmilling has higher rank compared to direct performance. In general, total relative operating surplus is larger in pulp and paper industry than in other industries in the Finnish forest sector. When comparing direct absolute operating surplus (figure 13) with direct relative operating surplus, it can be seen that forestry and manufacture of chemical pulp exhibit the best performance both in absolute terms and relative terms.

Figure 21 shows number of employees by industry in relative figures in upstream supply chain. These figures show both directly and indirectly employed workers by industry. Thus, system boundary of the ratio is gradually extended from direct impact to national level and from economy-wide impact to multinational level. Stakeholders may use these indicators in order to compare direct and indirect relative performance of industries in employment issues. Indicators also show the labour intensity of industries. Number of supply chain employees is often higher than the number of directly employed employees. The largest direct relative number of employees is in manufacture of other wood products. Its total relative number of employees is also high, but not as high as in industries related to manufacture of furniture and wood-based construction. Both direct and total relative number of employees in pulp and paper industry is small compared to other industries within the forest sector. Comparison between figure 14 (absolute number of employees) and figure 21 (relative number of employees) reveal differences in industry performance. For example, pulp and paper industry exhibits better performance in absolute terms than in relative terms, compared to other industries within the forest sector.

Figure 22 shows working hours by industry in relative figures in upstream supply chain. These indicators describe direct and indirect employment by industry as well, but in different metrics. Indicators of direct and total relative working hours give similar figures compared to relative number of employees, except that the largest highest relative working hours are in wood-based renovation of buildings. The influence of refining degree can be clearly seen in

both number of employees and in working hours. Total relative number of employees and total relative working hours increase both in mechanical and chemical forest industry, when refining degree increases. In order to create complete picture on employment by industry, both absolute figures (figures 14 and 15) and relative figures (21 and 22) should be considered.

Figure 23 shows direct and indirect GWP intensity ratios of industries in the Finnish forest sector. Hence, these indicators are relative indicators, normalised by 1 million FIM output. Direct GWP intensity ratios can be derived directly from absolute GWP indicators and total output indicators. As direct GWP intensity is the ratio of direct absolute GWP and direct monetary gross output, both numerator and denominator of ratio have an influence to intensity. Although manufacture of particle board and fibreboard has rather low direct absolute GWP, it has the highest direct GWP intensity in the forest sector. That's because the direct gross output of the particle board and fibreboard is low. On the other hand, high direct GWP intensity of manufacture of paperboard stems from its high direct absolute GWP. Forestry has the lowest GWP intensity in the forest sector, partly because of its high direct absolute output. Indirect intensity ratios are derived through input-output analysis and matrix inversion. Share of indirect GWP is relatively high in all industries compared to direct impacts. Indirect GWP related to imports represents pure calculatory approximation, since foreign contribution is approximated using Finnish technology assumption. However, it can be noticed that share of imports-related GWP in total GWP intensity is rather small within the Finnish forest sector. As figure 11 shows, direct use of imported products in the forest sector is also small. However, other sectors in Finland, such as metal and chemical industry, and energy sector, use imported products more extensively. These imports are then refined for the use in the forest sector. More analytic interpretation of domestic and foreign indirect impacts requires percentage indicators on the indirect industry contributions.

Figure 24 shows the direct and indirect Acidification Potential intensity of industries in the forest sector. Direct AP intensity is highest in manufacture of chemical pulp, as its direct absolute AP is high (see figure 25). On the other hand, high direct AP intensity of manufacture of particle board and fibreboard is caused by its low gross output (see figure 17). When adding indirect impacts to AP intensity indicator, manufacture of particle board and fibreboard has the highest figure. On the other hand, intensity indicators provide only partial picture on sustainability and they must be treated as complementary indicators for absolute indicators.

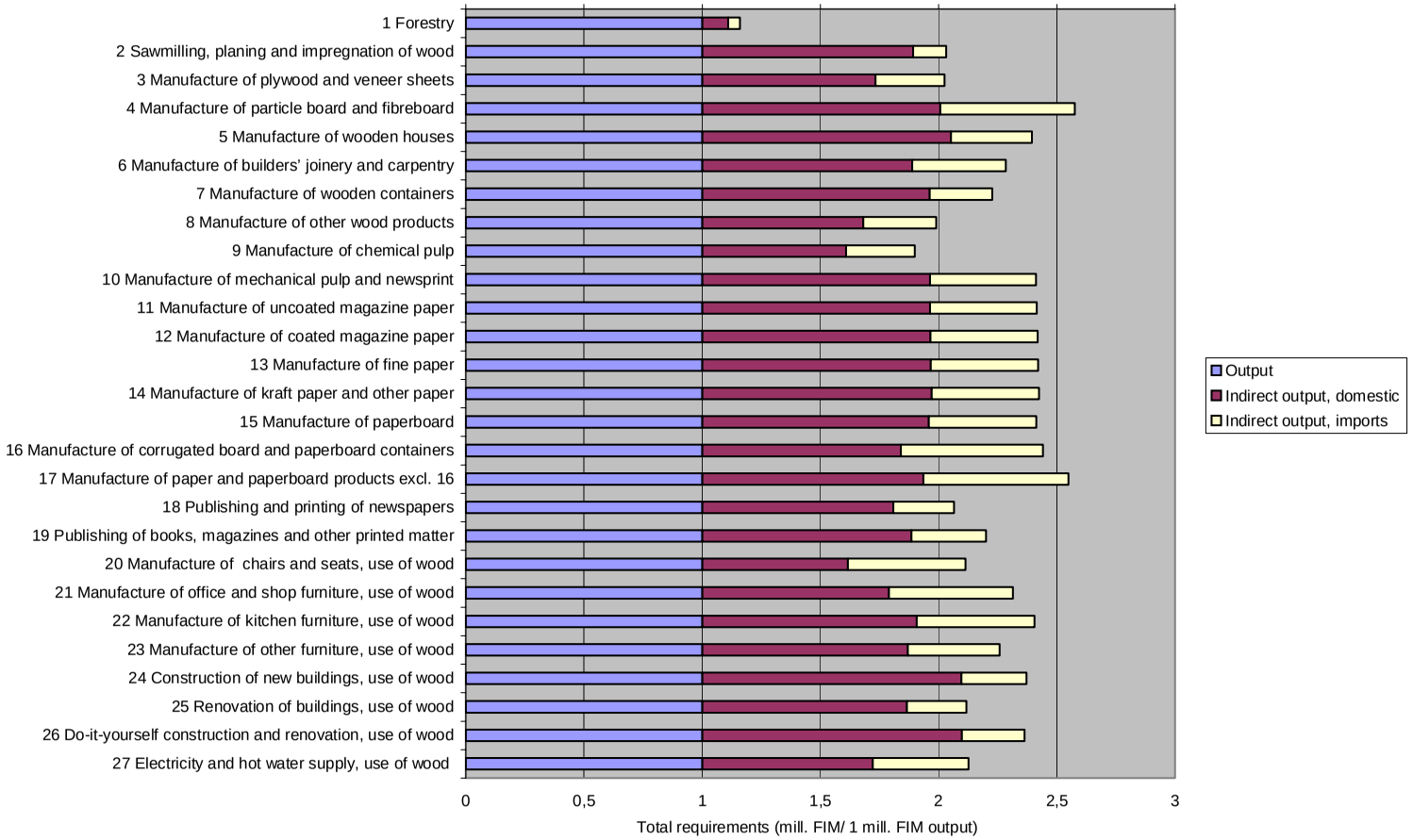

FIGURE 18 Total requirements (direct and indirect upstream supply chain output) of 1 million FIM output in the Finnish forest sector 1995

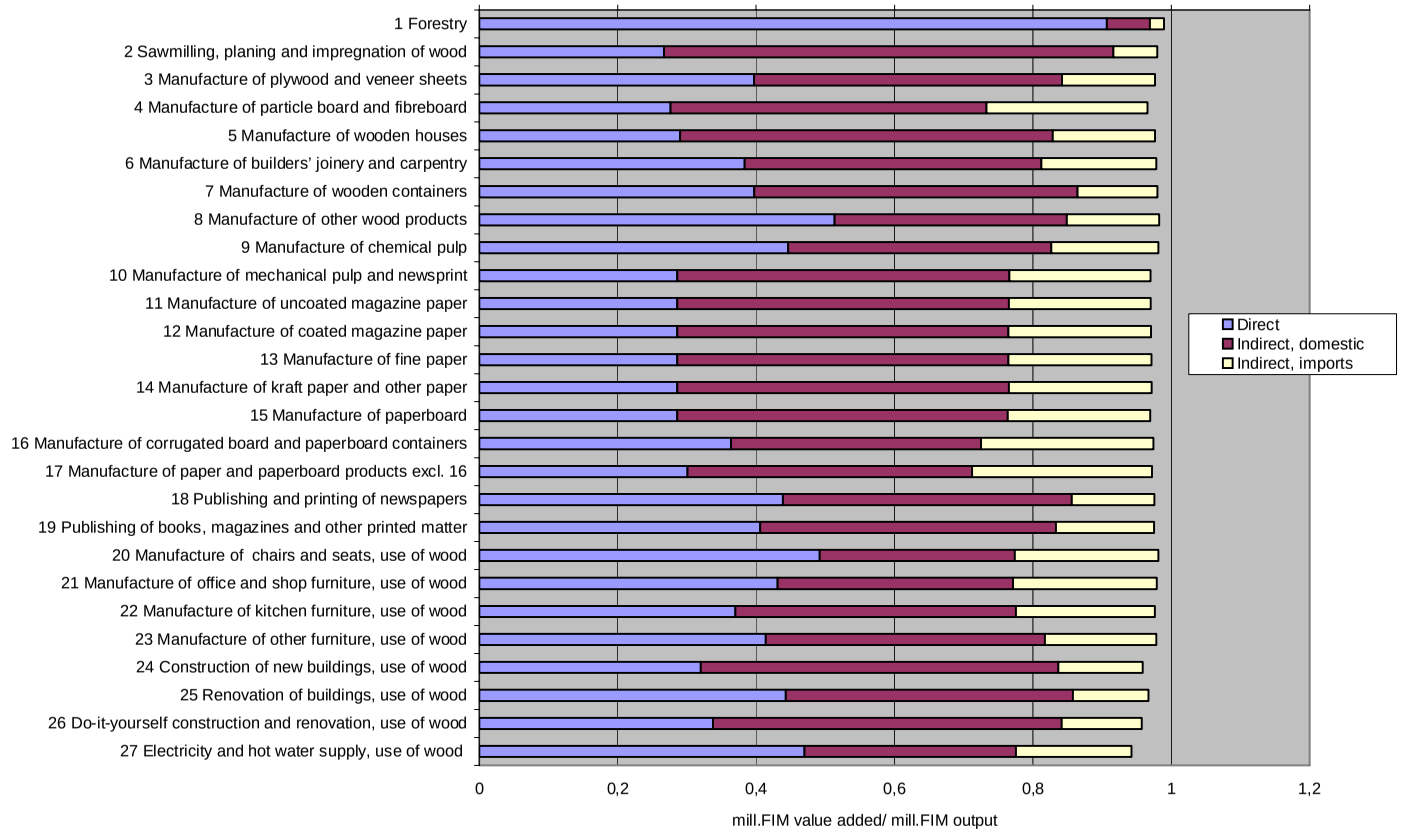

FIGURE 19 Direct and indirect upstream supply chain value added per million FIM output in the Finnish forest sector 1995

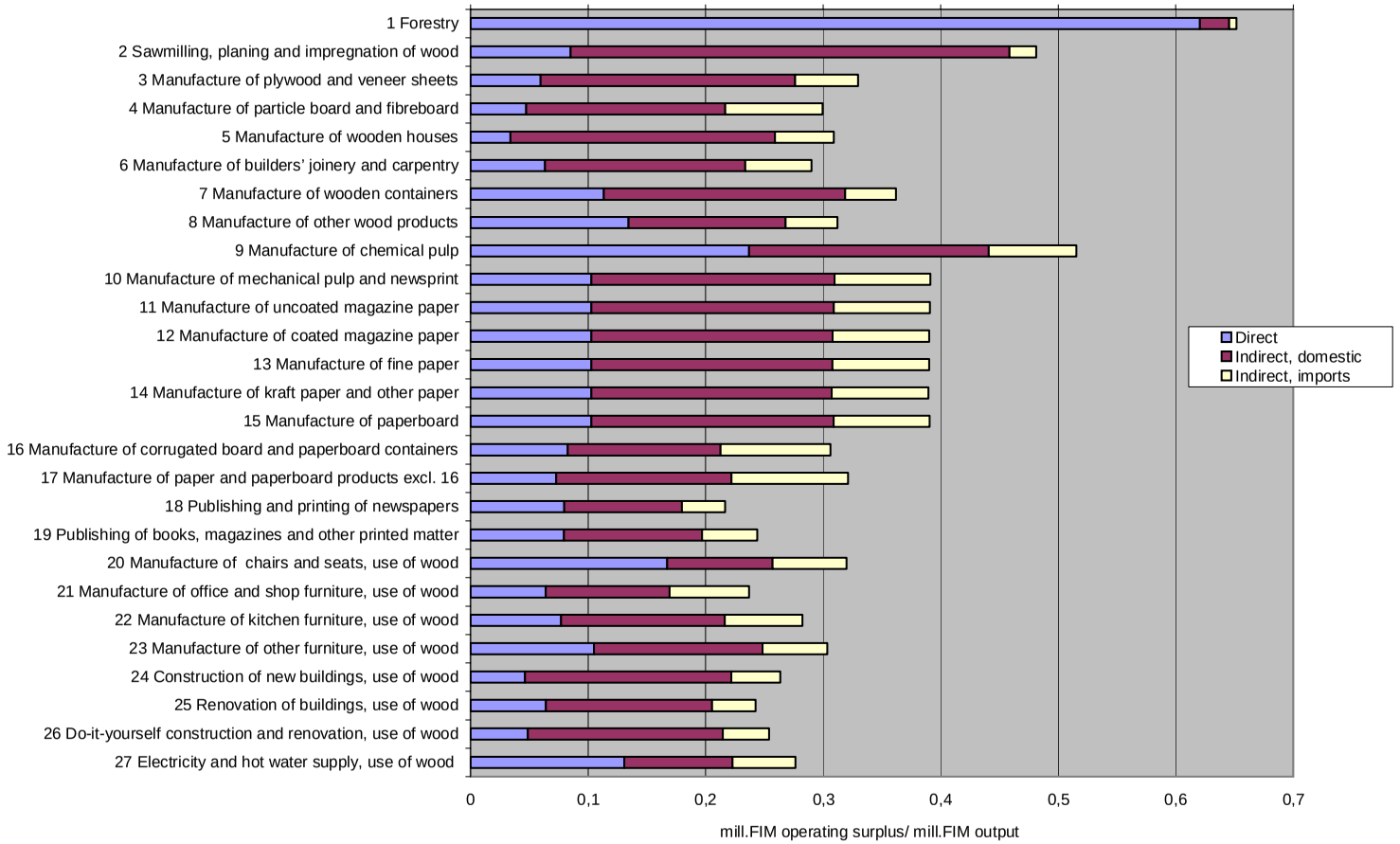

FIGURE 20 Direct and indirect upstream supply chain operating surplus per million FIM output in the Finnish forest sector 1995

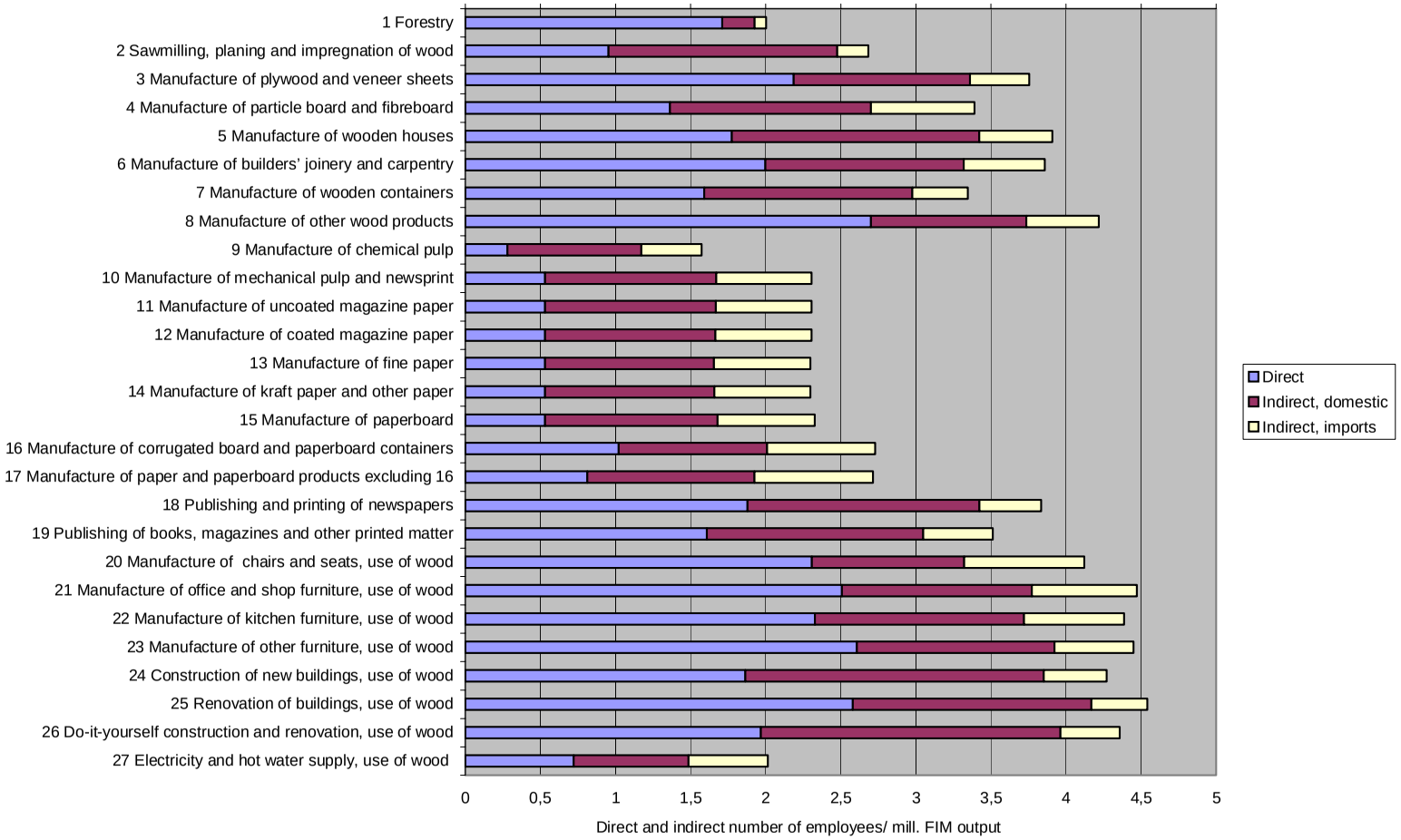

FIGURE 21 Direct and indirect upstream supply chain employees per million FIM output in the Finnish forest sector 1995

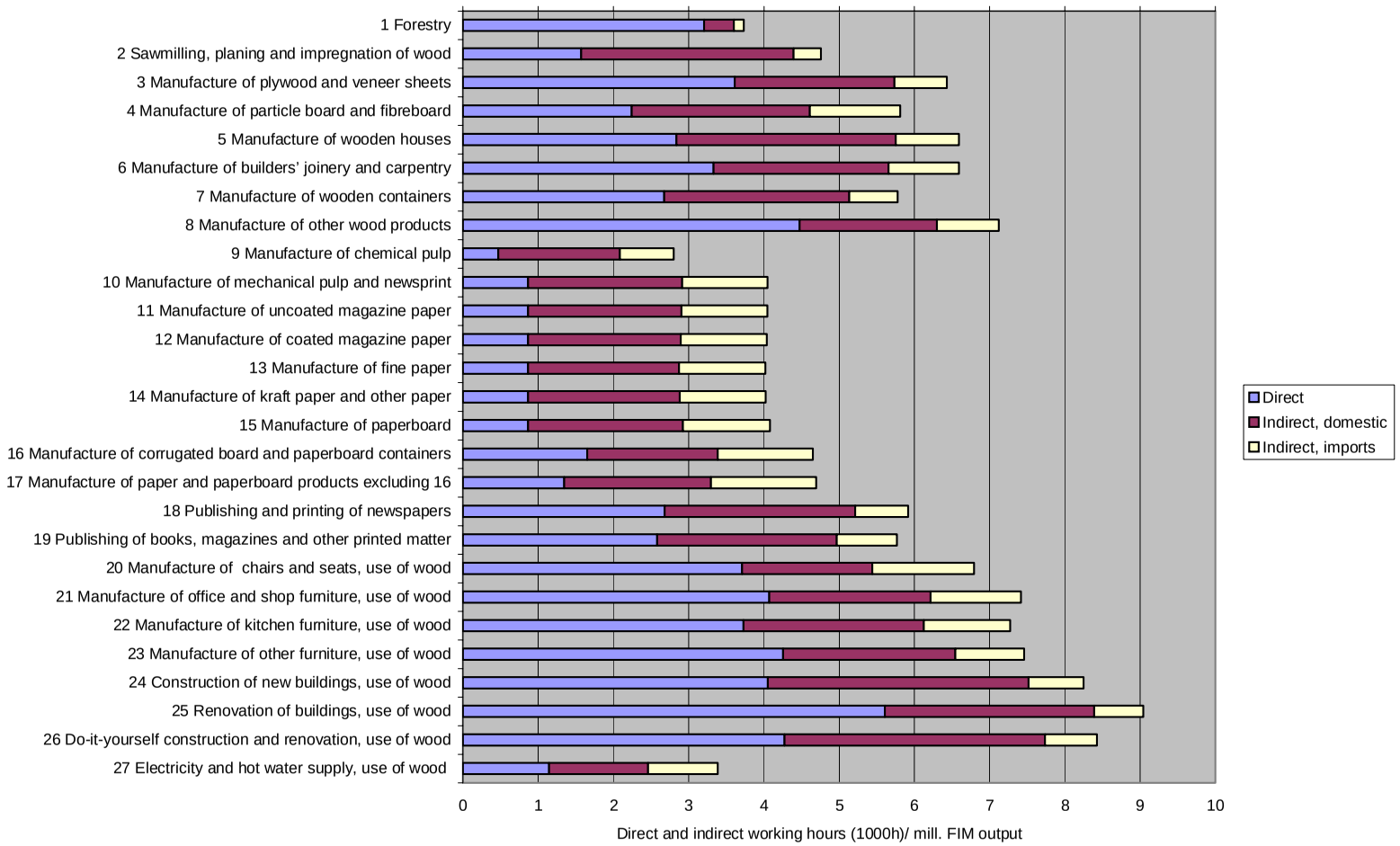

FIGURE 22 Direct and indirect upstream supply chain working hours (1000h) per million FIM output in the Finnish forest sector 1995

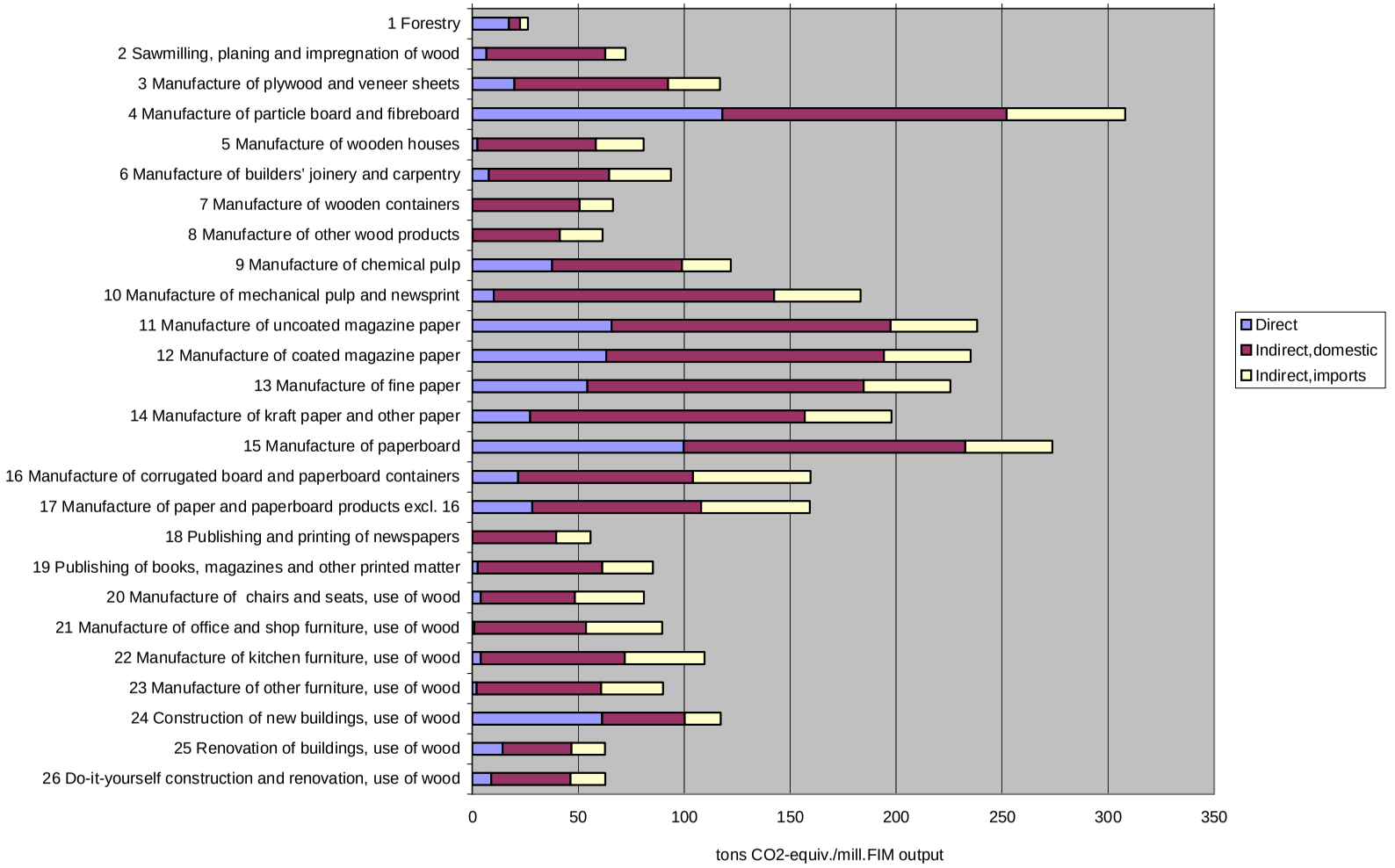

FIGURE 23 Direct and indirect upstream supply chain Global Warming Potential intensity of industries in the Finnish forest sector 1995 (GWP of wood-based electricity and hot water supply: 3038 CO2 equiv. tons/ mill. FIM output)

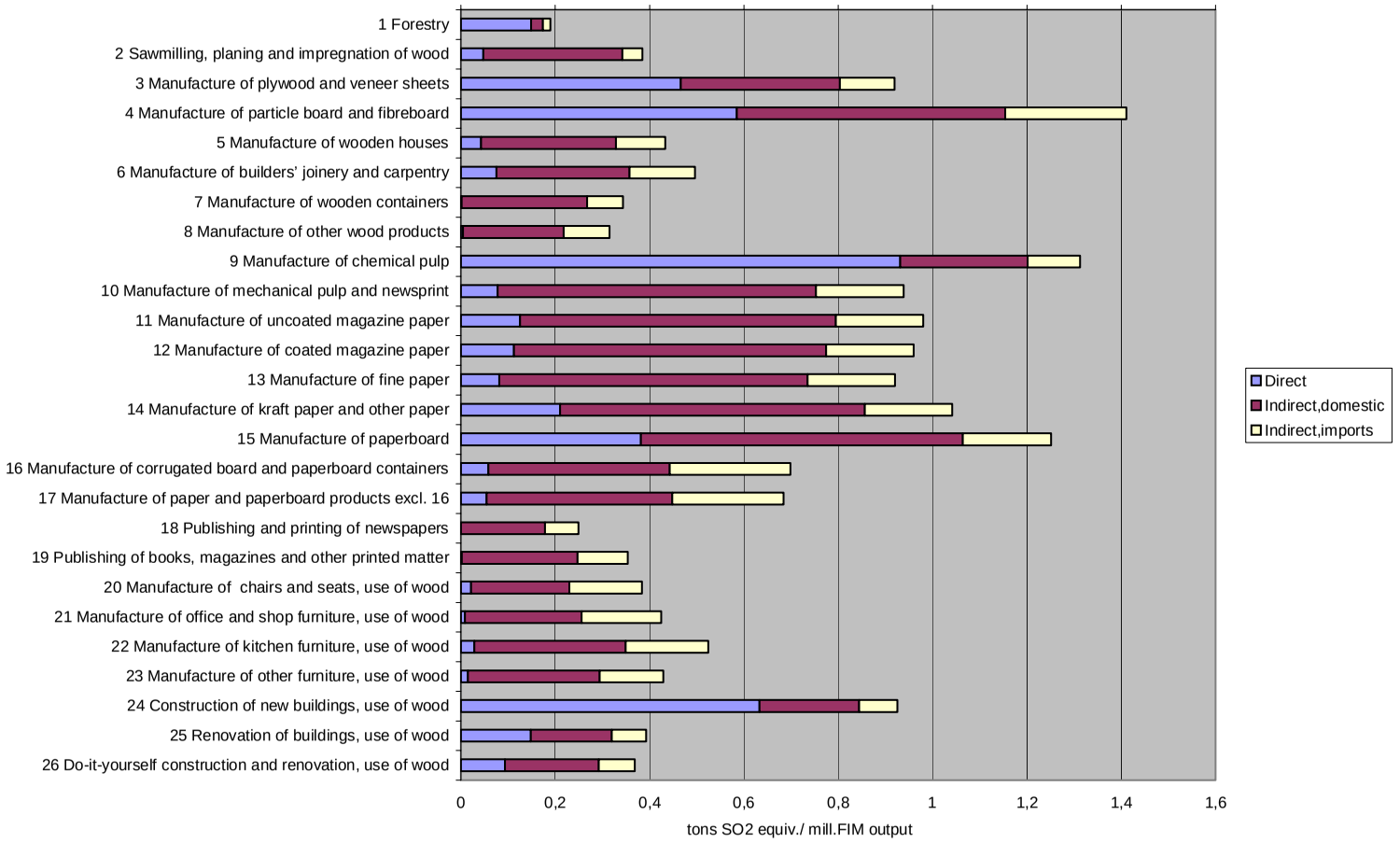

FIGURE 24 Direct and indirect upstream supply chain Acidification Potential intensity of industries in the Finnish forest sector 1995 (AP of wood-based electricity and hot water supply: 7,98 SO_2 equiv. tons/ mill. FIM output)

4.2.2 Systemic indicators

Figure 25 shows percentage indicators, including proportional share of direct and most important indirect contributions by industry in value added. In other words, indicators of relative performance in value added are turned into percentage indicators. Indirect impact is divided into industry-specific contributions, but domestic industries and foreign industries are not separated. These indicators explicitly show, in which industries of the upstream supply chain the production of particular industry creates value added. For example, value added in the supply chain of manufacture of chemical pulp is mostly created in pulp industry itself and in forestry. External stakeholders may use these indicators in decisions concerning particular industry sector in order to realize, which other industries are affected by the decision. In all industries, except in sawmilling, the total value added in supply chain is mostly contributed by industry itself. In sawmilling, the indirect impact in forestry contributes more to total value added than sawmilling itself. In paper industries, indirect impact in manufacture of chemical pulp contributes moderately to their total value added. Real estate, renting and business services, electricity, gas and steam supply and land transport also contribute moderately to the total value added in the Finnish forest sector.

Figure 26 shows percentage indicators, including proportional share of direct and the most important indirect contributions by industry in operating surplus. In these indicators, domestic and foreign contributions are not separated. Indirect contribution of forestry is larger in operating surplus than in value added. That's because the share of operating surplus in forestry's value added is especially high. In addition, manufacture of chemical pulp contributes indirectly to paper industries more in operating surplus than in value added. Indicators in figures 25 and 26 also reflect differences between different supply chains concerning the creation of value added and operating surplus. Suppliers of the forest sector can find out the industries, in which their contribution is relatively the most important. For example, forestry is relatively more important supplier for sawmilling than for manufacture of chemical pulp, in terms of creating value added and operating surplus. On the other hand, real estate, renting and business services is the most important supplier industry in creating value added and operating surplus in the supply chain of publishing and printing industries.

Figure 27 shows percentage indicators, including the proportional share of direct and the most important indirect contributions by industry in creating number of employees in upstream supply chain. In other words, indicators of relative number of employees are turned into percentage indicators. Indirect impact is divided into specific industry contributions, but the domestic industries and foreign industries are not separated. Share of direct impact is the largest in all industries, except in manufacture of chemical pulp, in which forestry contributes indirectly more than industry itself. Forestry is an important contributor in many other industries too. In addition, land transport contributes moderately in the forest sector, especially in paper industry. In

publishing and printing industry, community, social and other services is the most important indirect contributor.

Figure 28 shows percentage indicators, including the proportional share of direct and the most important indirect contributions by industry in upstream supply chain working hours. As in number of employees, forestry, sawmilling, builders' joinery and carpentry, land transport, real estate, renting and business services, and community, social and other services are the most important indirect contributors in upstream supply chain working hours.

Figure 29 shows GWP intensity indicators in percentages, which describe the proportional share of direct GWP, GWP of direct suppliers, GWP of higher-order domestic suppliers and GWP of foreign suppliers. In other words, they show how GWP is generated in upstream supply chain of industry. GWP of forestry and wood-based electricity and hot water supply are dominated by direct impact. It is because of low domestic and foreign input requirements in both branches (see figure 11), but also because of high direct absolute GWP in wood-based electricity and hot water supply. On the other hand, in manufacture of wooden containers and in manufacture of other wood products, GWP originates totally from indirect impacts of suppliers. Hence, percentage indicators are useful in recognizing the importance of direct impacts of industry itself compared to impacts related to its suppliers and the whole upstream supply chain. Proportional share of imports in total impact varies between 10 and 40 percentages. In manufacture of furniture, the share of imports is the highest. This is mainly because of its very low direct absolute GWP.

Figure 30 shows the same percentages for AP intensity. Share of indirect AP is low in forestry, as its input requirements are low. In electricity and hot water supply and in manufacture of chemical pulp, the share of indirect AP is low because of their high direct absolute AP. By comparing percentage indicators of GWP and AP intensities, external stakeholders can find out, that in manufacture of chemical pulp, for example, majority of AP (70%) originates within pulp mills, whereas majority of GWP (70%) originates beyond the gates of pulp mills. Figures explicitly show the focus areas in order to decrease total GWP and AP intensities. For example, in sawmilling most of the upstream supply chain GWP and AP is caused by domestic suppliers. In publishing and printing, in turn, most of the upstream supply chain GWP and AP is caused by higher-order domestic suppliers. Percentage indicators in figures 29 and 30 show general focus areas in upstream supply chain, whereas percentage indicators in figures 31 and 32 show percentage contribution of specific industries to GWP and AP. These indicators may provide information for co-operation between industries. Moreover, percentage indicators in figures 32 and 33 show percentage contribution of iterative tiers in upstream supply chain. These indicators provide information on how far along upstream supply chain there are potential environmental impacts.

In figures 31 and 32 the proportional share of different supplier industries in total upstream supply chain GWP and AP is shown. This is interesting for the industries, which have relatively high proportion of indirect impacts. It is

not surprising that energy sector, i.e. electricity, gas and steam supply, has the highest contribution to total GWP intensities in the forest sector. In many industries, it contributes more to the total GWP intensity than the industry itself. Manufacture of chemicals and chemical products and land transport also contribute to total intensities, but much less than energy sector. It should be noted that the share of "others" in upstream supply chain GWP may be up to 40%. This suggests that partial analysis, considering only the most relevant supplier industries of the upstream supply chain, such as energy sector, chemical industry and transport, does not necessarily provide comprehensive information on sustainability.

As figure 31 shows, the contribution of energy sector to upstream supply chain AP is not as large as to upstream supply chain GWP. This is because of high GWP intensity of average energy production. In addition, the contribution of manufacture of chemical pulp to upstream supply chain AP in paper industries is higher compared to upstream supply chain GWP. This stems from the high process-based AP of chemical pulp production. Indicators suggest that co-operation especially between forest sector and energy sector can enhance environmental sustainability of the industries in the forest sector, as they together play important role in upstream supply chain GWP and AP. Industries of the forest sector may also improve environmental sustainability by co-operating with chemical industry, land transport or other industries. Obviously this kind of co-operation must be coordinated effectively. However, indicators show that focusing only on direct impacts within industry is not likely to enhance sustainability as much as focusing comprehensively on the whole upstream supply chain.

Figures 33 and 34 show cumulative upstream supply chain GWP and AP tier-by-tier iteratively. Here, domestic and foreign supply chains are not separated. These percentage indicators are useful as screening indicators for more detailed industry-level LCA study. They show how many iterative tiers are required in order to achieve for example 90% upstream system completeness. As most of the GWP is generated directly in wood-based electricity and hot water supply, 90% upstream system completeness is achieved almost at tier 0, i.e. without considering any supplier industries. In mechanical forest industry, 90% upstream system completeness is achieved at tier three in forestry, at tier four in sawmilling and at tier five in manufacture of wooden houses. In chemical forest industry, 90% upstream system completeness is achieved at tier three in manufacture of chemical pulp, at tier four in manufacture of kraft paper and other paper and at tier five in publishing and printing of newspapers.

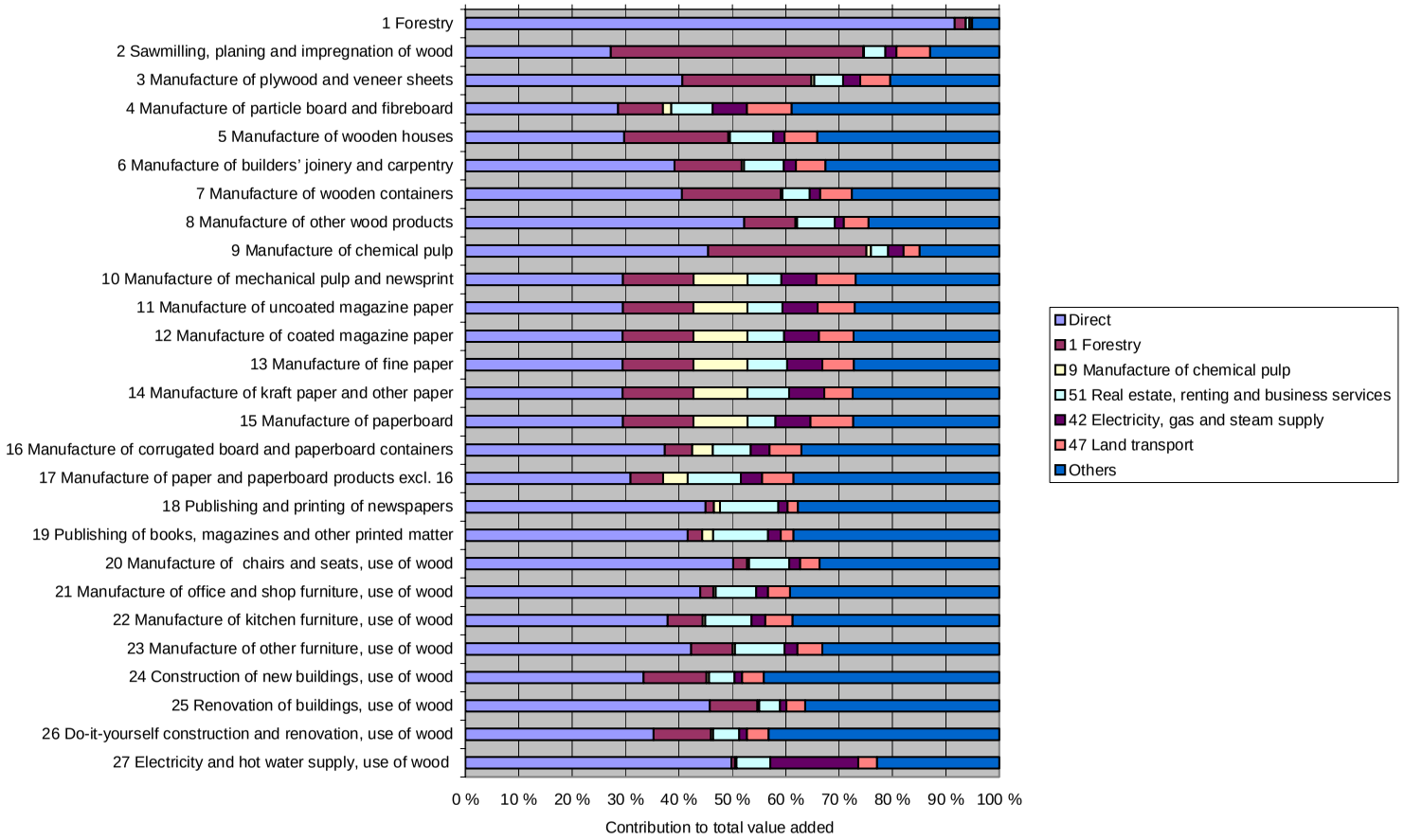

FIGURE 25 Contribution of different industries to upstream supply chain value added in the Finnish forest sector 1995

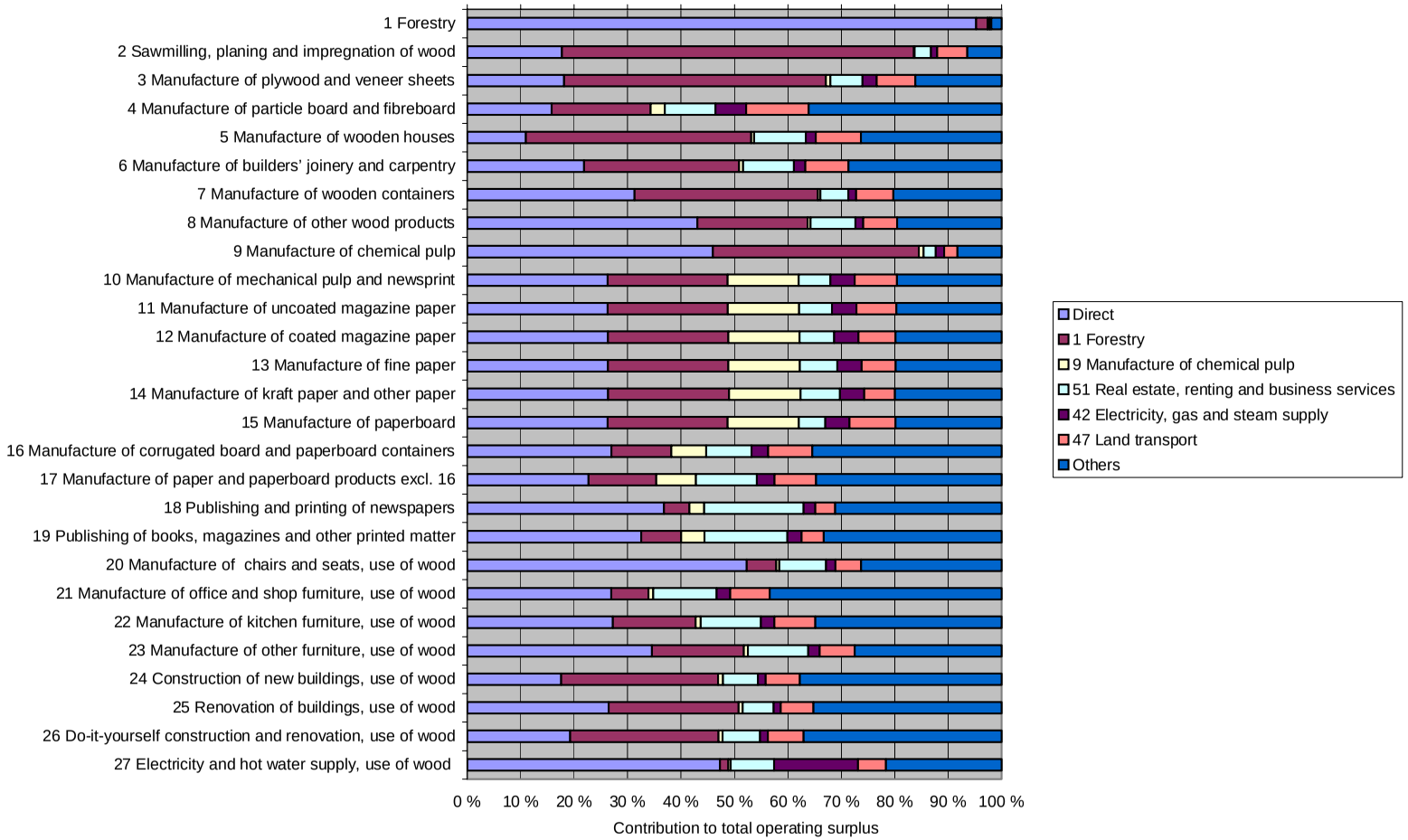

FIGURE 26 Contribution of different industries to upstream supply chain operating surplus in the Finnish forest sector 1995

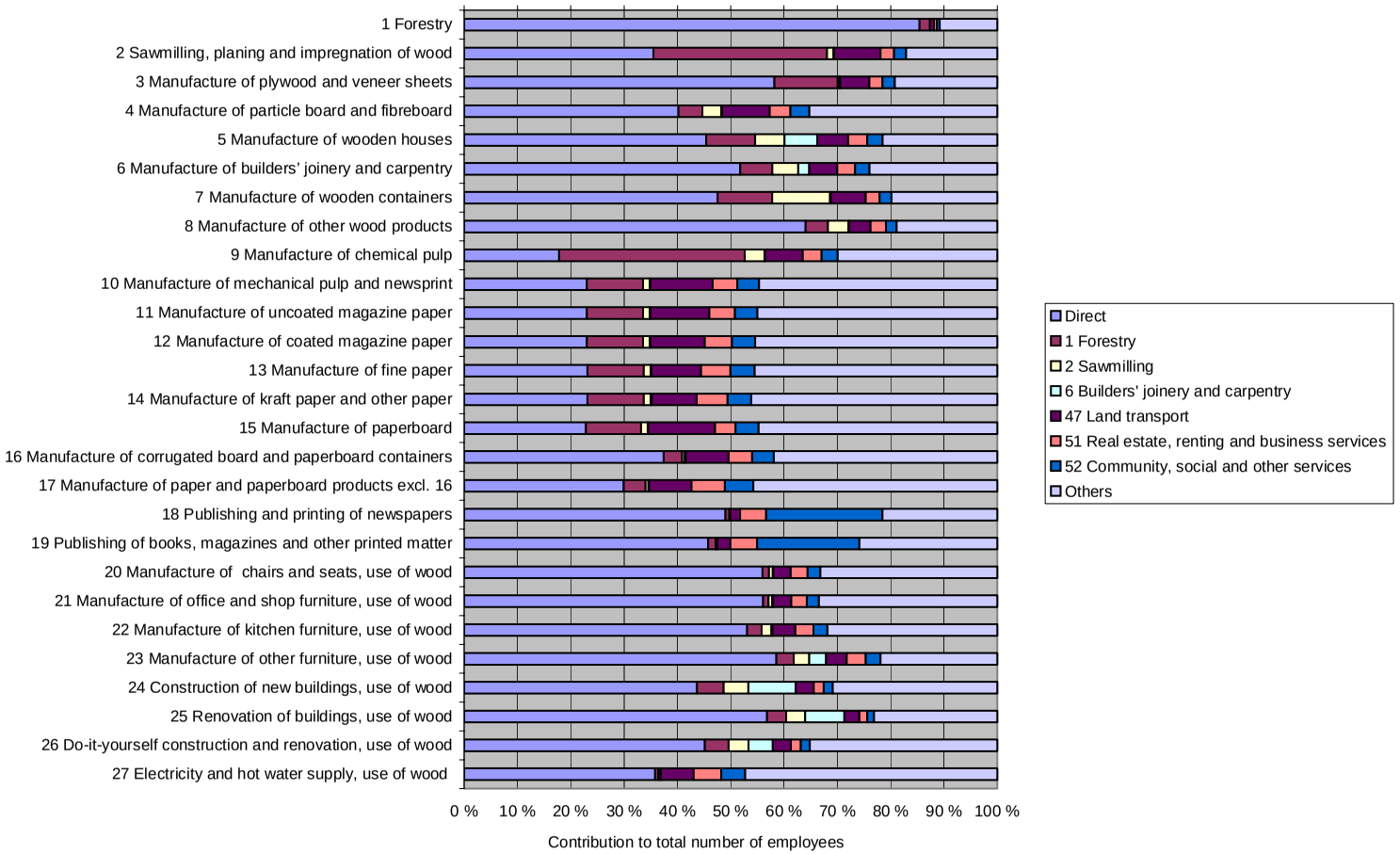

FIGURE 27 Contribution of different industries to upstream supply chain employees in the Finnish forest sector 1995

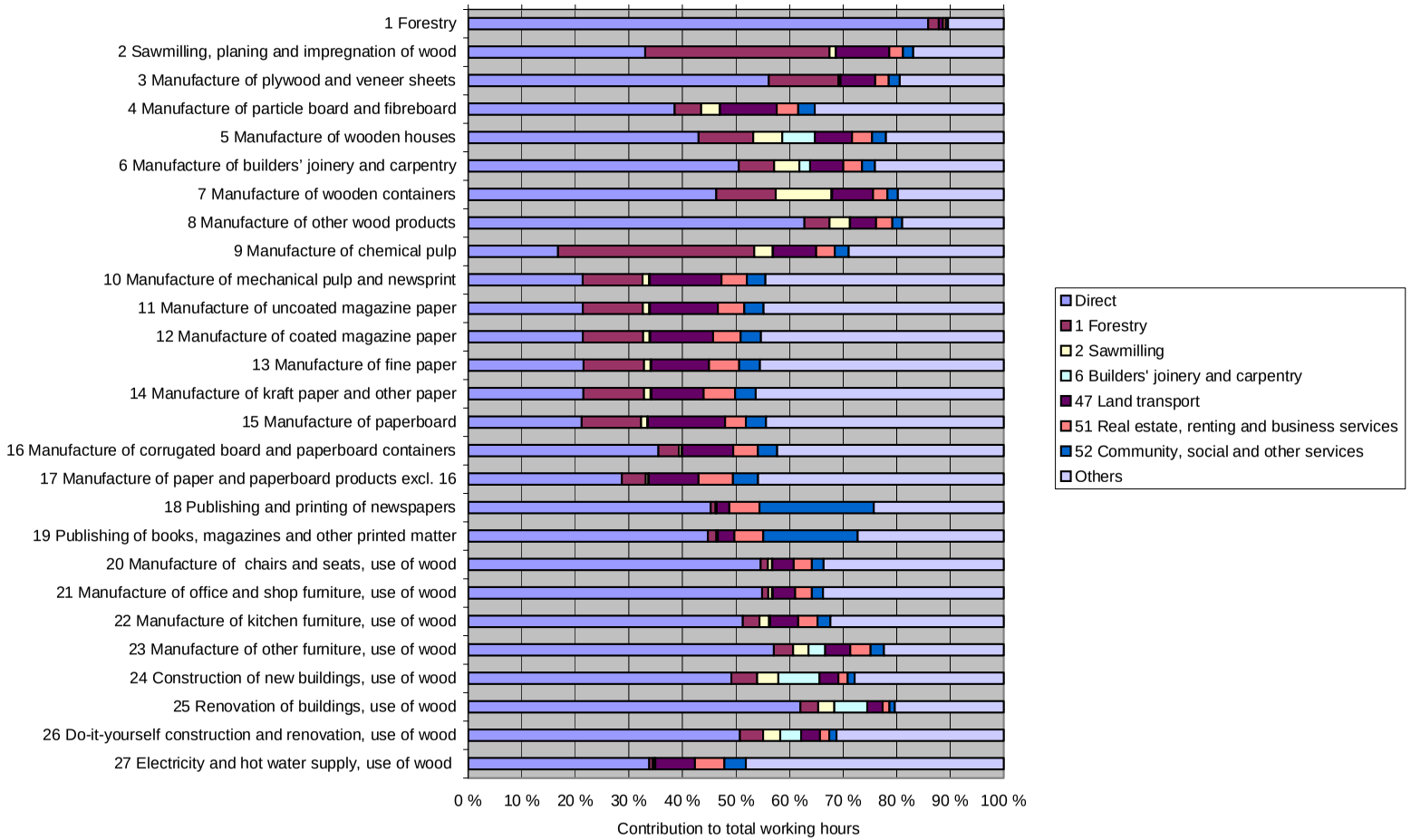

FIGURE 28 Contribution of different industries to upstream supply chain working hours in the Finnish forest sector 1995

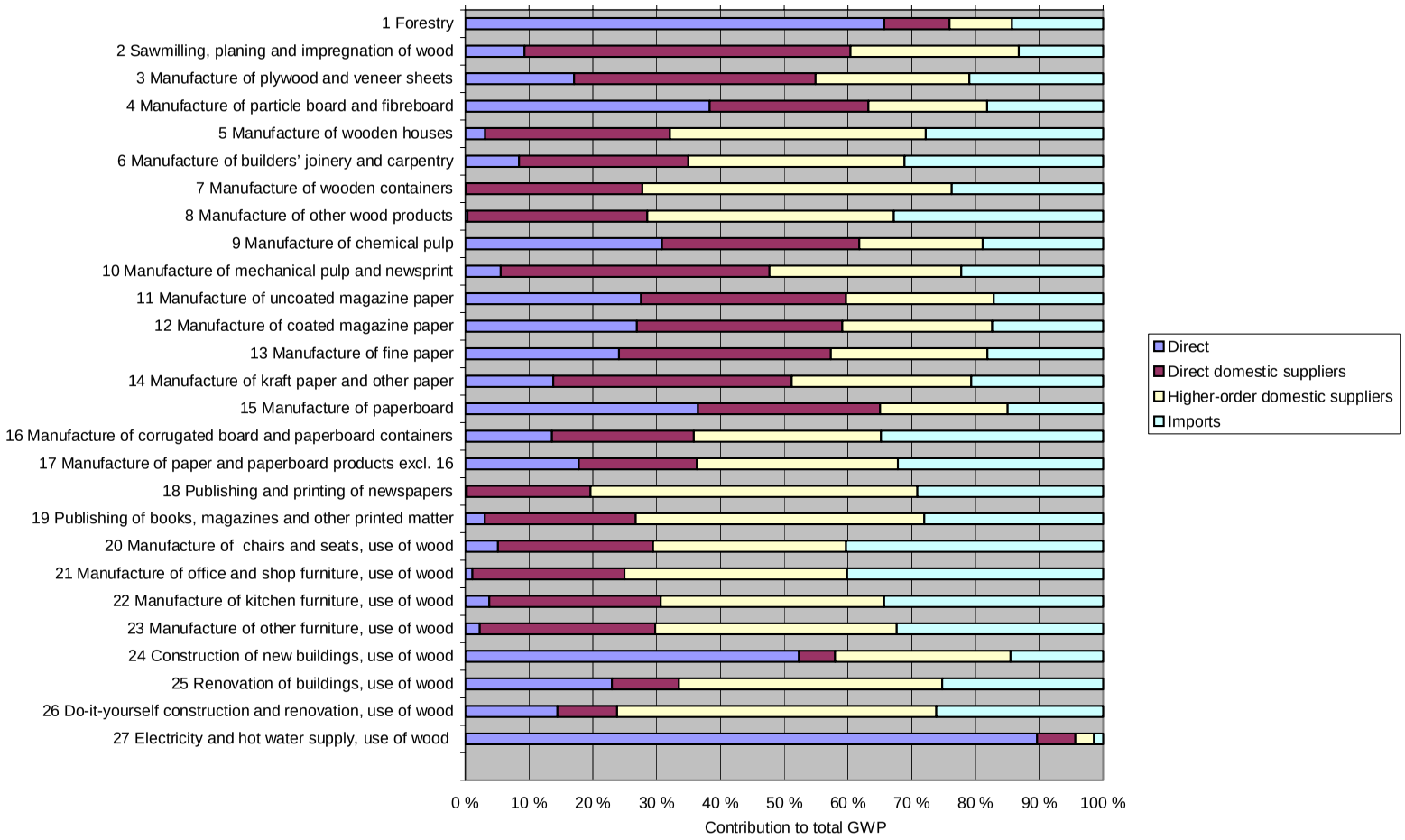

FIGURE 29 Proportional share of direct, direct domestic suppliers, higher-order domestic suppliers and imports contribution to total Global Warming Potential in the Finnish forest sector 1995

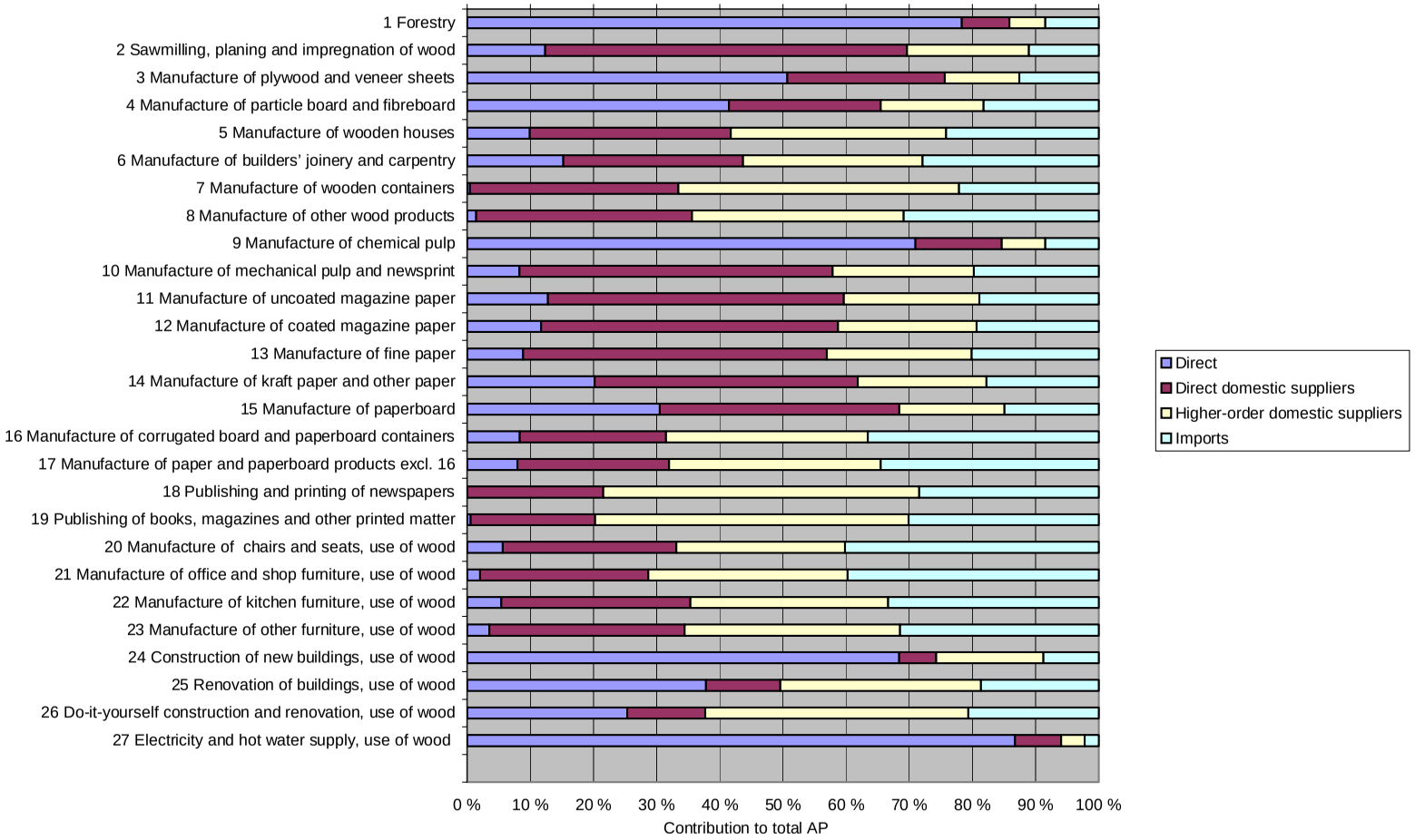

FIGURE 30 Proportional share of direct, direct domestic suppliers, higher-order domestic suppliers and imports contribution to total Acidification Potential in the Finnish forest sector 1995

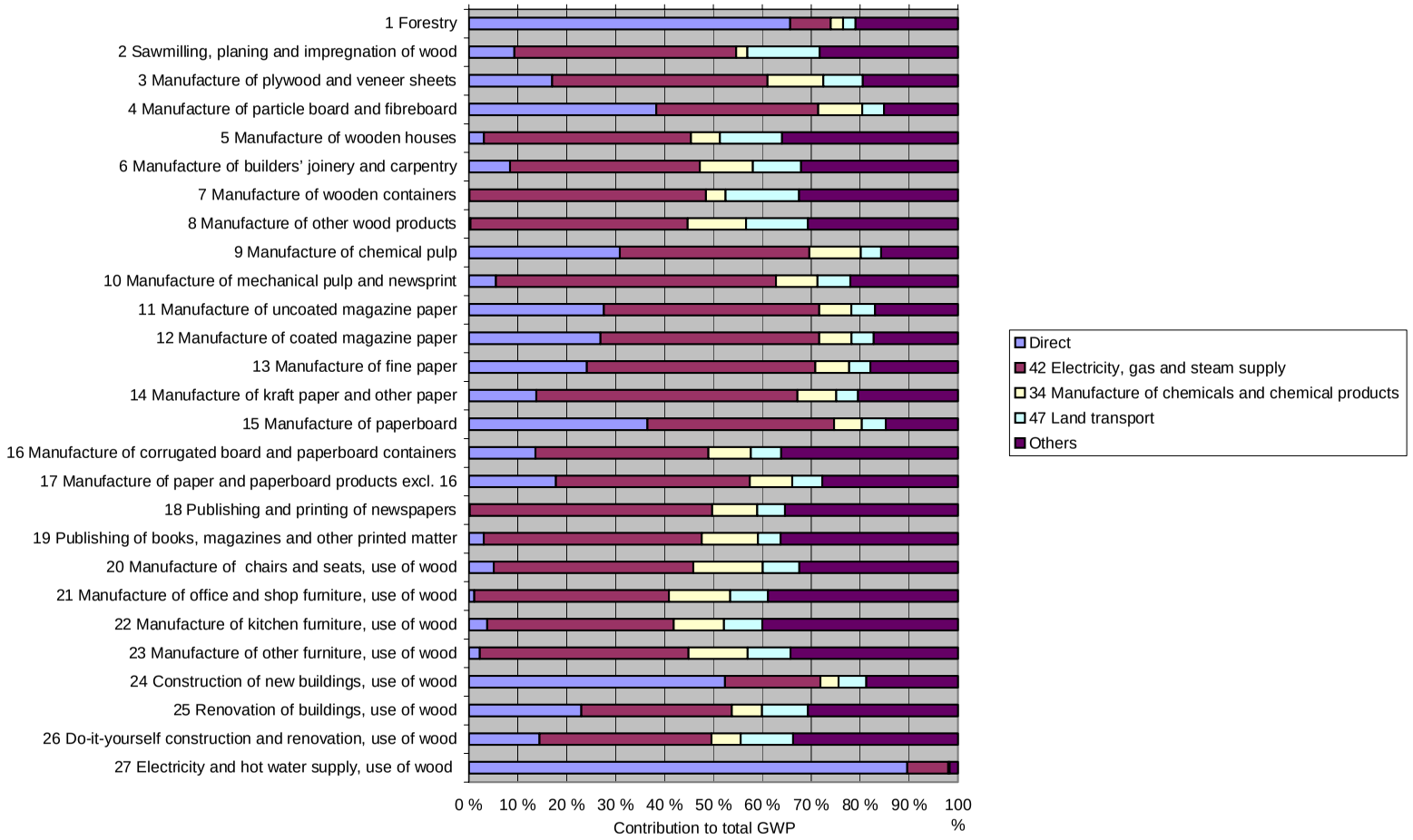

FIGURE 31 Contribution of different industries to upstream supply chain GWP in the Finnish forest sector 1995

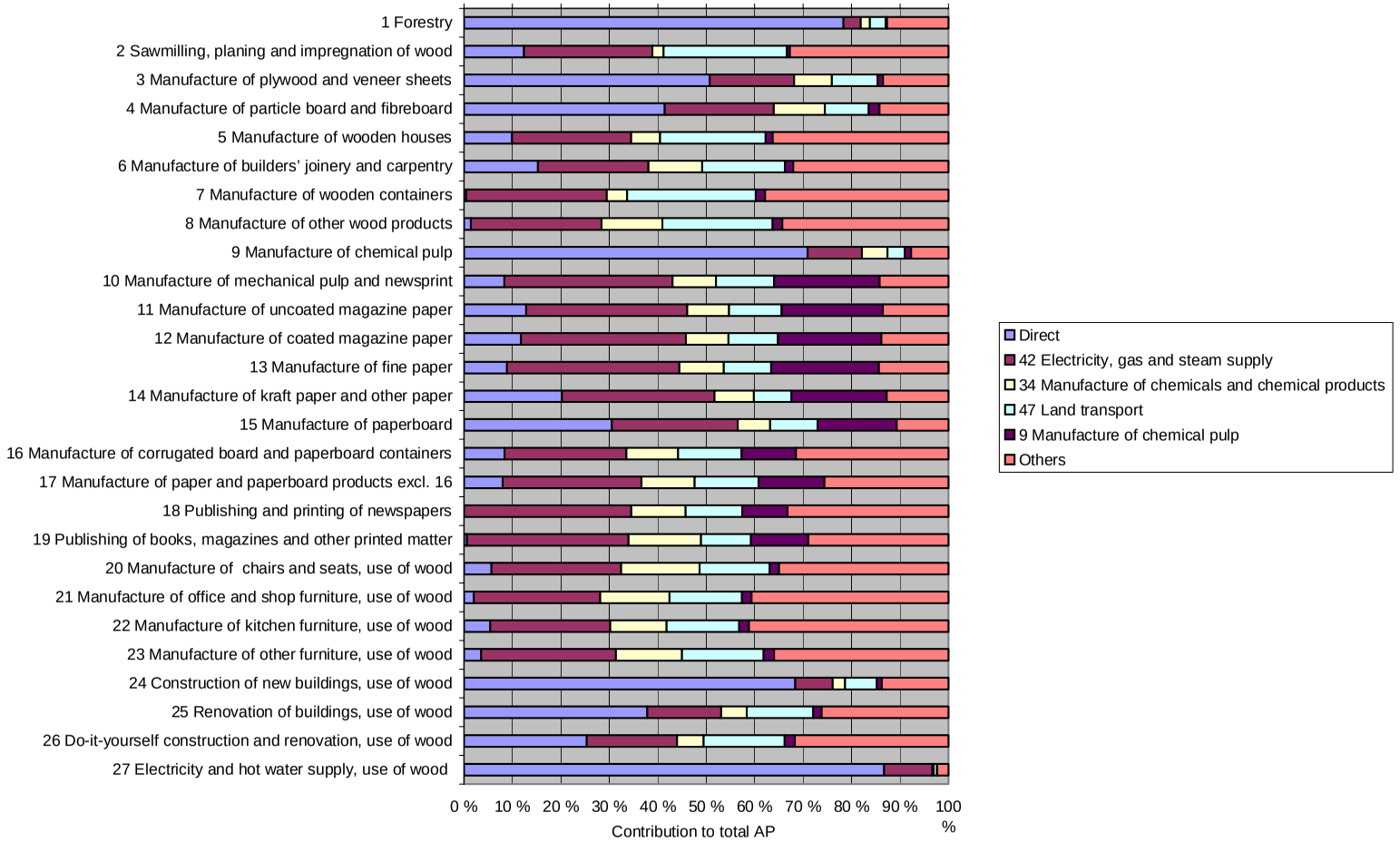

FIGURE 32 Contribution of different industries to upstream supply chain AP in the Finnish forest sector 1995

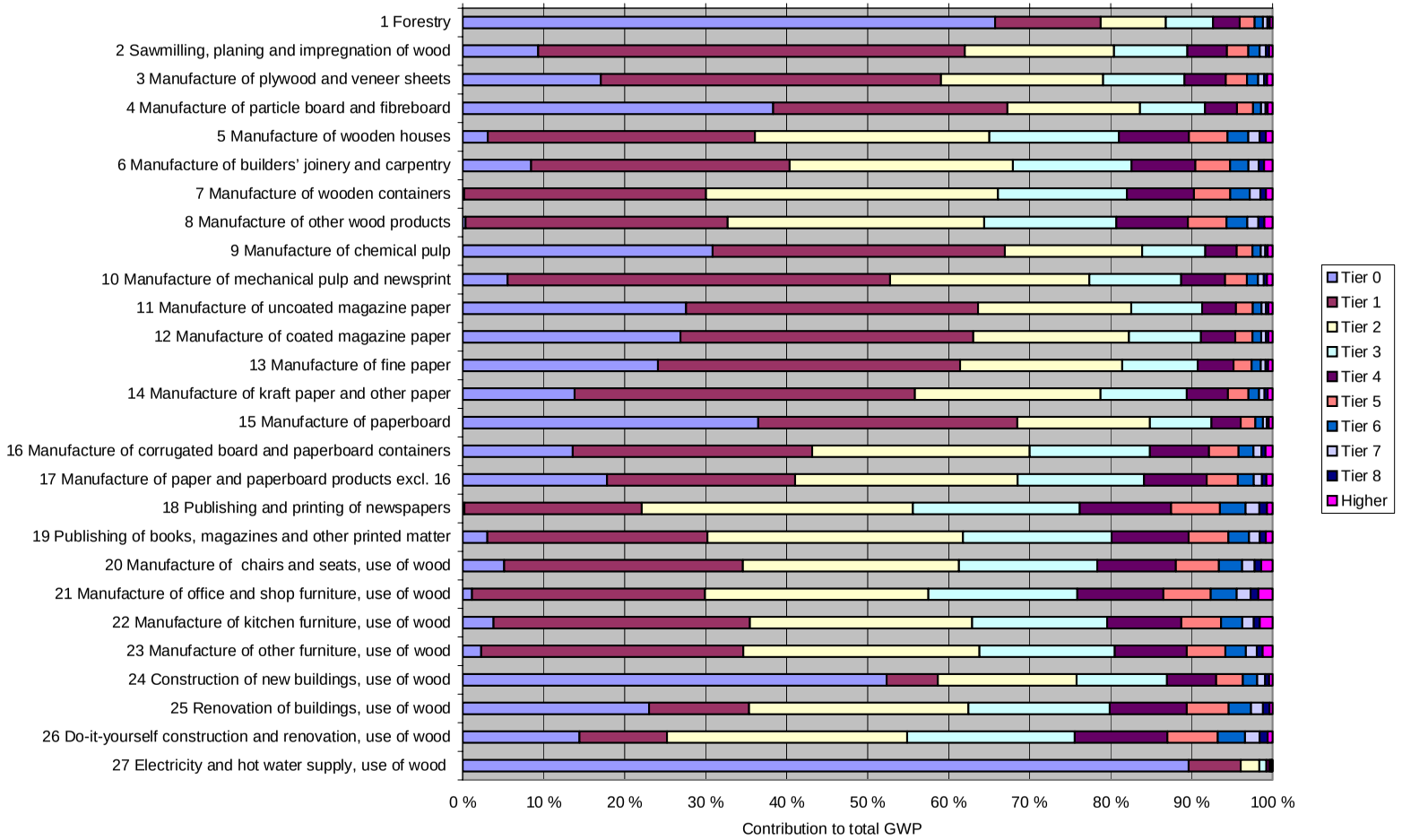

FIGURE 33 Contribution of upstream supply chain tiers to total GWP in the Finnish forest sector 1995

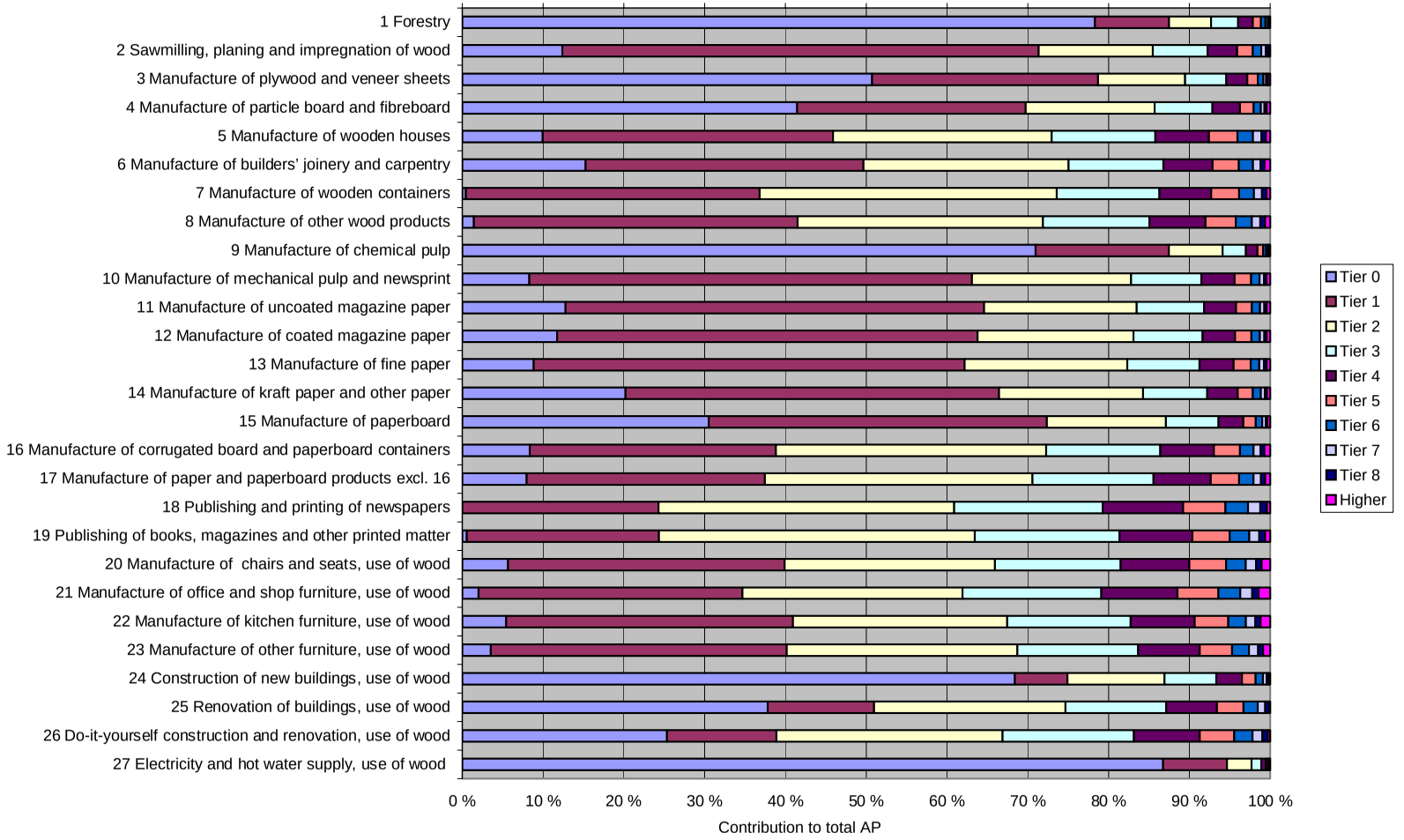

FIGURE 34 Contribution of upstream tiers to total AP in the Finnish forest sector 1995

Requirements of cumulative tiers in order to achieve 90% upstream system completeness in upstream supply chain AP are slightly different. In forestry, 90% completeness is achieved already at tier two. Also in sawmilling, in manufacture of wooden houses, in manufacture of chemical pulp and in manufacture of kraft paper and other paper 90% completeness is achieved one tier earlier than in GWP. In that sense, sustainability improvements in AP issues are easier to conduct than in GWP issues. It can be also noted, that system completeness of upstream supply chain GWP and AP is achieved earlier in energy-intensive industries. External stakeholders may use these percentage indicators in understanding the complexity of interdependencies in environmental issues.

4.3 Comparison of three sectors

This section presents a comparison of three industries/ branches within the Finnish forest sector in terms of their absolute economic and environmental performance, as well as their relative economic and environmental performance. Elaborated industries/ branches are forestry (industry class 1), manufacture of builders' joinery and carpentry (industry class 6) and manufacture of chemical pulp (industry class 9). These three industries introduce an interesting mix of different types of industries/ branches belonging to the forest sector. Indicators in the previous section provide a basis for the selection of these particular industries/ branches for further elaboration. Forestry represents an early phase of the supply chain, providing raw material, i.e. virgin wood, for all other industries/ branches in the forest sector. Hence, input requirements of forestry are low (figure 18). In addition, within the Finnish forest sector, absolute number of employees and working hours is highest in forestry (figure 14-15). Manufacture of chemical pulp represents typical intermediate product manufacture within chemical forest industry, providing raw material for paper industry. In addition, manufacture of chemical pulp is known as energy-intensive industry and it has the highest absolute acidification potential in the forest sector (figure 17). Among 27 industries of this case study, forestry and manufacture of chemical pulp have the highest absolute output value, value added and operating surplus (figures 11-13). Manufacture of builders' joinery and carpentry represents more refined manufacturing within mechanical forest industry, providing products for construction. According to indicators in the previous chapter, it also represents rather average sustainability performance compared to other industries/ branches in the forest sector.

4.3.1 Absolute economic and environmental performance

Absolute economic and environmental indicators were presented in the sections 4.1.1 and 4.1.2. However, figure 35 provides an indicator set, including all six absolute indicators with comparison of three branches.

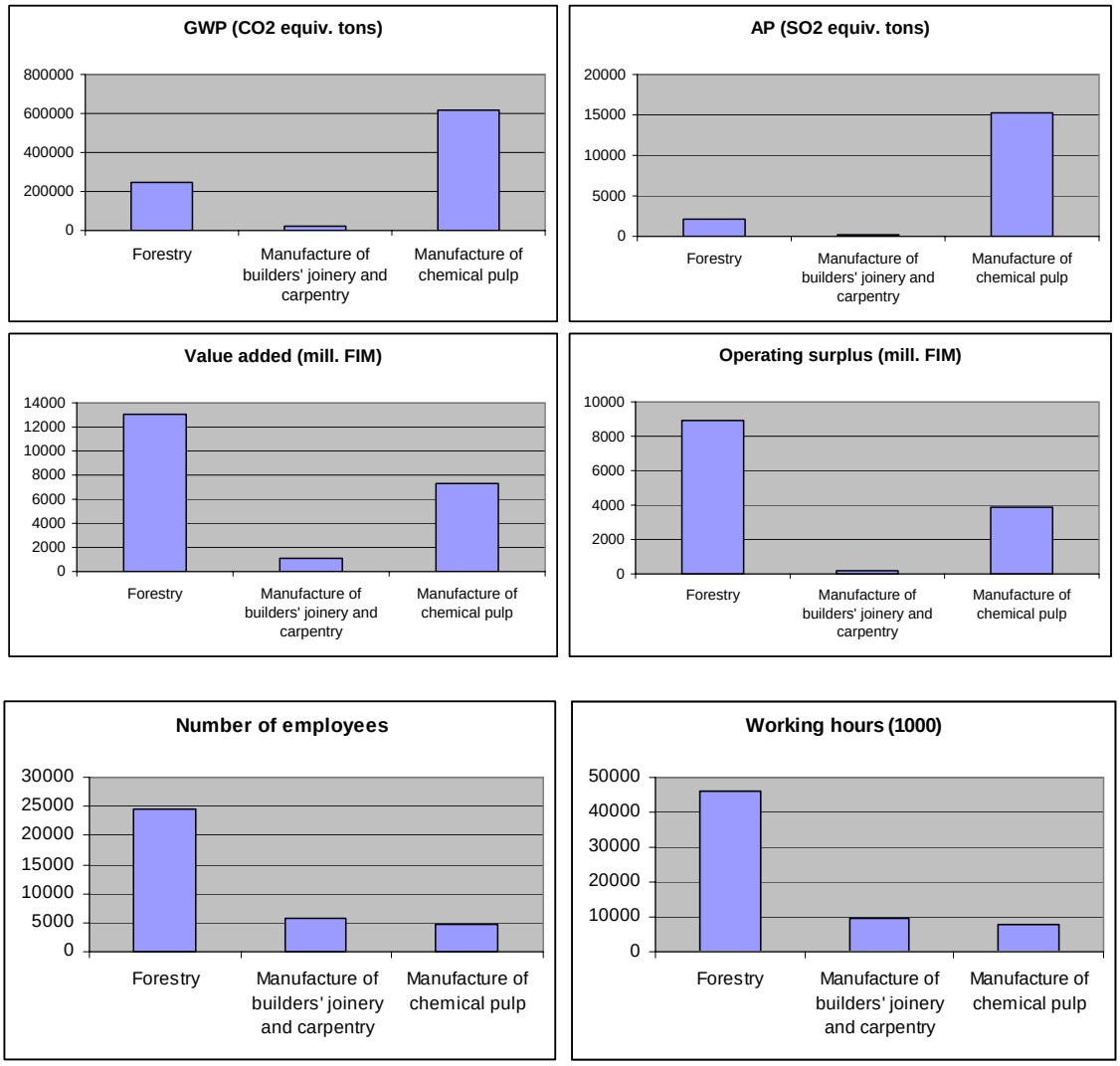

FIGURE 35 Absolute indicator set

4.3.2 Relative economic and environmental performance

In this section, two types of cross-cutting sustainability indicators at industry-level are presented in the case of the Finnish forest sector: eco-efficiency indicators and labour productivity indicators. Eco-efficiency indicators are presented in two sets. The first set shows the ratios of financial economic impact (value added or operating surplus) and environmental impact (GWP or AP). The second set shows the ratios of environmental impact (GWP or AP) and non-financial economic impact (number of employees or working hours).

Labour productivity indicator set, in turn, shows the ratios of financial economic impact (value added or operating surplus) and non-financial economic impact (number of employees or working hours). In addition, eco-efficiency and labour productivity indicators are presented as direct indicators and upstream supply chain indicators. Direct indicators can be derived as a ratio of two absolute indicators presented in figure 35. Upstream supply chain indicators, in turn, are derived as a ratio of two total factor multipliers (i.e. cross-cutting indicators presented in section 4.2.1). Set of total factor multipliers for the three sectors is presented in figure 36. Total factor multipliers are divided into direct and indirect multipliers. Hence, eco-efficiency and labour productivity of different sectors can be compared with different system boundaries.

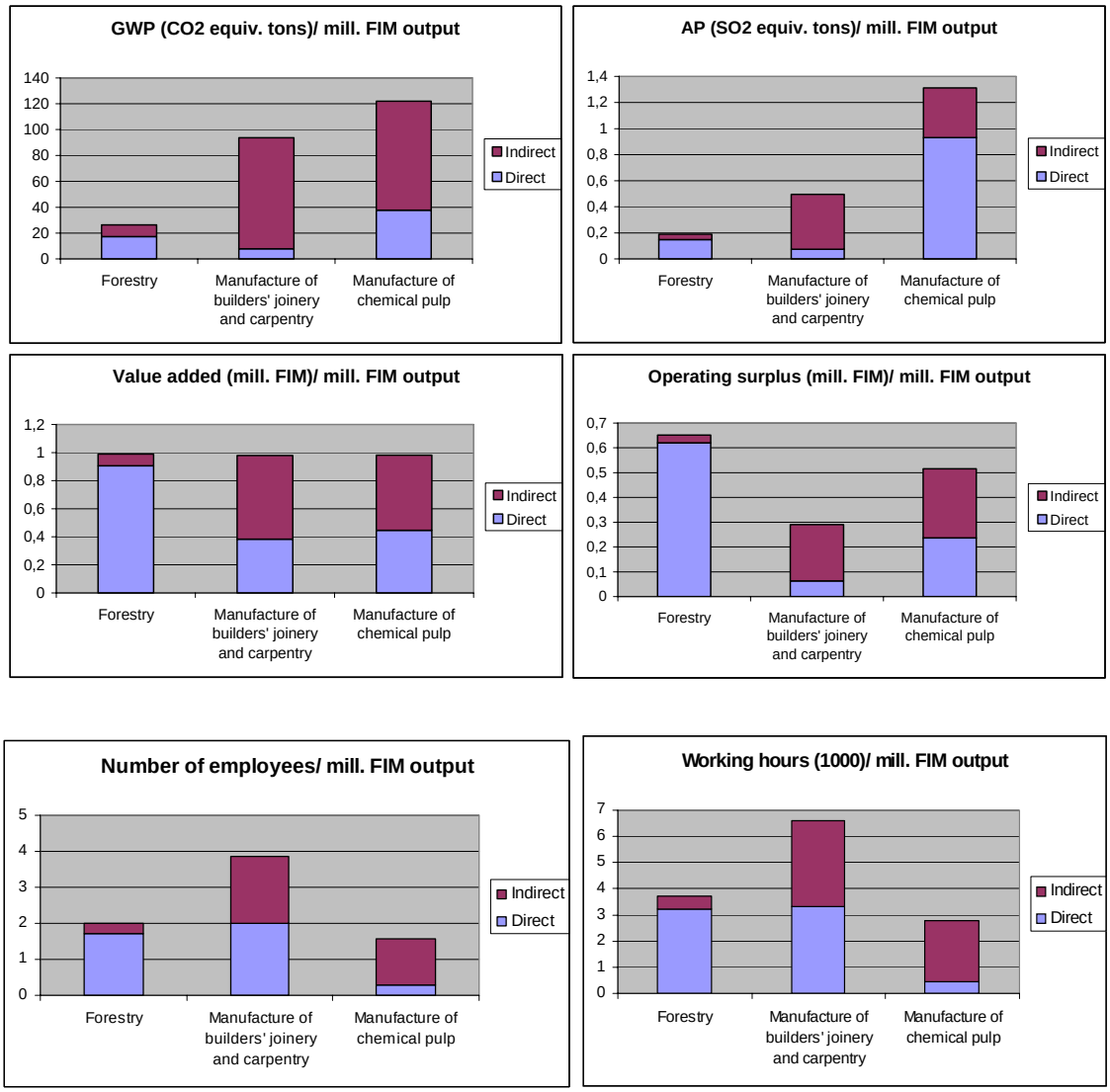

FIGURE 36 Total factor multipliers (direct and indirect upstream supply chain impact per million FIM output)

Direct eco-efficiency/ labour productivity indicators provide measures on the direct performance of industries, including impacts only within the industry itself. Upstream supply chain indicators provide measures with broader system boundary, including complete domestic upstream supply chain system and an approximation of upstream supply chain impacts abroad. Since the ratios include two different aspects, both aspects have the same system boundary. For example, numerator of upstream supply chain eco-efficiency indicator includes economic impacts within the whole upstream supply chain system and denominator of the indicator includes environmental impacts within the whole upstream supply chain.

4.3.2.1 Eco-efficiency

Figure 37 shows an eco-efficiency indicator set including four different eco-efficiency ratios (value added/ GWP, value added/ AP, operating surplus/ GWP and operating surplus/ AP. These eco-efficiency indicators enable external stakeholders to compare, which industries provide most value added/ operating surplus per unit of greenhouse gas emissions/ acidificating emissions. It is the performance of the whole national industry, which influences on the decisions of policy-makers and which is used as a benchmark by many other stakeholders too. Comparison of three selected sectors is provided. Increases in eco-efficiency indicators reflect positive environmental-economic performance. Forestry seems to be eco-efficient measured with any ratio. Forestry exhibits a good performance both in direct eco-efficiency and upstream supply eco-efficiency. Direct eco-efficiency is influenced by high direct value added. Upstream supply chain eco-efficiency is competitive because of low upstream supply chain GWP of forestry. As there are basically no differences in total upstream supply chain value added, it is upstream supply chain GWP, which makes differences in upstream supply chain eco-efficiency performance between industries. Broadening system boundary weakens eco-efficiency performance of manufacture of builders' joinery and carpentry crucially. That's because of its relatively high upstream supply chain GWP. In this indicator set, only manufacture of chemical pulp exhibits improved eco-efficiency with broader system boundary, but only in AP-related indicators. Compared to manufacture of builders' joinery and carpentry, however, manufacture of chemical pulp is not eco-efficient.

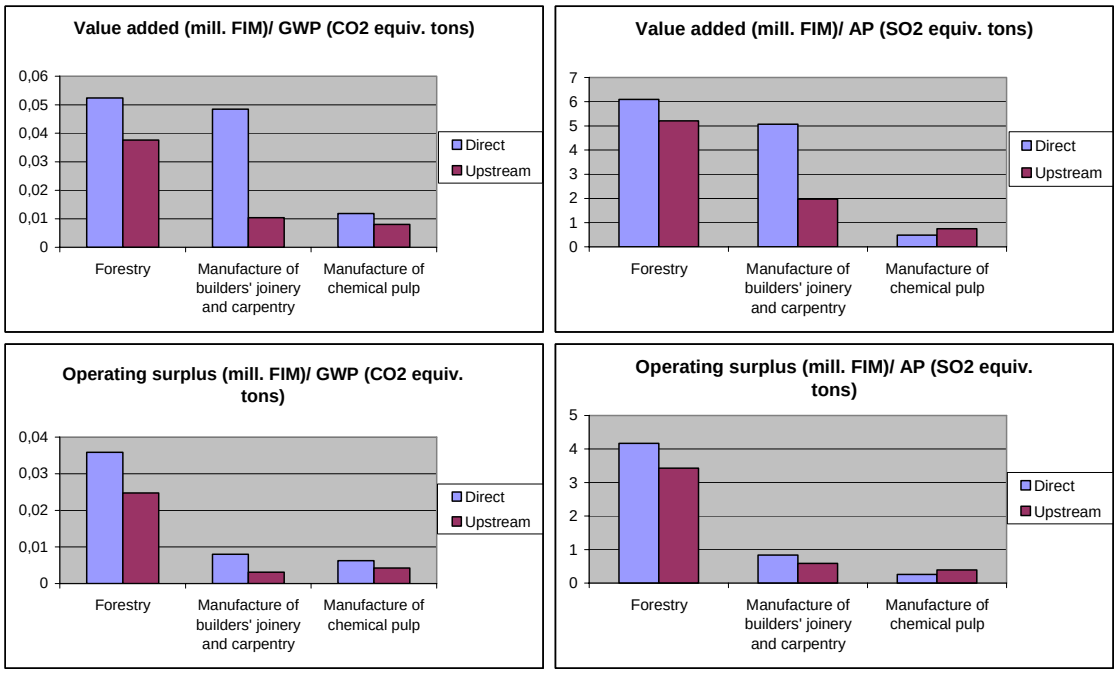

FIGURE 37 Eco-efficiency indicator set 1 (ratios of financial economic impact and environmental impact; direct eco-efficiency and upstream supply chain eco-efficiency)

In figure 38, eco-efficiency indicator set shows four other ratios, namely GWP/ employee, AP/ employee, GWP/ 1000 working hours and AP/ 1000 working hours. In contrast to first eco-efficiency indicator set, increases in these indicators reflect negative performance in terms of eco-efficiency. Based on this set of indicators, forestry and manufacture of builders' joinery and carpentry are much more eco-efficient than manufacture of chemical pulp. That's because of high direct GWP and AP as well as low direct number of employees in manufacture of chemical pulp. Broader upstream system boundary is beneficial for manufacture of chemical pulp, as it exhibits improved performance (i.e. lower column) in the upstream supply chain compared to direct performance. On the other hand, extension of the upstream system boundary weakens the eco-efficiency of forestry and manufacture of builders' joinery and carpentry.

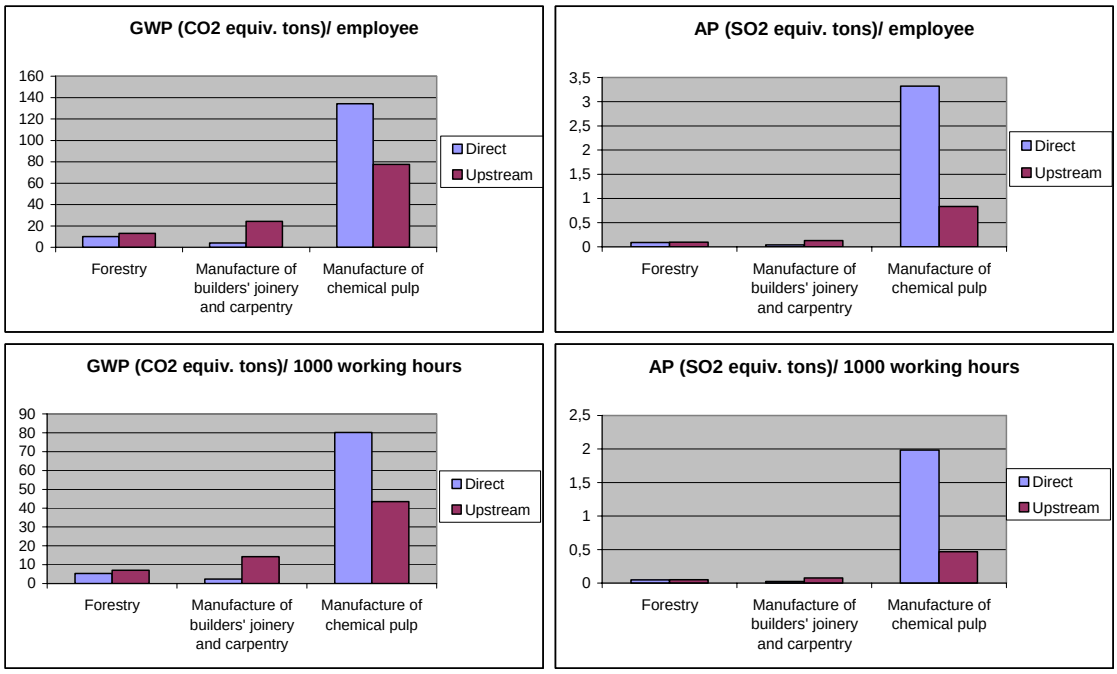

FIGURE 38 Eco-efficiency indicator set 2 (ratios of environmental impact and non-financial economic impact; direct eco-efficiency and upstream supply chain eco-efficiency)

As demonstrated above, comparison of industries based on direct eco-efficiency indicators provides rather limited perspective on sustainability. Many industries have very small direct emissions, which may make their eco-efficiency performance superior compared to other industries. Upstream supply chain eco-efficiency with extended system boundary provides a more complete picture on the eco-efficiency of the system, which as a whole serves the particular industry. Hence, industries with different characteristics can be compared more accurately with the indicators reflecting the whole upstream supply chain system. In addition, eco-efficiency ratios should be interpreted together with absolute indicators and labour productivity indicators, which are demonstrated in the next section.

4.3.2.2 Labour productivity

Figure 39 shows a labour productivity indicator set with four different ratios of financial and non-financial economic aspects. Indicators reflecting value added/ employee, operating surplus/ employee, value added/ 1000 working hours and operating surplus/ 1000 working hours are presented. Increases in labour productivity indicators reflect improved labour productivity performance. Manufacture of chemical pulp seems to have the highest direct labour productivity. That's because of its low direct number of employees. On the other hand, manufacture of builders' joinery and carpentry exhibits relatively poor labour productivity compared to forestry and manufacture of chemical pulp. This reflects the high labour intensity of manufacture of

builders' joinery and carpentry. In addition, relatively low operating surplus associated with manufacture of builders' joinery and carpentry has an influence in labour productivity indicators. However, manufacture of builders' joinery and carpentry exhibits slightly improved labour productivity with upstream supply chain system boundary. In manufacture of chemical pulp, introduction of upstream supply chain system boundary decreases labour productivity crucially. Using number of employees or working hours as a denominator of labour productivity ratio does not make a big difference. Same applies to eco-efficiency indicators with number of employees or working hours as a ratio. However, indicators with different metrics provide better options to describe the phenomenon for a diverse audience in different contexts. For example, employee-based indicators can be a powerful tool in explaining to industry workers their actual contribution to sustainability. Each employee of the industry produces annually x amount of value added and operating surplus, but, at the same time, y amount of greenhouse gas emissions and acidificating emissions. Thus, employee may consider himself/ herself simultaneously economically valuable and environmentally destructive.

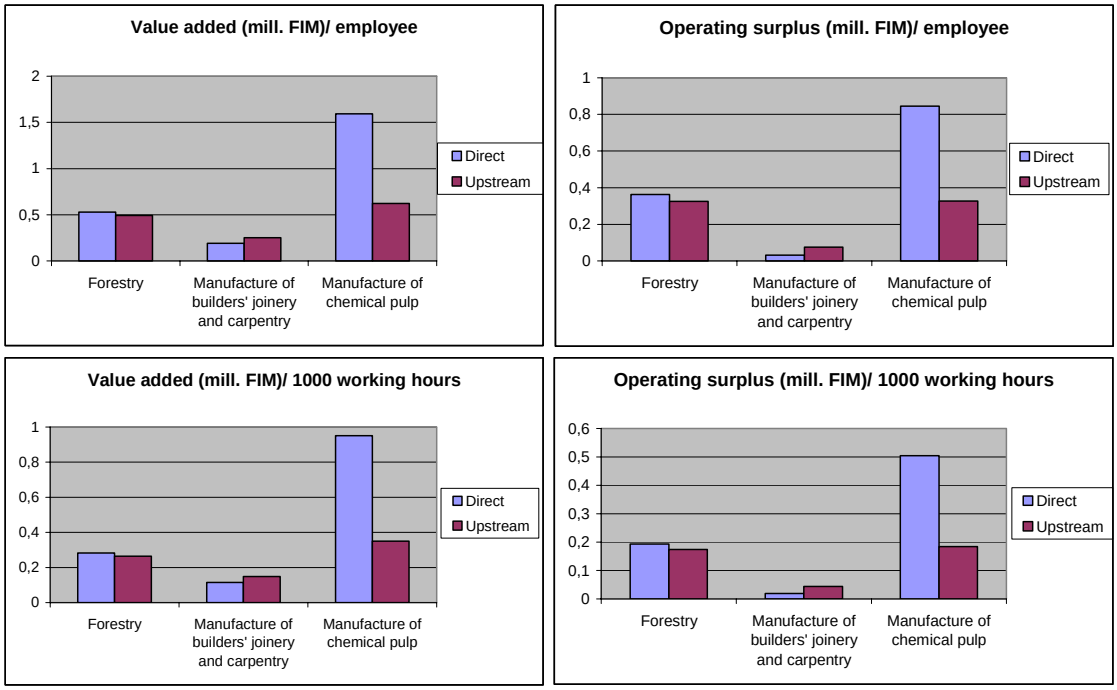

FIGURE 39 Labour productivity indicator set (ratios of financial and non-financial economic impact; direct labour productivity and upstream supply chain labour productivity)

Introduction of different indicators, i.e. eco-efficiency and labour productivity indicators provides a more complete picture on sustainability performance, but it also makes comparison of different industries more complex. Manufacture of chemical pulp, for example, exhibits excellent labour productivity ratios but, at the same time, rather poor eco-efficiency ratios compared to other sectors.

When there's a lack of employees, industries with high labour productivity may be preferred. In addition, as eco-efficiency and labour productivity indicators provide information only on relative sustainability performance, their interpretation requires information also on absolute sustainability performance.

4.4 Hybrid indicators

Industry-level economic, environmental and integrated sustainability indicators provide an appropriate basis for industry-level communication between micro-level and macro-level on average industry-level performance. From managerial perspective, industry-level indicators provide useful background information, with which a manager can benchmark sustainability performance of the industry related to other industries. In addition, decisions at macro-level are often based on industry-level information rather than site-specific or company-specific information. On the other hand, industry-level indicators are not accurate for managerial decision-making, since differences in sustainability performance within industry can be notable. Production sites within one industry often produce different products with different technologies. This, in turn, has a direct consequence on economic and environmental impacts. Moreover, the whole upstream supply chain of an individual site or a company is not the same as the upstream supply chain of an industry. For example, different sites within industry may use different energy suppliers, which each have different contribution to upstream supply chain sustainability. Each specific supply chain is unique in nature. Hence, from managerial perspective, site-specific or company-specific information is required for decision-making.

4.4.1 Site-specific data for hybrid indicators

Hybrid method makes it possible to combine site-level data with industry-level data. In principle, all data of the upstream supply chain should be site-specific in order to make accurate sustainability indicators. In practice, however, infinite interdependencies of the supply chain make site-specific approach difficult to conduct. Hybrid method is flexible in that sense, because it allows the use of site-specific data to any extent and simultaneously provides macro-level framework, which covers all industries and all interdependencies between industries. In this case study, hybrid method is demonstrated with very simple example of combining site-level and industry-level data in environmental sustainability indicators. More complete demonstration would require specific data on suppliers, which is often confidential. In table 10, site-specific data of three Finnish pulp mills producing bleached softwood sulphate pulp is presented. The data on site-specific production amounts and CO_2 emissions were obtained from Environmental Report of Pulp and Paper Industry 1999 (Metsäteollisuus ry 2000). These data were used in calculating direct GWP

coefficients for the three pulp mills. Average price (3483 FIM/ t) 1995 for sulphate pulp was used in calculating value of production (Metsäntutkimuslaitos 1997).

TABLE 10 Site-specific data of three Finnish pulp mills producing bleached softwood sulphate pulp

	Joutseno Pulp	Kemijärvi mill	Sunila Oy, Kotka
Production	382 000 t	216 000 t	285 300 t
GWP emissions	105 725 t	44 000 t	51 310 t
Value of production	1331 FIM mill.	752 FIM mill.	994 FIM mill.
Direct GWP coefficient	79,4 t/ FIM mill	58,5 t/ FIM mill	51,6 t/ FIM mill

4.4.2 Combination of site-specific data and industry-level data

In figure 23, average industry-level direct and indirect upstream supply chain GWP intensity indicators were presented. For site-specific GWP indicators, direct GWP intensity of industry average (manufacture of chemical pulp) can be replaced by site-specific direct GWP coefficients. In figure 40, site-level direct GWP intensity and industry-level indirect upstream supply chain GWP intensity are combined. Here, direct site-specific GWP and average indirect industry-level GWP are simply summed together. As figure 40 shows, direct GWP of the three individual sites is clearly higher than industry average. This can be caused by source data uncertainty or technological diversity.

Site-specific upstream supply chain GWP should also be based on site-specific data on suppliers, suppliers of suppliers and so on, because there are inherent differences between supply chains within the industry. In this case study, site-specific data on suppliers were not available. However, hybrid method can be applied also to whole upstream supply chain. Here, hybrid method is discussed by using industry-level input-output based data as background information in the case of manufacture of chemical pulp. First, figure 41 shows the contribution of each iterative tier to upstream supply chain GWP of manufacture of chemical pulp. The figure shows, that the 1st order (direct suppliers) contributes more to overall GWP of manufacture of chemical pulp than manufacture of chemical pulp itself directly. Higher-order suppliers contribute to upstream supply chain GWP considerably less, but at least 2nd order (suppliers of direct suppliers) and 3rd order should be considered as significant contributors. For hybrid indicators, relevant site-specific data should be traced at least to the third order, in order to avoid significant errors related to the use of average industry-level data.

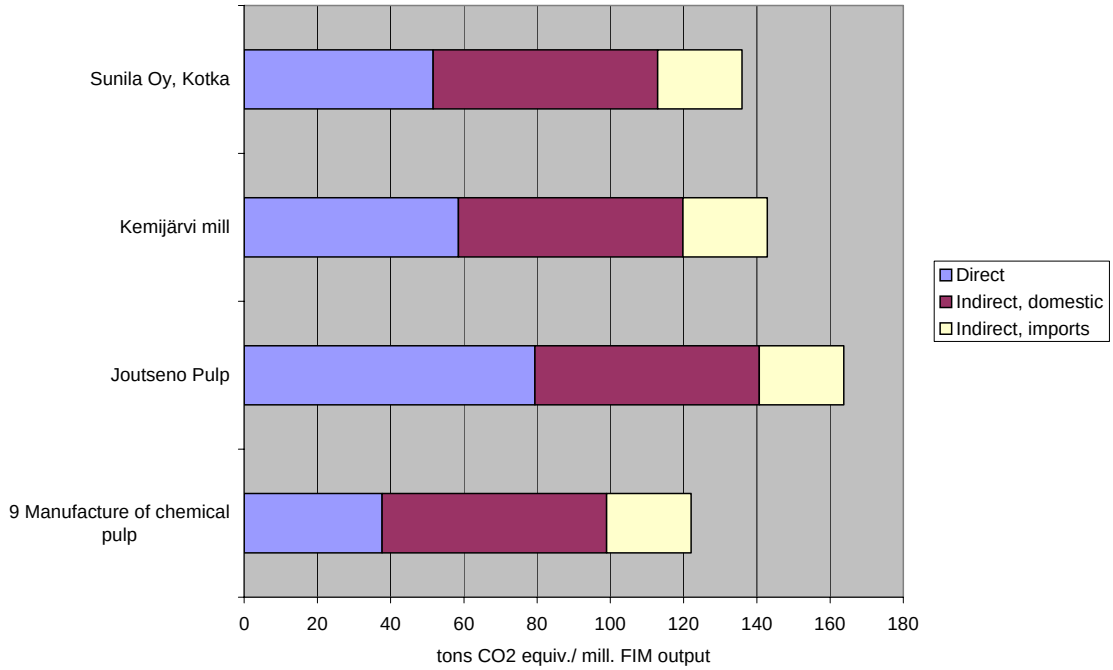

FIGURE 40 Direct and indirect upstream supply chain GWP intensity in three pulp mills and in average industry (indirect GWP based on average industry-level data)

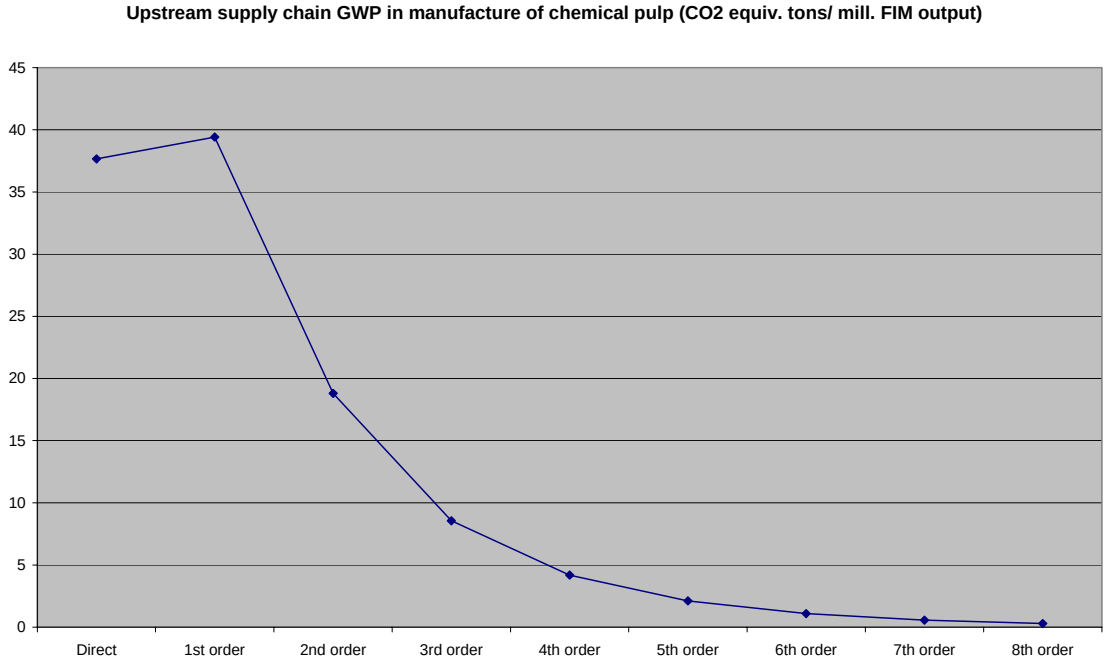

FIGURE 41 Contribution of upstream supply chain suppliers to upstream supply chain GWP of manufacture of chemical pulp

Figures 42-44 show the GWP contribution of the most important industries among the 1st order, 2nd order and 3rd order suppliers of manufacture of chemical pulp. Figure 42 shows that electricity, gas and steam supply

contributes the most to upstream supply chain GWP among the first order suppliers of manufacture of chemical pulp. Also forestry, manufacture of chemicals and chemical products as well as land transport exhibit relatively important GWP contribution among the first order suppliers. With respect to hybrid indicator, GWP data from individual suppliers within these industries should be used instead of average industry-level data.

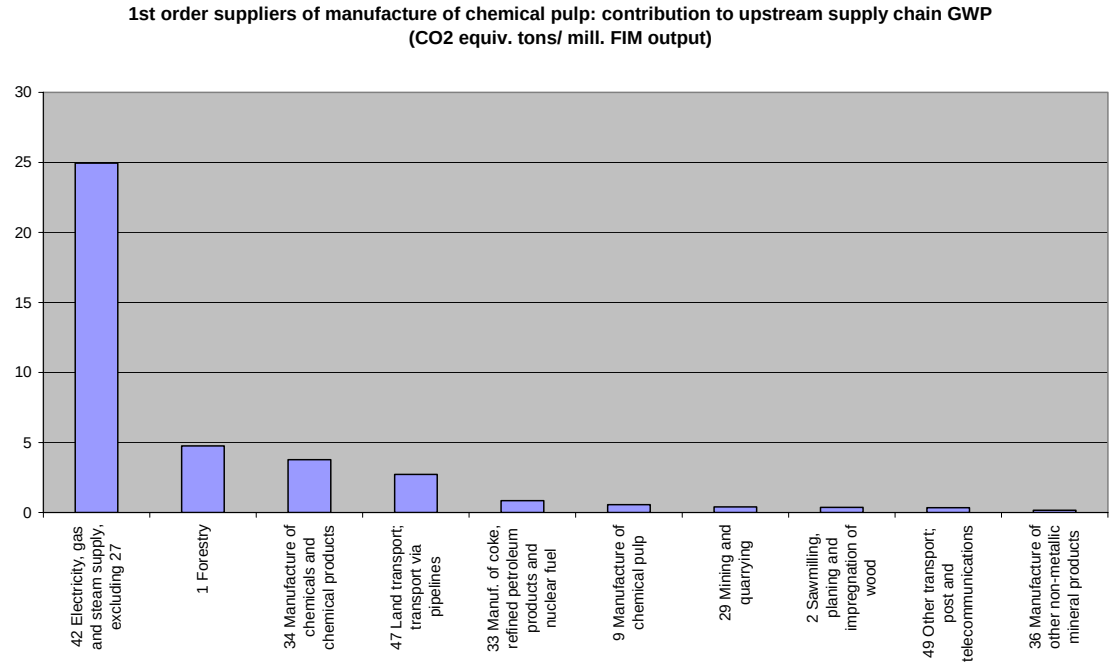

FIGURE 42 Contribution of the 1st order suppliers to upstream supply chain GWP of manufacture of chemical pulp

Figure 43 reveals that electricity, gas and steam supply, manufacture of coke, refined petroleum products and nuclear fuel, manufacture of chemicals and chemical products as well as land transport are the most important contributors to upstream supply chain GWP among the 2nd order suppliers.

As figure 44 shows, same supplier industries belong to the group of most significant contributors also in the third order. However, an interesting detail can be found, namely presence of agriculture in the top 10 contributors. In general, same supplier industries seem to be the most significant GWP contributors tier after tier. In the development of hybrid indicator, GWP contributions of individual suppliers within these industries should be traced.

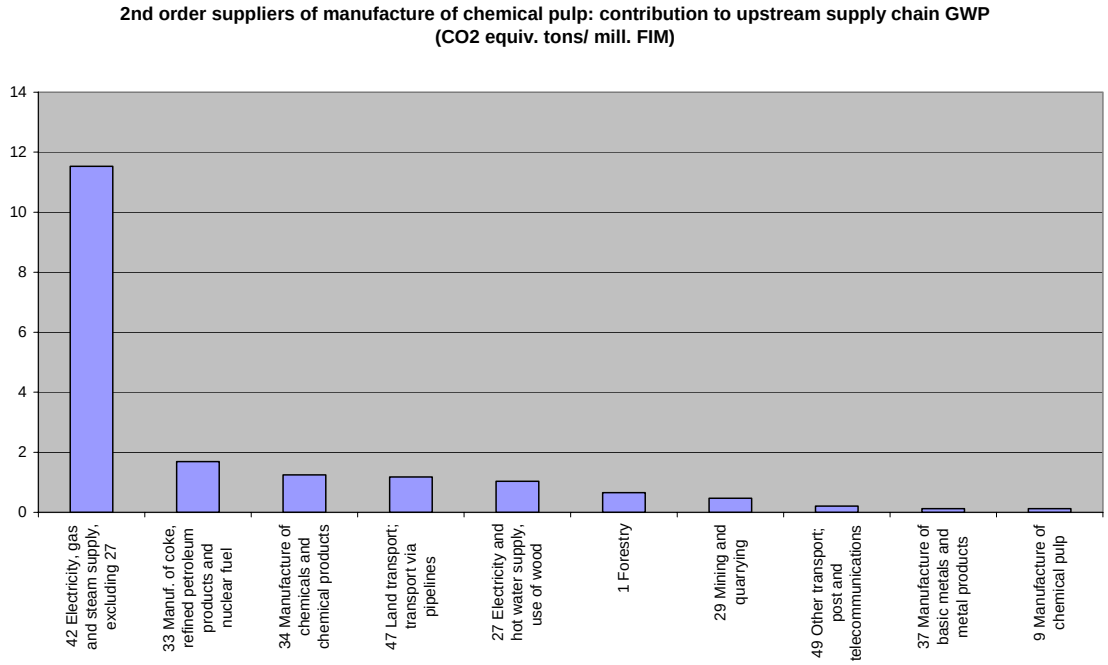

FIGURE 43 Contribution of the 2nd order suppliers to upstream supply chain GWP of manufacture of chemical pulp

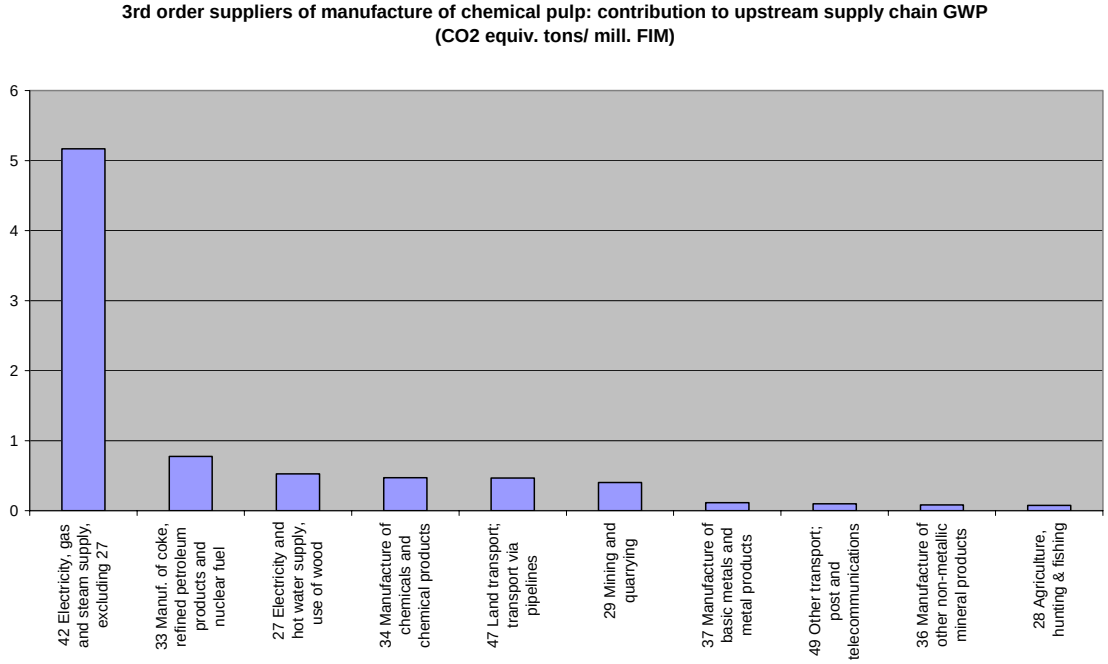

FIGURE 44 Contribution of the 3rd order suppliers to upstream supply chain GWP of manufacture of chemical pulp

Crucial information on higher order contributions relate to the specific paths, along which numerous indirect contributions finally reach manufacture of chemical pulp through lower order suppliers. For example, it is important to find out, which first order suppliers are using most inputs from electricity, gas and steam supply, which is the most significant second order GWP contributor in the upstream supply chain of manufacture of chemical pulp. In other words, it is explored, how particular second order contribution is distributed among the first order suppliers (see figure 45). It can be seen that among the first order suppliers of manufacture of chemical pulp, electricity, gas and steam supply itself uses most of the second order electricity, gas and steam supply. It means that transactions are made within the industry between different sites. Other suppliers of manufacture of chemical pulp, such as manufacture of chemicals and chemical products, sawmilling and real estate, renting and business activities, also require 2nd order electricity, gas and steam supply with associated GWP. For hybrid indicator, at least industry-level data on the use of electricity, gas and steam should be replaced by the data of specific power plants.

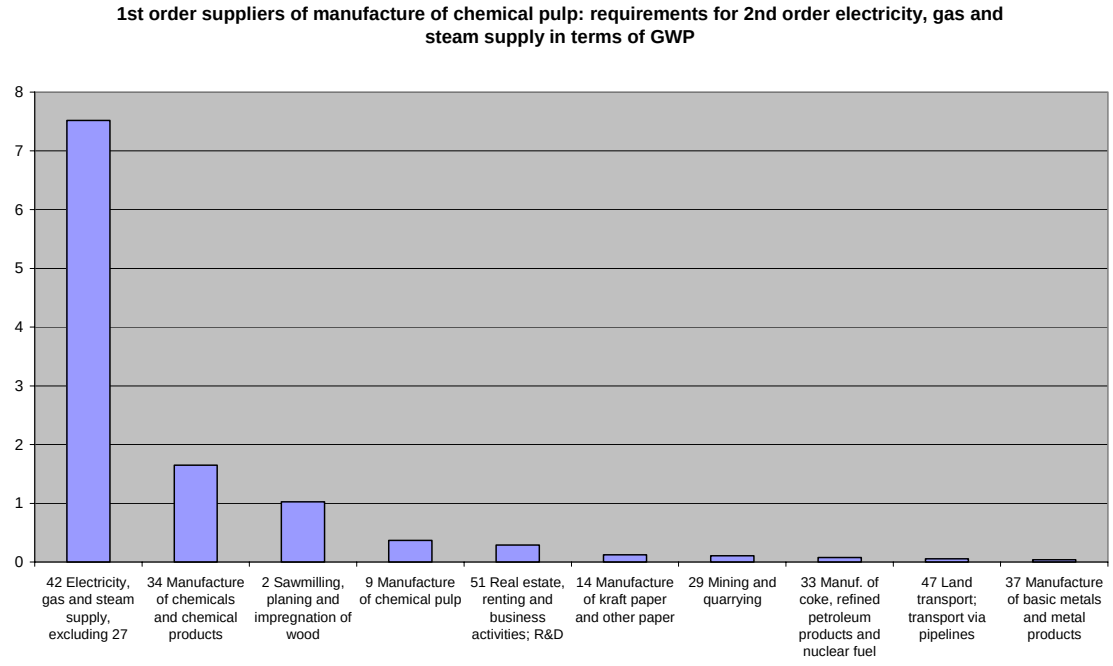

FIGURE 45 Requirements of the 1st order suppliers of manufacture of chemical pulp for 2nd order electricity, gas and steam supply in terms of GWP

Industry-level contributions provide an average approximation on GWP contribution in each transaction in the upstream supply chain. The most important transactions in the upstream supply chain should be replaced by site-specific transaction data. Industry-level contributions derived by iterative input-output analysis are useful, since the number of transactions increases

extensively along the upstream supply chain. For example, there are already 52^3 (140 608) third order suppliers. Therefore all the data cannot be site-specific. More sophisticated hybrid approach would take into account also interdependencies between industry-level data and site-specific data instead of simply adding site-specific data and complementary industry-level data together.

5 CONCLUSIONS AND DISCUSSION

5.1 Main findings and contribution

Applicability of input-output analysis to economic and environmental issues was discussed with theoretic-conceptual approach in Chapter 2. Economic and environmental sustainability indicator development and design based on input-output analysis was discussed with theoretic-conceptual approach in Chapter 3. Applicability of input-output analysis in industry-level and site-level economic and environmental sustainability indicator design was demonstrated with an empirical case study in Chapter 4. The research questions of the thesis were outlined in Chapter 1. They will be presented and assessed anew. Seven sub-questions of the study are first discussed separately and the final conclusions answering the main research question of each chapter are then formulated based on these answers.

1. How does input-output analysis follow the life cycle approach? How does it deal with system boundary issues?

Input-output analysis (IOA) provides an elegant mathematical solution for calculating cradle-to-gate life cycle impacts within the upstream supply chain. Hence, it provides a complete system boundary for the upstream supply chain system within national economy. Impacts beyond the national economy borders can be approximated with imports assumption, in which foreign industries are assumed to exhibit same technology as domestic industries. Input-output analysis has been used extensively in the life cycle inventory (LCI) phase of life cycle assessment (LCA). As LCA is made for specific products or functions, hybrid method is required when using input-output analysis. Stand-alone IOA provides average industry-level information. In hybrid approach, the most important life cycle phases are assessed with conventional process-based LCA, whereas IOA provides a macro-level boundary for assessing the impacts beyond the process-based system. Hence, it combines specificity of process-

based analysis and completeness of input-output-based system. Input-output analysis can be applied also at company-level and site-level.

2. How does input-output analysis take into account economic and environmental dimensions of sustainability?

Input-output analysis is originally an economic tool, which uses sectoral monetary transaction matrices describing complex interdependencies of industries within a national economy. Intermediate use table, final use table and primary inputs table include purely economic information. IOA takes into account both direct and indirect impacts caused by a production of unit of output in a specific industry. Mathematically this is conducted by matrix inversion. Direct and indirect requirements for primary inputs (e.g. capital and labour requirements in monetary units) can also be calculated in relation to monetary transactions between industries. Calculation of direct and indirect environmental impacts in physical units follows the same logic. Physical input-output tables could provide more adequate basis for environmental IOA, but unfortunately empirical input-output tables are still rare. Different environmental applications of IOA were presented in Chapter 2.

3. What is the availability and accuracy of data in input-output tables? What are the uncertainties in input-output analysis?

Availability and accuracy of data in input-output tables is crucial for empirical IOA studies. In this study, input-output tables were received from the research project of Helsinki University of Technology (HUT), in which I was working as a researcher. In practice, input-output tables are available from national statistics centres in all industrialized countries. However, there are considerable variations between different national input-output tables in the level of detail. Input-output tables compiled at HUT provided interesting framework, as part (forest sector) of the Finnish input-output tables of Statistics Finland was disaggregated. Hence, Finnish forest sector could be studied in more detail. In general, disaggregation of input-output tables requires a lot of labour resources, whereas aggregation is an easier effort. There are also limitations in the availability of environmental data. In many cases, environmental data is limited to air emissions, which are often included in national industry-level inventories. Also in this study, statistical industry-level environmental data could be obtained only on air emissions. Environmental data related to the disaggregated forest sector was modelled at HUT using data of several Finnish research organizations. Accuracy of source data is one important uncertainty in IOA. As data of input-output tables originates from many different sources and is processed in many different levels, overall assessment of accuracy of data is difficult. Relatively old data of input-output tables is another problem. In this study, the data represented the year 1995. Other uncertainties of input-output

analysis are related to aggregatation, allocation, imports assumption, capital flow estimation, gate-to-grave truncation error and proportionality assumption.

Answers for these three sub-questions can be used in formulating the answer for the main question of Chapter 2: *What are the advantages and disadvantages of using input-output analysis in measuring economic and environmental sustainability?*

Input-output analysis is a quantitative tool, which provides a macro-level top-down approach for measuring direct and indirect economic and environmental impacts. The main advantage of IOA concerning the measurement of economic and environmental sustainability is that it can be applied at all levels of the economic system: global, national, regional, product, production site and company. It also provides links between different levels and different actors of the economic system. That's why it is applicable also in life cycle approaches. On the other hand, the main disadvantages of IOA are related to huge data requirements as well as necessary assumptions, which must be clearly stated in any IOA-based measurement.

4. What are the main characteristics of sustainability indicators at different levels?

Sustainability indicators can definitely be divided into several groupings according to their characteristics. Sustainability indicators can be divided into economic, environmental, social and integrated indicators. Economic, environmental and social indicators, in turn, are based on numerous economic, environmental and social aspects. Integrated indicators can be divided into cross-cutting indicators and systemic indicators. Indicators can be applied with different geographical focus (global, national, regional), business focus (business unit, company, industry) and product focus (defined life cycle/ supply chain system). Indicators can be quantitative or qualitative, absolute or relative, core or supplemental, micro-level or macro-level as well as bottom up, top down or hybrid indicators. All these different characteristics of sustainability indicators are important in measuring sustainability. Veleva and Ellenbecker (2000) argue that creating a tiered system for indicators is critical for achieving sustainable development. Such consistency will allow for aggregation of data from facility level to local and then national/ global levels (Veleva & Ellenbecker 2000). In spite of the large selection of sustainability indicators, there is still need for developing and designing indicators in the actual sustainability context. Measuring contributions of individual business units, for example, requires broader system boundaries in order to achieve a link to macro-level impacts. According to Global Reporting Initiative (GRI), system boundary research is a "high priority" in GRI's work programme (GRI 2002). GRI also calls for deeper understanding how best to link organisational performance with macro-level concerns (GRI 2002).

5. How can sustainability indicators based on input-output analysis relate the activity of an industry or a production site to the larger economic and environmental systems?

Adoption of input-output analysis in sustainability indicator design and development may enhance the understanding the links between different levels in the economic system and may also provide a communication tool between micro-level and macro-level actors. Input-output accounting framework and analysis provide directly information on industry-level economic and environmental sustainability performance, which can be processed into absolute or relative sustainability indicators. Sustainability indicators based on IOA relate the production of an individual industry to the larger nation-wide system by concerning the interdependencies between industries and by providing information on the impacts of the upstream supply chain system in average industry-level detail. Hybrid indicators based on site-specific data and on IOA can relate the production of an individual site to the national system. IOA provides a macro-level top-down framework for the sustainability performance and splits the upstream supply chain system into contributions from different supplier industries of different orders. Cross-cutting indicators based on IOA, such as eco-efficiency indicators and labour productivity indicators, can be presented as direct eco-efficiency/ labour productivity or as upstream supply chain eco-efficiency/ labour productivity with broader system boundaries. Systemic indicators based on IOA can provide information on percentage contribution of different supplier industries in the whole upstream supply chain system or on percentage contribution of successive supplier tiers/ orders in the upstream supply chain system.

Answers for sub-questions 4 and 5 can be used in formulating the answer for the main question of Chapter 3: *How can input-output analysis be used in designing economic and environmental sustainability indicators relevant for corporate environmental management?*

Sustainability indicators are relevant communication and management tools in companies. Input-output analysis can be used in designing industry-level indicators, which cannot be used directly in company-level decision-making. However, industry-level sustainability information is useful for companies in order to benchmark the performance of an industry in the national context and thus it can be used as a communication tool between companies and public-policy makers, for example. Moreover, efficient intra-industry and inter-industry partnerships can be created with the help of sustainability indicators based on IOA. Efforts can be made in order to make the whole industry or the whole upstream supply chain system more eco-efficient instead of focusing on the eco-efficiency of an individual actor. Hybrid indicators are more appropriate in measuring the contribution of a specific site or a company to sustainability in the broader national context. Site-specific information on the

most important suppliers in the connection with macro-level IOA framework may be an important step towards sustainability at macro-level.

6. How can economic and environmental sustainability performance of industries and production sites be compared with indicators based on input-output analysis in the Finnish forest sector?

Sustainability indicators on the economic and environmental performance of 27 industries of the Finnish forest sector were presented graphically in the empirical Chapter 4. Finnish input-output tables with disaggregated forest sector data were used as a basis for input-output analysis. First, absolute economic and environmental performance of the industries was compared. Absolute indicators are necessary in any framework of sustainability measurement, as they provide information about the magnitude of the reporting unit's contribution to overall effect (GRI 2002), in this case to overall value added, operating surplus, GWP, AP, number of employees and working hours. Input-output analysis produces relative cross-cutting indicators, which were presented as ratios of environmental/ economic impact and million FIM industry output. In input-output terminology, these ratios are called as total factor multipliers, but in general they describe e.g. GWP or AP intensity of industries, covering the whole upstream supply chain system of an industry. Hence, comparison of industries in both absolute terms and relative terms provided more comprehensive picture on industry performance. With relative indicators, comparison of direct eco-efficiency/ labour productivity and upstream supply chain eco-efficiency/ labour productivity in forestry, manufacture of builders' joinery and carpentry and manufacture of chemical pulp was conducted. These indicators reflected the inherent differences between different industries in eco-efficiency and labour productivity. Empirical demonstration on the comparison of production sites was limited in scope (three sulphate pulp mills), as the supplier data of specific production sites was not available. However, hybrid indicators demonstrated with the case study may allow comparison between production sites, so that their specific supply chain systems are taken into account.

7. How do indicators based on input-output analysis reflect the contribution of an industry or a production site to sustainability in the Finnish forest sector?

Different systemic indicators were presented in the empirical chapter, reflecting the structure of the upstream supply chain contribution of each industry in the forest sector. Systemic indicators in the case of the Finnish forest sector reflected the percentage contribution of different supplier industries to upstream supply chain systems. In the upstream supply chain GWP, for example, electricity, gas and steam supply seemed to be the main contributor. Another set of systemic indicators reflected the percentage contribution of successive supplier tiers/

orders to upstream supply chain systems of industries. Main contribution in each industry seemed to relate to tiers 0-4. Contribution of higher-order suppliers seemed to be lower. Hence, systemic indicators presented in this case study reflected more the quality of the upstream supply chain contributions than absolute contributions. In fact, sustainability indicators based on input-output analysis can be considered as screening indicators, which provide information for further prioritizing and more detailed indicators. Splitting the upstream supply systems into the contributions of supplier industries and successive supplier tiers provides also a basis for the development of hybrid indicators. This was demonstrated in the case of manufacture of chemical pulp.

Answers for the last two sub-questions provide a basis for answering for the main question of Chapter 4: *How can sustainability indicators based on input-output analysis be used in describing sustainability performance of industries or production sites in the Finnish forest sector at the national level?*

Sustainability indicators based on input-output analysis do not provide direct answers on the sustainability performance of business or on contribution of business units to sustainability. Sustainability indicators demonstrated with the case study of the Finnish forest sector were used in comparing sustainability performance of industries as well as reflecting the quality or the structure of the upstream supply chain contributions of industries. As such, they are difficult to apply to actual decision-making directly. However, they provide deeper understanding on the economic and environmental impacts, which are generated not only directly by individual business entities, but also indirectly through complex interdependencies between business entities, which are mathematically presented as a matrix. Hence, they are powerful descriptive tools, which may be used in the communication between companies, policy makers and other actors in the society. In this study, it is argued that improving matrix sustainability is more crucial for sustainable development than focusing only on independent business sustainability.

5.2 Suggestions for further research

Suggestions of this study for further research emphasize the value of empirical studies. Value related to data collection work cannot be overestimated in input-output framework. Limitations of this study provide a good basis for further research. Disaggregated input-output tables for other sectors than forest sector could be compiled. Disaggregated tables of metal industry or agriculture would provide interesting information. In addition, important sectors contributing to GWP and AP, such as energy sector and transport sector, could be further disaggregated. Updated input-output tables should be used instead of 1995 input-output tables used in this study in order to obtain more relevant

indicators. Indicators based on more recent input-output tables could be compared with 1995 results by using appropriate price data. Data on downstream impacts could be collected in an input-output format. Data on delivery of final products, use phase, maintenance, recycling and disposal would enable full life cycle assessment. Moreover, data on capital requirements, i.e. input-output tables for domestically produced and imported capital, would make indicators more comprehensive. In this study, impacts related to capital goods, such as buildings and durable machinery, were not included. Scope of studied indicators could be broadened by collecting data on other economic, environmental and social impacts. Data on economic performance could include environmentally related taxes and fees, environmental protection expenditure, environmental liabilities and other costs related to fines, worker compensation, waste treatment and disposal. Naturally metrics used in the further research on economic indicators should be euros (€) instead of Finnish markka (FIM). Data on environmental performance could include fresh water consumption, materials and energy use, solid and liquid waste, chemicals use, eutrophication, biodiversity and toxic contamination. Data on social performance could include community spending, charitable contributions, lost workdays, illness cases and number of hours of employee training.

Finnish input-output tables could be connected to international networks. International input-output frameworks would enable the analysis of global impacts in more detail. International comparisons between domestic and foreign industries could be made. This would first require that input-output data (e.g. sectors, metrics) of different countries should be made comparable. Dynamic input-output studies could be conducted by estimating the dynamics of coefficients with appropriate data. This would allow predictions and future scenarios of different changes. Consolidations of company-level/ plant level data and national level data could be conducted. Case studies of specific companies/ plants could be conducted, although data might be confidential. Hybrid analyses could be made by combining data on individual product systems and input-output data. LCA's and related product-level indicators might then utilize available process specific data and completeness of input-output accounting framework. LCA system and IOA system could be studied separately or as an integrated system.

Physical input-output tables describing material flows could be compiled and they could be connected with monetary input-output tables. At the moment there is physical input-output table for the Finnish economy under construction at Thule Institute. That could provide a starting point for direct and indirect indicators based on physical, not monetary transactions. Ambitious combinations of economic systems data and ecological systems data could be made. Integrated economic-ecological indicators would provide real macro-level information on sustainability, although they are difficult to implement because of very large data requirements. Although there are also theoretical problems in input-output applications, the most basic requirement of that field is data, data and data. According to Forssell and Polenske (1998), the reason

why many methodological possibilities provided by input-output models are utilized so little is basically the lack of empirical data. With more accurate and complete data there are fewer assumptions to be made in input-output analysis. However, in the context of sustainability indicators, more data is not always the solution. Stakeholder approach, for example, should be taken seriously in indicator design and development. All these suggestions for further research might produce more valuable sustainability indicators, which could be used on the endless road of sustainable development.

YHTEENVETO (Finnish Summary)

Matriisikestävyys: Panos-tuotosanalyysin soveltaminen ekologisen ja taloudellisen kestävyyden indikaattoreihin

Case: Suomen metsäsektori

Kestävä kehitys on ollut otsikoissa vuodesta 1987, jolloin YK:n asettama asiantuntijaelin julkaisi Gro Harlem Brundtlandin johdolla raportin ”Our Common Future”. Kestävän kehityksen kolmijalan muodostavat taloudellisesti, ekologisesti ja sosiaalisesti kestävä kehitys, joka poliittisesti määriteltiin tarkemmin YK:n Rio de Janeiron ympäristö- ja kehityskonferenssissa 1992. Vaikka kestävää kehitystä voidaan mitata ja toteuttaa tuotetasolla, yritystasolla, toimipaikkatasolla, toimialatasolla, kansallisella tasolla ja globaalilla tasolla, kestävä kehitys on ensisijassa makrotason käsite. Tämän vuoksi myös kestävän kehityksen mittaamiseen tulisi sisällyttää makrotason näkökulma, oli tarkasteltava taso mikä tahansa.

Yritystoiminnan kannalta kestävä kehitys on haaste, joka vaatii perinteisen mikrotason näkökulman sijaan kokonaisvaltaisempaa makrotason tarkastelua. Käytännössä tämä tarkoittaa yrityksen tai toimialan toiminnan makrotason vaikutusten arviointia. Yritystaloudessa on sovellettu erilaisia käsitteitä ja työkaluja, joilla kestävä kehitys on pyritty ottamaan mukaan osaksi päätöksentekoa ja kommunikointiin sidosryhmien kanssa. Ekotehokkuus on käsite, jonka tavoitteena on tuottaa enemmän arvoa pienemmillä ympäristövaikutuksilla. Elinkaarianalyysi on tuonut tietoa tuotteiden ympäristövaikutuksista koko elinkaaren aikana ja lisännyt ympäristötietoisuutta yrityksissä ja yritysten sidosryhmissä. Samalla erilaiset määrälliset ja laadulliset taloudelliset, ympäristö- ja sosiaaliset indikaattorit eli mittarit ovat yleistyneet päätöksenteossa ja raportoinnissa. Käytetyt työkalut ovat kuitenkin pääasiassa mikrotason työkaluja, joilla on pystytty käsittelemään tarkoin rajattua systeemiä. Siksi kokonaisvaltaisempaa näkökulmaa kestävään kehitykseen voisikin hakea kansantalouden malleista, joiden avulla voidaan tarkastella laajempia systeemejä.

Tässä tutkimuksessa on kuvattu panos-tuotosanalyysin (input-output analysis) soveltuvuutta toimialan ja toimipaikan kestävän kehityksen mittaamiseen. Tutkimuksessa on vastattu kolmeen pääkysymykseen, jotka edelleen on jaettu suppeampiin alakysymyksiin. Pääkysymykset ovat:

1. Mitkä ovat panos-tuotosanalyysin edut ja haitat taloudellisen ja ekologisen kestävyyden mittaamisessa?
2. Miten panos-tuotosanalyysiä voidaan käyttää yritysten ympäristöjohtamisen kannalta relevanttien taloudellisten ja ympäristöindikaattorien suunnittelussa?

3. Miten panos-tuotosanalyysiin perustuvia kestävyyden indikaattoreita voidaan käyttää kuvaamaan toimialojen ja toimipaikkojen kansallisen tason kestävyyttä Suomen metsäsektorilla?

Toimialatason indikaattorit on laskettu perinteillä panos-tuotosmenetelmällä, kun taas toimipaikkatason indikaattoreiden laskemisessa on hyödynnetty hybridimenetelmää, jossa toimipaikkakohtaisia ja toimialakohtaisia tietoja on yhdistetty. Tutkimuksen lähtökohtana on ollut ottaa makrotason näkökulma toimiala- ja toimipaikkatason kestävään kehitykseen ja sisällyttää siihen sekä taloudellinen että ympäristöulottuvuus. Sosiaalista ulottuvuutta ei tutkimuksessa ole huomioitu, koska sitä on vaikea mitata määrällisesti. Tutkimus perustuu Suomen metsäsektorin case – tutkimukseen, jossa panos-tuotosanalyysillä on laskettu kestävän kehityksen indikaattoreita yksityiskohtaisella toimialajaottelulla. Tarkasteltavina näkökohtina olivat ilmaston lämpenemispotentiaali (GWP), happamoitumispotentiaali (AP), arvonlisä (value added), toimintaylijäämä (operating surplus), työllisten lukumäärä (number of employees) sekä työtuntien määrä (working hours).

Tutkimuksen keskeinen johtopäätös on, että panos-tuotosanalyysillä voidaan mitata toimialan ja toimipaikan kestävää kehitystä kokonaisvaltaisemmin, koska se huomioi sekä välittömät ja välilliset vaikutukset. Toimialatason indikaattoreita voidaan käyttää kommunikointiin mikro- ja makrotason toimijoiden välillä kestävän kehityksen dialogissa. Toimipaikkatason indikaattoreiden avulla yritys voi mitata kontribuutiotaan kansallisen tai globaalin tason kestävään kehitykseen. Indikaattorien vertailtavuuden kannalta on tärkeää että indikaattoreiden systeemin rajaus on yhtenevä. Lisäksi panos-tuotostaulut ja kerroinmatriisit kuvaavat läpinäkyvästi toimialojen välistä vuorovaikutusta. Tutkimuksen empiiriset tulokset osoittavat, että välillisten vaikutusten osuus toimialojen makrotason vaikutuksesta on usein merkittävän suuri niin taloudellisten kuin ympäristöindikaattoreiden kohdalla.

REFERENCES

Atkinson, G. 2000. Measuring Corporate Sustainability. Journal of Environmental Planning and Management 43 (2), 235-252.

Ayres, R.U. & Kneese, A. 1969. Production, Consumption, and Externalities. American Economic Review 59, 282-297.

Baumann, H. & Cowell, S.J. 1999. An Evaluative Framework for Conceptual and Analytical Approaches Used in Environmental Management. Greener Management International 26, 109-122.

Bicknell, K.B., Ball R.J., Cullen R. & Bigsby, H.R. 1998. New methodology for the ecological footprint with an application to the New Zealand economy. Ecological Economics 27, 149-160.

Bouman, M., Heijungs, R., van der Voet, E., van den Bergh, J. & Huppes, G. 1999. Material flows and economic models: An analytical comparison of SFA, LCA and equilibrium models. CML-SSP Working Paper 99.001. http://www.leidenuniv.nl/cml/ssp/publications/wp99001.pdf. Version current as of November 18, 2003.

Burritt, R.L., Hahn, T. & Schaltegger S. 2002. Towards a comprehensive framework for environmental management accounting – Links between business actors and environmental accounting tools. Australian Accounting Review 12 (2), 39-50.

CEFIC (European Chemical Industry Council). 2003. Responsible care: Health, safety and environmental reporting guidelines. http://www.cefic.be/activities/hse/rc/guide/01.htm. Version current as of June 19, 2003.

Costanza, R. & Hannon, B. 1997. Dealing with the "mixed-units" problem in ecosystem network analysis. In: R. Costanza (Ed.) Frontiers in ecological economics: Transdisciplinary essays by Robert Costanza. Cheltenham: Edward Elgar, 179-194.

Costanza, R. & Herendeen, R.A. 1997. Embodied energy and economic value in the United States economy: 1963, 1967 and 1972. In: R. Costanza (Ed.) Frontiers in ecological economics: Transdisciplinary essays by Robert Costanza. Cheltenham: Edward Elgar, 116-150.

Daly, H. 1968. On economics as a life science. Journal of Political Economy 76, 392-406.

Daly, H. & Cobb, J.B. with contributions by Cobb, Jr. 1994. For the common good. Redirecting the economy toward community, the environment, and a sustainable future. Boston: Beacon Press.

DeSimone, L. & Popoff, F. 1997. Eco-efficiency: The business link to sustainable development. Cambridge, Massachusetts: MIT Press.

Ditz, D. & Ranganathan, J. 1996. Corporate Environmental Performance Indicators: Bridging Internal and External Information Needs. 1996 Fenner Conference, Australian Academy of Sciences.

Ditz, D. & Ranganathan, J. 1998. Global Developments on Environmental Performance Indicators. Corporate Environmental Strategy 5 (3), 47-52.

Duchin, F. 1997. Technology and lifestyle as central concepts for global scenarios. In: P.B. Boorsma, Aarts, K. & Steenge A.E. (Eds.) Public Priority Setting: Rules and Costs. Netherlands: Kluwer, 103-119.

Duchin, F. 1998. Structural Economics. Measuring Change in Technology, Lifestyles, and the Environment. Washington, D.C.: Island Press.

Duchin, F. & Lange, G-M. with Thonstad, K. & Idenburgh A. 1994. The future of the environment: Ecological Economics and Technological Change. New York: Oxford University Press.

Dyllick, T. & Hockerts, K. 2002. Beyond the business case for corporate sustainability. Business Strategy and the Environment 11 (2), 130-141.

EEA (European Environment Agency). 1999a. Making sustainability accountable: Eco-efficiency, resource productivity and innovation. Topic report No 11/1999. Copenhagen: EEA.

EEA (European Environment Agency). 1999b. Material Flow-based indicators in Environmental Reporting. Environmental Issues Series. No 14. Italy.

Elkington, J. 1997. Cannibals with forks: the triple bottom line of 21st century business. Oxford: Capstone.

Fankhouser, S. & McCoy, D. 1995. Modelling the economic consequences of environmental policies. In: Folmer, H., Landis Gabel, H. & Opschoor, H. (Eds.) Principles of environmental and resource economics: A guide for students and decision-makers. Aldershot: Edvar Elgar, 253-275.

Figge, F., Hahn, T., Schaltegger, S. & Wagner, M. 2002. The Sustainability Balanced Scorecard – linking sustainability management to business strategy. Business Strategy and the Environment 11 (5), 269-282.

Finnveden, G., Johansson, J., Moberg, Å, Palm, V. & Wadeskog, A. with contributions from Suh S. & Huppes, G. 2001. Miljöpåverkan från olika varugrupper. FOI Memo. Forskningområde 91 "Övriga civila tillämpningar". http://www.fms.ecology.su.se/pdf/varugrupper.pdf. Version current as of December 1, 2003.

Forssell, O. 1985. Panos-tuotosmallit. Sarja B 46 series. Helsinki: Elinkeinoelämän tutkimuslaitos (in Finnish).

Forssell, O. & Polenske, K. R. 1998. Introduction: Input-output and the environment. Economic Systems Research 10 (2), 91-98.

Forsund, F.R. & Strom, S. 1976. The generation of residual flows in Norway: an input-output approach. Journal of Environmental Economics and Management 3, 129-141.

GRI. 2002. Sustainability Reporting Guidelines. Global Reporting Initiative. http://www.globalreporting.org/guidelines/2002.asp. Version current as of November 10, 2003.

Green, K. & Irwin, A. 1996. Clean technologies. In: P. Groenewegen, K. Fischer, E.G. Jenkins & J. Schot (Eds.) The Greening of Industry Resource Guide and Bibliography. Washington: Island Press, 169-194.

Gronow, T. 2001. Material Flow Models in Environmental Policy Planning. Case: Pulp and Paper Industry. Doctoral thesis. Jyväskylä Studies in Business and Economics 13. University of Jyväskylä.

Hamilton, C. 1997. The sustainability of logging in Indonesia's tropical forests: A dynamic input-output analysis. Ecological Economics 21 (3), 183-195.

Hannon, B. 2001. Ecological pricing and economic efficiency. Ecological Economics 36 (2001), 19-30.

Hannon, B. & Puleo, F. 1975. Transferring from Urban Cars to Buses: The Energy and Employment Impacts. In: R.H. Williams (Ed.) The Energy Conservation Papers. Chapter 3. Cambridge: Ballinger.

Hart, M. 1999. Guide to sustainable community indicators. 2nd ed. Massachusetts: Hart Environmental Data.

Heikkinen, A. 2002. Metsäsektorin arvosisältö: Ekotaseet toimialalla puun käyttö sähkö- ja lämpöhuollossa. Osaraportti 2000/71. Teknillinen korkeakoulu. Puurakentaminen. Arkkitehtiosaston julkaisuja. Espoo: Otamedia (in Finnish).

Helminen, R-R. 1998. Eco-efficiency in the Finnish and Swedish Pulp and Paper Industry. Acta Polytechnica Scandinavica. Mathematics, computing and management in engineering series No. 90. Espoo. Dissertation.

Hendrickson, C., Horvath, A., Joshi, S. & Lave L. 1998. Economic Input-Output Models for Environmental Life-Cycle Assessment. Environmental Science and Technology 32 (7), 184-191.

Hinterberger, F., Giljum, S. & Hammer, M. 2003. Input-Output Analysis of Material Flows: A new approach for calculating overall resource requirements of production and consumption activities. Sustainable Europe Research Institute. Vienna, Austria. http://www.mosus.net/ documents/SERI_MFA%20and%20IO%20analysis_1st%20MOSUS%20meeting.pdf. Version current as of November 21, 2003.

Holliday, C.O., Schmidheiny, S. & Watts, P. 2002. Walking the talk: The business case for sustainable development. Sheffield: Greenleaf Publishing.

Holmijoki, O. 2002a. Metsäsektorin arvosisältö: arviointimenetelmä ja laskentaohjelma. Osaraportti 2000/65. Teknillinen korkeakoulu. Puurakentaminen. Arkkitehtiosaston julkaisuja. Espoo: Otamedia (in Finnish).

Holmijoki, O. 2002b. Metsäsektorin arvosisältö: Yhteenvetoraportti. Osaraportti 2000/ 64. Teknillinen korkeakoulu. Puurakentaminen. Arkkitehtiosaston julkaisuja. Espoo: Otamedia (in Finnish).

Holmijoki, O. & Paloviita A. 2002. Metsäsektorin arvosisältö: ekotaseet, ympäristöpanokset ja arvottaminen. Osaraportti 2000/66. Teknillinen korkeakoulu. Puurakentaminen. Arkkitehtiosaston julkaisuja. Espoo: Otamedia (in Finnish).

Huppes, G. 2001. Current state of development in environmentally extended international input-output table. In: S. Suh (Ed.) European Network of Environmental Input-Output Analysis. Proceeding.

http://www.leidenuniv.nl/interfac/cml/ssp/projects/envioa/proceeding1.pdf. Version current as of November 21, 2003.

Huppes, G. & Suh, S. 2002. Towards Global IOA. http://www.lca-conf.alcas.asn.au/Papers/12. Version current as of November 18, 2003.

Häkkinen, T., Vares, S. & Vanhatalo, L. 2002. Metsäsektorin arvosisältö: Ekotaseet toimialoilla mekaaninen metsäteollisuus, puuhuonekalujen valmistus ja talonrakentaminen. Osaraportti 2000/ 68. Teknillinen korkeakoulu. Puurakentaminen. Arkkitehtiosaston julkaisuja. Espoo: Otamedia (in Finnish).

IBM. 2003. Public environmental reporting initiative. http://www.ibm.com/ibm/environment/initiatives/peri.shtml. Version current as of June 23, 2003.

ISO. 1998a. Environmental management – Life cycle assessment – Goal and scope definition and inventory analysis. ISO 14041: 1998 (E). Geneva: International Organization for Standardization.

ISO. 1998b. Environmental performance evaluation. ISO 14031 (Draft). Geneva: International Organization for Standardization.

James, D.E., Jansen, H.M.A. & Opschoor, H. 1978. Economic Approaches to Environmental Problems. Amsterdam: Elsevier.

James, P. 1994. Business environmental performance measurement. Business Strategy and the Environment 3(2), 59-67.

Joshi, S. 2000. Product Environmental Life-Cycle Assessment Using Input-Output Techniques. Journal of Industrial Ecology 3 (2 & 3), 95-120.

Järvinen, P. & Järvinen, A. 2000. Tutkimustyön metodeista. Tampere: Opinpajan kirja (in Finnish).

Kandelaars, P.P.A.A.H. 1999. Economic Models of Material-Product Chains for Environmental Policy Analysis. Eco-efficiency in industry and science. Vol. 4. Dordrecht: Kluwer.

Kaplan, R.S. & Norton, D. 1996. The Balanced Scorecard: Translating Strategy into Action. Boston: Harvard Business School Press.

Keegan, D.P., Eiler, R.G. & Jones, C.R. 1989. Are your performance measures obsolete? Management Accounting, June, 45-50.

Kolk, A. & Mauser, A. 2002. The Evolution of Environmental Management: From Stage Models to Performance Evaluation. Business Strategy and the Environment 11, 14-31 (2002).

Konijn, P., de Boer, S. & van Dalen, J. 1997. Input-output analysis of material flows with application to iron, steel and zinc. Structural Change and Economic Dynamics 8, 129-153.

Konijn, P. & Steenge, A.E. 1995. Compilation of input-output data from the national accounts. Economic Systems Research 7 (1), 31-46.

Krugmann, H. 1996. Toward Improved Indicators to Measure Desertification and Monitor the Implementation of the Desertification Convention. In: H. Hambly & T.O. Angura (Eds.) Grassroots Indicators for Desertification. http://www.eldis.org/static/DOC4624.htm. Version current as of August 17, 2004.

KTM (Kauppa- ja teollisuusministeriö). 1998. Ekotehokkuus ja factor-ajattelu. Kauppa- ja teollisuusministeriön työryhmä- ja toimikuntaraportteja 1/1998. Ekotehokkuustyöryhmä. Helsinki: Edita (in Finnish).

Kuhndt, M., von Geibler, J. & Eckermann, A. 2002. Developing a Sectoral Sustainability Indicator Set taking a Stakeholder Approach. The 10th International Conference of the Greening of Industry Network 23-26 June, 2002, Göteborg, Sweden. http://www.gin2002.miljo.chalmers.se/. Version current as of February 24, 2003.

Kutinlahti, T. 2002. Metsäsektorin arvosisältö: Ekotaseet toimialalla kemiallinen metsäteollisuus. Osaraportti 2000/ 69. Teknillinen korkeakoulu. Puurakentaminen. Arkkitehtiosaston julkaisuja. Espoo: Otamedia (in Finnish).

Lange, G.-M. 1998. Applying an integrated natural resource accounts and input-output model to development planning in Indonesia. Economic Systems Research 10 (2).

Lave, L. B., Cobas-Flores, E., Hendrickson, C. & McMichael, F. C. 1995. Using Input-Output Analysis to Estimate Economy-wide Discharges. Environmental Science & Technology 29 (9), 420A-426A.

Lehni, M. 2000. Measuring Corporate Eco-Efficiency: A Guide for Companies to measure their Economic and Environmental Excellence. Corporate Environmental Strategy 7 (3), 256-266.

Lenzen, M. 2001a. A Generalized Input-Output Multiplier Calculus for Australia. Economic Systems Research 13 (1), 65-92.

Lenzen, M. 2001b. Errors in Conventional and Input-Output-based Life-Cycle Inventories. Journal of Industrial Ecology 4 (4), 127-148.

Lenzen, M. & Murray, S. 2001. A modified ecological footprint method and its application to Australia. Ecological Economics 37 (2), 229-255.

Leontief, W. 1986. Input-output economics. Second edition. New York: Oxford University Press.

Leontief, W., Carter, A. & Petri, P. 1977. Future of the World Economy. New York: Oxford University Press.

Leontief, W. & Ford, D. 1972. Air pollution and the economic structure: Empirical results of input-output computations. In: A. Brody & A.P. Carter (Eds.) Input-output techniques. Amsterdam: North-Holland Publishing Company, 9-30.

Lin, X. & Polenske, K.R. 1998. Input-output modeling of production processes for business management. Structural Change and Economic Dynamics 9, 205-226.

Matthews, H.S. & Small, M.J. 2001. Extending the Boundaries of Life-Cycle Assessment through Environmental Economic Input-Output Models. Journal of Industrial Ecology 4 (3), 7-10.

Metsäntutkimuslaitos. 1997. Metsätilastollinen vuosikirja 1997. SVT Maa- ja metsätalous 1997: 4. Jyväskylä: Gummerus.

Metsäntutkimuslaitos. 2003. Metsätilastollinen vuosikirja 2003. http://www.metla.fi/julkaisut/metsatilastollinenvsk/index.htm. Version current as of March 16, 2003.

Metsäteollisuus ry. 2000. Ympäristönsuojelun vuosikirja. Massa- ja paperiteollisuus. Vuoden 1999 tilastot. Espoo: Sävypaino (in Finnish).

Metsäteollisuus ry. 2002a. Ympäristönsuojelun vuosikirja. Massa- ja paperiteollisuus. Vuoden 2001 tilastot. Rauma: West Point (in Finnish).

Metsäteollisuus ry. 2002b. Ympäristönsuojelun vuosikirja. Puutuoteteollisuus. Vuoden 2001 tilastot. Rauma: West Point (in Finnish).

Meyer, B. & Uno, K. 1999. COMPASS – Ein globales Energie-Wirtschaftsmodell. ifo Studien 4, 703-719.

Miller, R.E. & Blair, P.D. 1985. Input-Output Analysis: Foundations and Extensions. Englewood Cliffs, NJ: Prentice-Hall.

Mäenpää, I. 1998. Kansantalous, energia ja päästöt. Tilastokeskus. Ympäristö 1998:1. Helsinki: Edita (in Finnish).

Mäenpää, I. 2002. Physical input-output tables of Finland 1995 – solutions to some basic methodological problems. 14th International Conference on Input-Output Techniques. October 10-15, 2002. Montréal, Canada.

Mäenpää, I. & Juutinen, A. 2000. Natural resource use in the structures of the Finnish economy – an input-output analysis. In: Conference Proceedings of the Helsinki Symposium on Industrial Ecology and Material Flows. Helsinki, Finland. August 30 – September 3, 2000. CD-reprint, University of Jyväskylä.

Nakamura, S. & Kondo, Y. 2002. Input-Output Analysis of Waste Management. Journal of Industrial Ecology 6 (1), 39-64.

Neely, A., Gregory, M. & Platts, K. 1995. Performance measurement system design. International Journal of Operations & Production Management 15 (4), 80-116.

Neely, A., Mills, J., Platts, K., Richards, H., Gregory, M., Bourne, M. & Kennerley, M. 2000. Performance measurement system design: developing and testing a process-based approach. International Journal of Operations & Production Management 20 (10), 1119-1145.

Nielsen, A.M. 2001. Hybrid LCA. In: A.M. Nielsen & B.P. Weidema (Eds.) Input/Output analysis – Shortcuts to life cycle data? Environmental Project No. 581. Miljostyrelsen. Miljo- og Energiministeriet. http://www.mst.dk/udgiv/publications/2001/87-7944-365-6/pdf/87-7944-366-4.pdf. Version current as of November 18, 2003.

OECD (Organization for Economic Co-Operation and Development). 2003. About: Environmental Indicators. http://www.oecd.org/EN/about /0,,EN-about-567-nodirectorate-no-no-no-21,00.html. Version current as of June 19, 2003.

Owens, J.W. 1997. Life-Cycle Assessment: Constraints on Moving from Inventory to Impact Assessment. Journal of Industrial Ecology 1 (1), 37-49.

Pento, T. 1998. Integrating environmental management instruments: Material flow analysis. In: B. Nath, L. Hens, P. Compton & D. Devuyst (Eds.)

Environmental Management in Practice, Vol. 1. Instruments for environmental management. London: Routledge, 241-254.

Pesonen, H-L. 1999. From Material Flows to Cash Flows: An Extension to Traditional Material Flow Modelling. Doctoral thesis. Jyväskylä Studies in Computer Science, Economics and Statistics 49. University of Jyväskylä.

Proops, J.L.R., Faber, M. & Wagenhals, G. 1993. Reducing CO2 Emissions. A Comparative Input-Output Study for Germany and the UK. Berlin: Springer.

Ranganathan, J. 1998. Sustainability Rulers: Measuring Corporate Environmental and Social Performance. http://www.wri.org/meb/sei/state.html. Version current as of June 23, 2003.

Rosenström, U. & Palosaari, M. (Eds.). 2000. Signs of Sustainability. Finland's indicators for sustainable development 2000. Helsinki: Edita.

Schaltegger, S. with Müller, K. & Hindrichsen H. 1996. Corporate Environmental Accounting. Chichester, UK: John Wiley.

Schaltegger, S. 1997. Economics of life cycle assessment: Inefficiency of the present approach. Business Strategy and the Environment. Vol. 6, 1-8.

Scherpereel, C., van Koppen, C.S.A & Heering, G.B.F. 2001. Selecting Environmental Performance Indicators. The Case of Numico. Greener Management International 33, Spring 2001, 97-114.

Schmidt-Bleek, F. 1994. Wieviel Umwelt braucht der Mensch? MIPS – Das Maß für ökologiches Wirtschaften. Berlin: Birkhäuser.

Schmidheiny, S. & Zorraquin, F.J.L. 1996. Financing change. The financial community, eco-efficiency, and sustainable development. Cambridge, Massachusetts: MIT Press.

Schroder, H. 1999. Merging economic and environmental input-output analysis. Danedi. http://danedi.dk/int/eioa.htm. Version current as of July 19, 1999.

SEEA. 2002. SEEA 2000. http://www4.statcan.ca/citygrp/london/publicrev/pubrev.htm. Version current as of June 17, 2003.

Seppälä, J. & Jouttijärvi, T. (toim.). 1997. Metsäteollisuus ja ympäristö. Suomen Ympäristö 89. Helsinki: Edita (in Finnish).

Seuring, S.A., Koplin, J., Behrens, T. & Schneidewind, U. 2003. Sustainability assessment in the German detergent industry: From stakeholder involvement to sustainability indicators. Sustainable Development 11 (4), 199-212.

Spangenberg, J.H. & Bonniot, O. 1998. Sustainability Indicators – A Compass on the Road Towards Sustainability. Wuppertal Paper No. 81, February 1998.

Statistics Finland. 1999. Input – Output tables. Preliminary data according to the European System of Accounts (ESA95). Kansantalous 1999:10. National Accounts. Official Statistics of Finland. Vantaa: Tummavuoren kirjapaino.

Statistics Finland. 2002. Sectoral (68 industry) emission data. Electronic file (unpublished).

Suh, S. (Ed.) 2001. European Network of Environmental Input-Output Analysis. 1st Meeting: 8 May 2001, Madrid, Spain. Proceeding.

http://www.leidenuniv.nl/cml/iolci/. Version current as of December 17, 2003.

Suh, S. 2004. Materials and energy flows in industry and ecosystem networks. Life Cycle Assessment, Input-Output Analysis, Material Flow Analysis, Ecological Network Flow Analysis and Their Combinations for Industrial Ecology. Doctoral thesis. Leiden: Institute of Environmental Sciences (CML).

Suh, S. & Huppes, G. 2002. Missing Inventory Estimation Tool Using Extended Input-Output Analysis. International Journal of Life Cycle Assessment 7 (3) 9A, 134-140.

Teittinen, A. 2002. Metsäsektorin arvosisältö: Ekotaseet toimialalla metsätalous. Osaraportti 2000/ 67. Teknillinen korkeakoulu. Puurakentaminen. Arkkitehtiosaston julkaisuja. Espoo: Otamedia (in Finnish).

Thage, B. 2002. Methods used in the Construction of Symmetric Input-Output Tables and Quality Based Official Statistics. Book of abstracts. Fourteenth International Conference on Input-Output Techniques. October 10-15, 2002. Montréal, Canada.

Todd, J.A. & Curran M.A. 1999. Streamlined Life-Cycle Assessment: A Final Report from the SETAC North America Streamlined LCA Workgroup. http://www.setac.org/files/lca.pdf. Version current as of June 23, 2003.

Treloar, G.J. & Love, P.E.D. 2000. A hybrid life cycle assessment method for construction. Construction Management and Economics 18 (1), 5-10.

Tyteca, D. 1996. On the Measurement of the Environmental Performance of Firms – A Literature Review and a Productive Efficiency Perspective. Journal of Environmental Management 46, 281-308.

Tyteca, D., Carlens, J., Berkhout, F., Hertin, J., Wehrmeyer, W. & Wagner, M. 2002. Corporate Environmental Performance Evaluation: Eveidence from the MEPI Project. Business Strategy and the Environment 11, 1-13.

Udo de Haes, H., Heijungs, R., Huppes, G., van der Voet, E. & Hettelingh, J-P. 2000. Full Mode and Attribution Mode in Environmental Analysis. Journal of Industrial Ecology 4 (1), 45-56.

UPM-Kymmene. 2003. Corporate Responsibility Report 2002. Helsinki: UPM (in Finnish).

Warhurst, A. 2002. Sustainability Indicators and Sustainability Performance Management. MMSD report No. 43. IIED and WBCSD. http://www.iied.org/mmsd/mmsd_pdfs/sustainability_indicators.pdf. Version current as of February 11, 2002.

WCED (The World Commission on Environment and Development). 1987. Our Common Future. Oxford: Oxford University Press.

Vehmas, M. 2002. Metsäsektorin arvosisältö: Ekotaseet toimialalla kustantaminen ja painaminen. Osaraportti 2000/70. Teknillinen korkeakoulu. Puurakentaminen. Arkkitehtiosaston julkaisuja. Espoo: Otamedia (in Finnish).

Veleva, V. & Ellenbecker M. 2000. A proposal for Measuring Business Sustainability. Addressing Shortcomings in Existing Frameworks. Greener Management International 31. Autumn 2000, 101-120.

Veleva, V. & Ellenbecker, M. 2001. Indicators of sustainable production: framework and methodology. Journal of Cleaner Production 9 (2001), 519-549.

Welford, R. 2002. Beyond systems: A vision for corporate environmental management for the future. A background paper for the keynote speech to be made during the Science Days for the Studia Economica lecture series at Helsinki School of Economics Jan 8th 2003.

White, P. 2001. Sustainability Through the Market: Making Markets Work for Everyone. Corporate Environmental Strategy 8 (1), 16-23.

Wier, M. & Hasler, B. 1999. Accounting for nitrogen in Denmark – a structural decomposition analysis. Ecological Economics 30 (2), 317-331.

Yin, R.K. 1989. Case study research. Design and methods. Revised edition. Newbury Park: Sage.

Ympäristöministeriö (Ministry of the Environment). 2001. Kansallinen ilmasto-ohjelma – Ympäristöministeriön sektoriselvitys. Suomen Ympäristö 473. Helsinki: Edita (in Finnish).

APPENDICES

Appendix 1
Product-by-industry supply table 1995 at producer's price (million FIM)

Product		Industry											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Saw log, pulpwood and firewood	14382	63	3	0	12	0	0	0	0	0	0	0
2	Sawn timber, chips, sawdust and other wood residues	0	12092	185	0	42	37	1	15	125	5	7	13
3	Plywood and veneer	0	21	2838	28	23	6	0	1	0	0	0	0
4	Particle board and fibreboard	0	0	50	742	0	0	0	0	0	0	0	0
5	Prefabricated wooden houses	0	3	0	0	1164	0	0	0	0	0	0	0
6	Builder's joinery and carpentry	0	39	0	0	48	2674	10	0	0	0	0	0
7	Wooden containers	0	24	0	0	0	0	497	0	0	0	0	0
8	Other wood products	0	24	0	0	0	2	15	238	0	0	0	0
9	Chemical and semi-chemical pulp	0	0	0	0	0	0	0	0	15356	3	5	9
10	Newsprint and mechanical pulp	0	0	0	0	0	0	0	0	0	4491	0	0
11	Uncoated magazine paper	0	0	0	0	0	0	0	0	0	0	7271	0
12	Coated magazine paper	0	0	0	0	0	0	0	0	0	0	0	12441
13	Fine paper	0	0	0	0	0	0	0	0	0	0	0	0
14	Kraft paper and other paper	0	0	0	0	0	0	0	0	0	0	0	0
15	Paperboard	0	0	0	0	0	0	0	0	0	0	0	0
16	Corrugated board and paperboard containers	0	0	0	0	0	0	0	0	0	0	0	0
17	Paper and paperboard products excluding 16	0	0	0	0	0	0	0	0	0	182	294	503
18	Newspapers	0	0	0	0	0	0	0	0	0	0	0	0
19	Books, magazines and other printed matters	0	0	0	0	0	0	0	0	0	0	0	0
20	Wood chairs and seats	0	0	2	0	0	0	0	0	0	0	0	0
21	Wood office and shop furniture	0	0	0	0	0	3	0	0	0	0	0	0
22	Wood kitchen furniture	0	0	0	0	0	0	6	0	0	0	0	0
23	Other wood furniture	0	14	9	0	0	8	0	0	0	0	0	0
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	0	0	0	0	0	0	0	0	0	0	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	0	190	36	0	0	0	0	0	98	85	138	236
28	Products of agriculture, hunting & fishing	0	0	0	0	0	0	0	0	0	0	0	0
29	Products from mining and quarrying	0	0	0	0	0	0	0	0	0	0	0	0
30	Food products, beverages and tobacco	0	0	0	0	0	0	0	0	0	0	0	0
31	Textiles, wearing apparel and leather products	0	0	0	0	0	1	0	0	0	0	0	0
32	Recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	0	0	0	0	0	0	0	0	0	0	0	0
34	Chemicals and chemical products	0	0	0	0	0	0	0	0	558	30	49	84
35	Rubber and plastic products	0	0	0	0	0	0	0	0	0	0	0	0
36	Other non-metallic mineral products	0	0	0	0	1	13	0	0	0	0	0	0
37	Basic metals and fabricated metal products	0	0	0	0	0	5	0	5	0	15	24	41
38	Machinery and equipment	0	0	15	0	11	73	1	0	4	30	49	83
39	Electrical and optical equipment	0	0	0	0	0	0	0	0	0	0	0	0
40	Transport equipment	0	0	0	0	0	0	0	0	0	0	0	0
41	Furniture, excluding 20-23, manufactured goods n.e.c.	0	6	0	0	0	0	0	3	0	0	0	0
42	Electricity, gas and steam, excluding 27	0	0	0	0	0	0	0	0	0	15	25	43
43	Water	0	0	0	0	0	0	0	0	0	0	0	0
44	Construction work, excluding wood construction work	0	0	0	0	0	0	0	0	0	0	0	0
45	Wholesale and retail trade services	0	0	0	0	0	0	0	0	0	0	0	1
46	Hotel and restaurant services	0	0	0	0	0	0	0	0	0	0	0	0
47	Land transport services; transport services via pipelines	0	37	2	0	2	15	0	0	141	24	39	67
48	Water transport services	0	0	0	0	0	0	0	0	0	0	0	0
49	Other transport services; post and telecom. services	0	0	0	0	0	0	0	0	0	1	1	2
50	Financial intermediation and insurance services	0	0	0	0	0	0	0	0	0	0	0	0
51	Real estate, renting and business services; R&D services	0	128	76	23	13	29	5	9	100	281	454	777
52	Community, social and other services	0	0	0	0	0	0	0	0	0	0	0	0
Total industry output at producer's price		14382	12639	3217	794	1316	2867	535	273	16381	5162	8358	14300

(continues)

Appendix 1 (continues)
Product-by-industry supply table 1995 at producer's price (million FIM)

Product		Industry											
		13	14	15	16	17	18	19	20	21	22	23	24
1	Saw log, pulpwood and firewood	0	0	0	0	0	0	0	0	0	0	0	0
2	Sawn timber, chips, sawdust and other wood residues	9	7	9	0	1	0	0	0	0	2	1	0
3	Plywood and veneer	0	0	0	0	0	0	0	2	0	0	0	0
4	Particle board and fibreboard	0	0	0	0	0	0	0	0	0	25	2	0
5	Prefabricated wooden houses	0	0	0	0	0	0	0	0	0	0	0	0
6	Builder's joinery and carpentry	0	0	0	13	0	0	0	0	2	3	0	0
7	Wooden containers	0	0	0	0	0	0	0	0	0	0	0	0
8	Other wood products	0	0	0	0	0	0	0	3	0	0	3	0
9	Chemical and semi-chemical pulp	7	5	6	0	0	0	0	0	0	0	0	0
10	Newsprint and mechanical pulp	0	0	0	0	0	0	0	0	0	0	0	0
11	Uncoated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
12	Coated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
13	Fine paper	8942	0	0	0	0	0	0	0	0	0	0	0
14	Kraft paper and other paper	0	7125	0	8	98	1	16	0	0	0	0	0
15	Paperboard	0	0	8648	12	72	0	0	0	0	0	0	0
16	Corrugated board and paperboard containers	0	0	0	2056	15	0	36	0	0	0	0	0
17	Paper and paperboard products excluding 16	362	288	350	188	2384	0	325	0	0	0	0	0
18	Newspapers	0	0	0	0	0	3477	591	0	0	0	0	0
19	Books, magazines and other printed matters	0	0	0	0	147	202	10228	0	0	0	0	0
20	Wood chairs and seats	0	0	0	0	0	0	0	535	0	16	44	0
21	Wood office and shop furniture	0	0	0	0	0	0	0	361	358	1	18	0
22	Wood kitchen furniture	0	0	0	0	0	0	0	83	4	785	19	0
23	Other wood furniture	0	0	0	0	0	0	0	123	61	81	1115	0
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	2290
25	Wood products in repairs of buildings	0	0	0	0	0	0	0	0	0	0	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	170	135	164	0	0	0	0	0	0	0	0	0
28	Products of agriculture, hunting & fishing	0	0	0	0	0	0	0	0	0	0	0	0
29	Products from mining and quarrying	0	0	0	0	0	0	0	0	0	0	0	0
30	Food products, beverages and tobacco	0	0	0	0	0	0	0	0	0	0	0	0
31	Textiles, wearing apparel and leather products	0	0	0	0	12	0	0	1	0	0	0	0
32	Recorded media	0	0	0	0	0	1	70	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	0	0	0	0	0	0	0	0	0	0	0	0
34	Chemicals and chemical products	60	48	58	0	0	0	34	0	0	0	0	0
35	Rubber and plastic products	0	0	0	0	6	0	45	5	16	0	0	0
36	Other non-metallic mineral products	0	0	0	0	0	0	0	0	0	0	0	0
37	Basic metals and fabricated metal products	29	23	28	138	19	0	76	1	27	0	36	0
38	Machinery and equipment	60	48	58	19	1	1	0	2	3	2	1	0
39	Electrical and optical equipment	0	0	0	0	0	0	0	0	27	0	2	0
40	Transport equipment	0	0	0	0	0	0	0	0	0	0	0	0
41	Furniture, excluding 20-23, manufactured goods n.e.c.	0	0	0	1	0	0	5	0	2	0	0	0
42	Electricity, gas and steam, excluding 27	31	24	30	0	0	0	0	0	0	0	0	0
43	Water	0	0	0	0	0	0	0	0	0	0	0	0
44	Construction work, excluding wood construction work	0	0	0	0	0	0	0	0	0	0	0	0
45	Wholesale and retail trade services	0	0	0	0	0	0	0	0	0	0	0	0
46	Hotel and restaurant services	0	0	0	0	0	0	0	0	0	0	0	0
47	Land transport services; transport services via pipelines	48	38	47	50	0	66	43	2	0	1	1	0
48	Water transport services	0	0	0	0	0	0	0	0	0	0	0	0
49	Other transport services; post and telecom. services	1	1	1	0	0	2	3	0	0	0	0	0
50	Financial intermediation and insurance services	0	0	0	0	0	0	0	0	0	0	0	0
51	Real estate, renting and business services; R&D services	559	445	540	27	48	3073	1475	24	7	21	14	0
52	Community, social and other services	0	0	0	0	0	0	7	0	0	0	0	0
Total industry output at producer's price		10279	8190	9941	2512	2803	6823	12956	1141	507	938	1256	2290

(continues)

Appendix 1 (continues)
Product-by-industry supply table 1995 at producer's price (million FIM)

Product		Industry											
		25	26	27	28	29	30	31	32	33	34	35	36
1	Saw log, pulpwood and firewood	0	0	0	0	0	0	0	0	0	0	0	0
2	Sawn timber, chips, sawdust and other wood residues	0	0	0	0	1	0	0	0	0	0	0	0
3	Plywood and veneer	0	0	0	0	0	0	0	0	0	0	0	0
4	Particle board and fibreboard	0	0	0	0	0	0	0	0	0	0	0	0
5	Prefabricated wooden houses	0	0	0	0	0	0	0	0	0	0	0	0
6	Builder's joinery and carpentry	0	0	0	0	0	0	0	0	0	0	2	0
7	Wooden containers	0	0	0	0	0	0	0	0	0	0	0	0
8	Other wood products	0	0	0	0	0	0	0	0	0	0	0	0
9	Chemical and semi-chemical pulp	0	0	0	0	0	0	0	0	0	14	0	0
10	Newsprint and mechanical pulp	0	0	0	0	0	0	0	0	0	6	6	0
11	Uncoated magazine paper	0	0	0	0	0	0	0	0	0	10	10	0
12	Coated magazine paper	0	0	0	0	0	0	0	0	0	17	17	0
13	Fine paper	0	0	0	0	0	0	0	0	0	12	12	0
14	Kraft paper and other paper	0	0	0	0	0	0	0	0	0	10	10	0
15	Paperboard	0	0	0	0	0	0	0	0	0	12	12	0
16	Corrugated board and paperboard containers	0	0	0	0	0	0	0	0	0	0	41	0
17	Paper and paperboard products excluding 16	0	0	0	0	0	0	6	0	0	0	21	0
18	Newspapers	0	0	0	0	0	0	0	0	0	0	2	0
19	Books, magazines and other printed matters	0	0	0	0	0	0	0	0	0	0	5	0
20	Wood chairs and seats	0	0	0	0	0	0	0	0	0	0	12	6
21	Wood office and shop furniture	0	0	0	0	0	0	0	0	0	0	0	0
22	Wood kitchen furniture	0	0	0	0	0	0	0	0	0	0	0	0
23	Other wood furniture	0	0	0	0	0	0	0	0	0	0	12	6
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	5649	0	0	0	0	0	0	0	0	0	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	2721	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	0	0	1116	0	0	8	0	0	20	16	1	0
28	Products of agriculture, hunting & fishing	0	0	0	21360	0	144	2	0	0	0	1	0
29	Products from mining and quarrying	0	0	0	0	4068	9	0	0	0	6	0	37
30	Food products, beverages and tobacco	0	0	0	42	0	45748	1	0	0	58	0	0
31	Textiles, wearing apparel and leather products	0	0	0	0	0	1	7568	0	0	2	28	0
32	Recorded media	0	0	0	0	0	0	0	232	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	0	0	0	0	0	0	0	0	10322	123	0	2
34	Chemicals and chemical products	0	0	0	0	2	216	6	0	20	21128	0	0
35	Rubber and plastic products	0	0	0	0	0	0	7	0	0	18	7839	5
36	Other non-metallic mineral products	0	0	0	0	21	1	54	0	0	5	0	7720
37	Basic metals and fabricated metal products	0	0	0	0	1	0	14	0	0	8	30	1
38	Machinery and equipment	0	0	22	0	0	40	23	0	18	62	141	57
39	Electrical and optical equipment	0	0	0	0	0	1	66	0	0	44	309	7
40	Transport equipment	0	0	0	0	0	0	0	0	0	0	13	0
41	Furniture, excluding 20-23, manufactured goods n.e.c.	0	0	0	0	0	1	8	0	0	0	29	11
42	Electricity, gas and steam, excluding 27	0	0	0	0	1	192	1	0	456	359	30	5
43	Water	0	0	0	0	1	1	0	0	0	0	0	0
44	Construction work, excluding wood construction work	0	0	0	0	0	0	0	0	0	0	0	0
45	Wholesale and retail trade services	0	0	35	0	13	550	126	0	33	464	260	14
46	Hotel and restaurant services	0	0	0	0	0	0	0	0	0	0	0	0
47	Land transport services; transport services via pipelines	0	0	0	0	100	133	1	0	1	327	2	113
48	Water transport services	0	0	0	0	0	0	0	0	0	0	0	0
49	Other transport services; post and telecom. services	0	0	0	0	2	13	0	0	7	0	0	0
50	Financial intermediation and insurance services	0	0	0	0	0	0	0	0	0	0	0	0
51	Real estate, renting and business services; R&D services	0	0	27	0	180	1079	278	5	493	487	317	259
52	Community, social and other services	0	0	0	0	0	5	0	0	0	0	0	0
Total industry output at producer's price		5649	2721	1200	21402	4389	48140	8163	237	11371	23187	9161	8240

(continues)

Appendix 1 (continues)
Product-by-industry supply table 1995 at producer's price (million FIM)

Product		Industry											
		37	38	39	40	41	42	43	44	45	46	47	48
1	Saw log, pulpwood and firewood	0	0	0	0	0	0	0	0	0	0	0	0
2	Sawn timber, chips, sawdust and other wood residues	0	0	0	0	0	0	0	0	0	0	0	0
3	Plywood and veneer	0	0	0	0	0	0	0	0	0	0	0	0
4	Particle board and fibreboard	0	0	0	0	0	0	0	0	0	0	0	0
5	Prefabricated wooden houses	0	0	0	0	0	0	0	0	0	0	0	0
6	Builder's joinery and carpentry	0	0	0	0	0	0	0	0	0	0	0	0
7	Wooden containers	0	0	0	0	0	0	0	0	0	0	0	0
8	Other wood products	0	0	0	0	0	0	0	0	0	0	0	0
9	Chemical and semi-chemical pulp	0	0	0	0	0	0	0	0	0	0	0	0
10	Newsprint and mechanical pulp	0	0	0	0	0	0	0	0	0	0	0	0
11	Uncoated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
12	Coated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
13	Fine paper	0	0	0	0	0	0	0	0	0	0	0	0
14	Kraft paper and other paper	0	0	0	0	0	0	0	0	0	0	0	0
15	Paperboard	0	0	0	0	0	0	0	0	0	0	0	0
16	Corrugated board and paperboard containers	19	0	0	0	0	0	0	0	0	0	0	0
17	Paper and paperboard products excluding 16	21	0	0	0	0	0	0	0	0	0	0	0
18	Newspapers	5	0	0	0	3	0	0	0	0	0	0	0
19	Books, magazines and other printed matters	14	0	0	0	7	0	0	0	0	0	0	0
20	Wood chairs and seats	10	4	1	6	3	0	0	0	0	0	0	0
21	Wood office and shop furniture	0	0	0	0	0	0	0	0	0	0	0	0
22	Wood kitchen furniture	0	0	0	0	0	0	0	0	0	0	0	0
23	Other wood furniture	11	4	1	6	3	0	0	0	0	0	0	0
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	0	0	0	0	0	0	0	0	0	0	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	30	0	0	0	0	0	1	0	0	0	0	0
28	Products of agriculture, hunting & fishing	0	0	0	0	0	0	0	0	0	0	0	0
29	Products from mining and quarrying	0	0	0	0	0	0	0	0	0	0	0	0
30	Food products, beverages and tobacco	0	0	0	0	0	0	0	0	0	0	0	0
31	Textiles, wearing apparel and leather products	10	13	1	0	7	0	0	0	0	0	0	0
32	Recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	86	0	0	0	0	0	0	0	0	0	0	0
34	Chemicals and chemical products	176	4	0	0	0	0	0	0	0	0	0	0
35	Rubber and plastic products	81	0	69	42	39	0	0	0	0	0	0	0
36	Other non-metallic mineral products	18	0	2	0	24	0	0	0	0	0	0	0
37	Basic metals and fabricated metal products	44814	640	149	1055	334	0	0	0	0	0	0	0
38	Machinery and equipment	964	38874	492	165	4	497	52	0	0	0	0	0
39	Electrical and optical equipment	65	325	48994	24	22	0	0	0	0	0	0	0
40	Transport equipment	142	787	32	13650	0	0	0	0	0	0	0	0
41	Furniture, excluding 20-23, manufactured goods n.e.c.	53	14	15	12	2971	0	0	0	0	0	0	0
42	Electricity, gas and steam, excluding 27	698	4	4	2	0	25589	21	0	0	0	0	0
43	Water	0	0	0	0	0	0	1867	0	0	0	0	0
44	Construction work, excluding wood construction work	0	0	0	0	0	0	0	46903	0	0	0	0
45	Wholesale and retail trade services	88	93	359	13	45	803	-36	0	81958	0	0	503
46	Hotel and restaurant services	0	0	0	0	0	0	0	0	0	18439	0	1009
47	Land transport services; transport services via pipelines	295	7	9	0	7	1	0	0	0	0	27379	0
48	Water transport services	0	0	0	0	0	0	0	0	0	0	0	6040
49	Other transport services; post and telecom. services	3	4	2	0	0	0	0	0	0	0	253	0
50	Financial intermediation and insurance services	0	0	0	0	0	0	0	0	0	0	0	0
51	Real estate, renting and business services; R&D services	978	990	1947	648	48	628	38	0	1331	5	0	0
52	Community, social and other services	2	0	0	0	0	1	0	0	0	1874	0	0
Total industry output at producer's price		48583	41765	52078	15623	3517	27518	1943	46903	83289	20318	27632	7553

(continues)

Appendix 1 (continues)
Product-by-industry supply table 1995 at producer's price (million FIM)

Product		Industry				Total
		49	50	51	52	supply
1	Saw log, pulpwood and firewood	0	0	0	0	14459
2	Sawn timber, chips, sawdust and other wood residues	0	0	0	0	12552
3	Plywood and veneer	0	0	0	0	2919
4	Particle board and fibreboard	0	0	0	0	820
5	Prefabricated wooden houses	0	0	0	0	1167
6	Builder's joinery and carpentry	0	0	0	0	2789
7	Wooden containers	0	0	0	0	521
8	Other wood products	0	0	0	0	286
9	Chemical and semi-chemical pulp	0	0	0	0	15405
10	Newsprint and mechanical pulp	0	0	0	0	4503
11	Uncoated magazine paper	0	0	0	0	7291
12	Coated magazine paper	0	0	0	0	12475
13	Fine paper	0	0	0	0	8967
14	Kraft paper and other paper	0	0	0	0	7268
15	Paperboard	0	0	0	0	8755
16	Corrugated board and paperboard containers	0	0	0	0	2170
17	Paper and paperboard products excluding 16	0	0	0	0	4925
18	Newspapers	0	0	0	0	4078
19	Books, magazines and other printed matters	0	0	0	0	10603
20	Wood chairs and seats	0	0	0	0	640
21	Wood office and shop furniture	0	0	0	0	741
22	Wood kitchen furniture	0	0	0	0	896
23	Other wood furniture	0	0	0	0	1454
24	Wood products in new buildings	0	0	0	0	2290
25	Wood products in repairs of buildings	0	0	0	0	5649
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	2721
27	Electrical energy and heat produced by wood	0	0	0	0	2447
28	Products of agriculture, hunting & fishing	0	0	0	0	21507
29	Products from mining and quarrying	0	0	0	0	4119
30	Food products, beverages and tobacco	0	0	0	0	45848
31	Textiles, wearing apparel and leather products	0	0	0	0	7643
32	Recorded media	0	0	0	0	303
33	Coke, refined petroleum products and nuclear fuel	0	0	0	0	10532
34	Chemicals and chemical products	0	0	0	0	22474
35	Rubber and plastic products	0	0	0	0	8172
36	Other non-metallic mineral products	0	0	0	0	7861
37	Basic metals and fabricated metal products	0	0	0	0	47514
38	Machinery and equipment	0	0	0	0	41870
39	Electrical and optical equipment	0	0	0	0	49884
40	Transport equipment	0	0	0	0	14624
41	Furniture, excluding 20-23, manufactured goods n.e.c.	0	0	0	0	3132
42	Electricity, gas and steam, excluding 27	0	0	0	0	27529
43	Water	0	0	0	0	1868
44	Construction work, excluding wood construction work	0	0	0	0	46903
45	Wholesale and retail trade services	243	0	0	0	85567
46	Hotel and restaurant services	0	0	0	0	19448
47	Land transport services; transport services via pipelines	0	0	0	0	29000
48	Water transport services	0	0	0	0	6040
49	Other transport services; post and telecom. services	44839	0	0	0	45135
50	Financial intermediation and insurance services	0	25604	0	0	25604
51	Real estate, renting and business services; R&D services	507	2814	133130	5198	159518
52	Community, social and other services	0	0	0	168801	170691
Total industry output at producer's price		45589	28418	133130	173999	1041577

Appendix 2
Product-by-industry use table 1995 at producer's price (million FIM)

Product		Industry 1	2	3	4	5	6	7	8	9	10	11	12
1	Saw log, pulpwood and firewood	313	6045	687	6	113	74	0	2	3474	233	377	646
2	Sawn timber, chips, sawdust and other wood residues	0	347	25	85	239	483	184	42	903	63	102	175
3	Plywood and veneer	0	0	84	0	4	51	12	8	0	0	0	0
4	Particle board and fibreboard	0	0	0	36	4	37	4	2	0	0	0	0
5	Prefabricated wooden houses	0	0	0	0	2	0	0	0	0	0	0	0
6	Builder's joinery and carpentry	0	0	0	0	147	104	0	0	0	0	0	0
7	Wooden containers	0	4	8	4	0	1	2	1	0	14	22	38
8	Other wood products	0	0	0	0	0	2	6	0	0	0	0	0
9	Chemical and semi-chemical pulp	0	0	0	0	0	0	0	0	195	998	1617	2766
10	Newsprint and mechanical pulp	0	0	0	0	0	0	0	0	0	22	36	61
11	Uncoated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
12	Coated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
13	Fine paper	0	0	0	0	0	0	0	0	0	52	85	145
14	Kraft paper and other paper	3	0	22	21	0	0	0	0	30	62	100	171
15	Paperboard	3	0	16	18	0	1	0	0	0	23	38	65
16	Corrugated board and paperboard containers	0	28	8	6	2	8	0	0	3	62	101	172
17	Paper and paperboard products excluding containers	1	1	0	0	0	9	0	0	0	1	1	2
18	Newspapers	3	1	0	0	0	0	0	0	0	0	1	2
19	Books, magazines and other printed matters	9	3	1	0	0	1	0	0	0	1	2	4
20	Wood chairs and seats	0	0	0	0	0	0	0	0	0	0	0	0
21	Wood office and shop furniture	0	0	0	0	0	0	0	0	0	0	0	0
22	Wood kitchen furniture	1	0	0	0	1	0	0	0	0	0	0	0
23	Other wood furniture	1	0	0	0	1	0	0	0	0	0	0	0
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	0	22	8	2	4	7	1	0	0	17	31	58
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	0	0	0	0	0	0	0	0	0	0	0	0
28	Products of agriculture, hunting & fishing	0	0	0	0	0	0	0	0	0	-2	-3	-6
29	Products from mining and quarrying	0	7	4	1	0	0	0	0	24	45	73	125
30	Food products, beverages and tobacco	0	0	2	0	0	3	0	0	0	30	49	84
31	Textiles, wearing apparel and leather products	10	0	0	0	0	0	0	4	0	0	0	0
32	Recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	85	9	3	5	1	1	0	0	20	6	10	18
34	Chemicals and chemical products	19	6	138	70	6	68	1	4	600	167	271	463
35	Rubber and plastic products	0	7	6	1	4	16	0	2	1	6	9	16
36	Other non-metallic mineral products	1	0	3	0	29	58	0	0	19	1	2	4
37	Basic metals and fabricated metal products	3	22	5	4	21	91	11	3	7	2	4	6
38	Machinery and equipment	0	91	26	15	18	33	3	1	113	69	121	229
39	Electrical and optical equipment	14	4	2	0	2	0	0	0	3	2	3	6
40	Transport equipment	0	0	0	0	0	0	0	0	0	0	0	0
41	Furniture, excluding 20-23, manufactured goods n.e.c.	1	0	0	0	0	0	0	0	0	0	0	0
42	Electricity, gas and steam, excluding 27	0	369	133	59	19	44	7	3	666	455	736	1259
43	Water	0	3	1	0	1	1	0	0	0	1	1	2
44	Construction work, excluding wood construction work	99	51	20	5	9	17	2	1	0	41	72	136
45	Wholesale and retail trade services	378	23	6	2	6	9	2	1	33	9	15	27
46	Hotel and restaurant services	38	39	15	4	5	10	1	1	29	17	30	57
47	Land transport services; transport services via pipelines	26	1003	196	55	61	109	21	10	401	346	512	767
48	Water transport services	2	30	4	1	1	1	0	0	8	7	10	15
49	Other transport services; post and telecom. services	58	248	67	20	27	49	8	4	174	105	160	252
50	Financial intermediation and insurance services	16	8	3	1	1	2	0	0	6	3	6	11
51	Real estate, renting and business services; R&D services	0	460	140	34	88	167	17	18	311	180	318	605
52	Community, social and other services	0	74	28	7	12	22	3	2	53	31	54	103
Use of domestic products at producer's price		**1085**	**8903**	**1662**	**464**	**827**	**1479**	**286**	**109**	**7075**	**3070**	**4966**	**8486**
Use of imported products at producer's price, total		**138**	**327**	**261**	**105**	**102**	**279**	**34**	**23**	**1911**	**582**	**947**	**1630**
Consumption expenses of non-resident households in Finland		0	0	0	0	0	0	0	0	0	0	0	0
Value added tax		4	5	2	1	1	1	0	0	6	2	4	7
Product taxes		114	33	16	5	5	9	2	1	77	31	51	87
Product subsidies		-3	-2	-1	0	0	0	0	0	-2	-1	-1	-3
Intermediate use at purchaser's price		**1338**	**9266**	**1940**	**574**	**934**	**1767**	**322**	**133**	**9067**	**3684**	**5966**	**10208**
Wages and salaries		1782	1280	740	123	244	627	91	64	773	472	765	1309
Employers' social contributions		470	400	236	37	68	186	26	19	249	145	235	401
Other taxes on production less subsidies		-278	-89	-16	-3	-4	-15	-5	-3	-50	-7	-11	-19
Consumption of fixed capital		2146	706	126	25	29	119	40	24	2462	336	545	932
Operating surplus/ mixed income, net		8924	1077	192	38	45	182	61	37	3881	530	859	1469
Value added, gross at producer's price		13044	3373	1278	219	382	1099	212	140	7315	1477	2392	4093
Output at producer's price		**14382**	**12639**	**3217**	**794**	**1316**	**2867**	**535**	**273**	**16381**	**5162**	**8358**	**14300**

(continues)

Appendix 2 (continues)
Product-by-industry use table 1995 at producer's price (million FIM)

	Product	Industry 13	14	15	16	17	18	19	20	21	22	23	24
1	Saw log, pulpwood and firewood	464	370	449	0	8	0	0	1	0	16	4	0
2	Sawn timber, chips, sawdust and other wood residues	126	100	122	0	0	0	0	20	5	50	129	312
3	Plywood and veneer	0	0	0	1	0	0	0	25	5	5	19	30
4	Particle board and fibreboard	0	0	0	1	0	0	0	36	28	112	58	15
5	Prefabricated wooden houses	0	0	0	0	0	0	0	0	0	0	0	158
6	Builder's joinery and carpentry	0	0	0	3	0	0	0	0	0	1	79	396
7	Wooden containers	28	22	27	7	3	0	6	1	1	1	0	4
8	Other wood products	0	0	0	1	0	0	0	4	0	5	5	0
9	Chemical and semi-chemical pulp	1988	1584	1923	0	52	0	0	0	0	0	0	7
10	Newsprint and mechanical pulp	44	35	42	0	0	584	277	0	0	0	0	0
11	Uncoated magazine paper	0	0	0	0	13	3	995	0	0	0	0	0
12	Coated magazine paper	0	0	0	1	0	0	153	0	0	0	0	0
13	Fine paper	104	83	101	37	101	51	704	0	0	0	0	0
14	Kraft paper and other paper	123	98	119	115	499	1	108	0	0	1	2	2
15	Paperboard	47	37	45	482	47	0	40	0	0	0	0	0
16	Corrugated board and paperboard containers	124	99	120	57	36	3	37	8	4	9	13	0
17	Paper and paperboard products excluding containers	1	1	2	4	64	2	18	1	1	1	0	2
18	Newspapers	1	1	1	1	2	10	16	0	0	0	0	0
19	Books, magazines and other printed matters	3	2	4	5	7	22	42	0	0	0	0	0
20	Wood chairs and seats	0	0	0	0	0	0	0	44	1	1	3	21
21	Wood office and shop furniture	0	0	0	0	0	0	0	25	41	47	3	8
22	Wood kitchen furniture	0	0	0	0	0	0	0	6	13	10	5	24
23	Other wood furniture	0	0	0	0	0	0	0	7	15	11	6	34
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	42	61	5	2	4	10	15	1	0	1	2	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	0	0	0	0	0	0	0	0	0	0	0	0
28	Products of agriculture, hunting & fishing	-4	-3	-4	0	0	0	0	0	0	0	0	0
29	Products from mining and quarrying	90	72	87	0	0	0	0	0	0	0	0	0
30	Food products, beverages and tobacco	61	48	59	6	10	0	5	0	0	0	3	0
31	Textiles, wearing apparel and leather products	0	0	0	2	9	1	2	27	0	1	0	0
32	Recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	13	10	12	2	1	2	5	1	0	1	1	0
34	Chemicals and chemical products	333	265	322	40	41	35	177	19	8	12	26	0
35	Rubber and plastic products	11	9	11	35	47	3	14	14	5	8	4	0
36	Other non-metallic mineral products	3	2	2	0	0	0	0	1	0	1	2	0
37	Basic metals and fabricated metal products	5	4	5	8	4	0	25	32	38	51	31	0
38	Machinery and equipment	164	116	197	11	21	42	62	6	3	4	7	0
39	Electrical and optical equipment	4	3	5	2	0	3	5	3	4	3	4	0
40	Transport equipment	0	0	0	0	0	0	0	0	0	0	0	0
41	Furniture, excluding 20-23, manufactured goods n.e.c.	0	0	0	0	0	0	0	2	3	4	2	0
42	Electricity, gas and steam, excluding 27	905	721	875	25	47	41	98	15	5	11	19	0
43	Water	1	1	2	0	1	5	7	0	0	0	1	0
44	Construction work, excluding wood construction work	98	130	30	5	9	24	35	2	1	2	4	0
45	Wholesale and retail trade services	20	15	21	37	7	10	37	2	1	3	3	358
46	Hotel and restaurant services	41	28	49	10	19	32	47	3	1	3	5	0
47	Land transport services; transport services via pipelines	470	304	752	87	119	39	65	25	11	28	36	17
48	Water transport services	9	6	15	1	1	2	2	0	0	0	0	0
49	Other transport services; post and telecom. services	162	111	232	47	54	549	811	14	6	15	22	0
50	Financial intermediation and insurance services	8	6	10	2	4	6	9	1	0	1	1	0
51	Real estate, renting and business services; R&D services	531	469	168	114	214	773	1258	64	24	61	109	0
52	Community, social and other services	74	52	89	18	33	1155	1710	7	3	7	13	0
	Use of domestic products at producer's price	**6094**	**4861**	**5899**	**1170**	**1475**	**3407**	**6785**	**417**	**229**	**486**	**622**	**1389**
	Use of imported products at producer's price, total	**1178**	**933**	**1134**	**414**	**469**	**396**	**858**	**159**	**58**	**101**	**109**	**108**
	Consumption expenses of non-resident households in Finland	0	0	0	0	0	0	0	0	0	0	0	0
	Value added tax	5	4	5	2	2	4	7	0	0	0	1	56
	Product taxes	62	50	60	13	16	24	48	4	2	4	5	4
	Product subsidies	-2	-1	-2	-1	-1	-1	-3	0	0	0	0	0
	Intermediate use at purchaser's price	**7337**	**5846**	**7096**	**1598**	**1960**	**3829**	**7697**	**580**	**288**	**591**	**736**	**1557**
	Wages and salaries	941	749	910	438	394	1583	2706	258	138	200	286	468
	Employers' social contributions	289	230	279	139	118	469	770	75	41	60	77	120
	Other taxes on production less subsidies	-14	-11	-13	-3	-3	-34	-64	-56	-9	-21	-38	-2
	Consumption of fixed capital	670	534	648	132	130	432	818	93	16	35	64	40
	Operating surplus/ mixed income, net	1056	842	1021	208	204	544	1030	191	32	72	132	106
	Value added, gross at producer's price	2942	2344	2845	914	843	2994	5260	562	218	347	520	733
	Output at producer's price	**10279**	**8190**	**9941**	**2512**	**2803**	**6823**	**12956**	**1141**	**507**	**938**	**1256**	**2290**

(continues)

Appendix 2 (continues)
Product-by-industry use table 1995 at producer's price (million FIM)

	Product	Industry 25	26	27	28	29	30	31	32	33	34	35	36
1	Saw log, pulpwood and firewood	0	0	0	0	0	1	1	0	0	0	0	4
2	Sawn timber, chips, sawdust and other wood residues	681	257	3	32	0	3	0	0	0	6	10	8
3	Plywood and veneer	6	4	0	0	0	0	0	0	0	0	4	0
4	Particle board and fibreboard	63	22	0	0	0	0	0	0	0	0	4	0
5	Prefabricated wooden houses	0	587	0	0	0	0	0	0	0	0	0	0
6	Builder's joinery and carpentry	896	187	0	0	0	0	0	0	0	0	0	0
7	Wooden containers	0	2	0	0	4	18	6	0	0	34	9	62
8	Other wood products	0	0	0	0	0	0	0	0	0	0	0	0
9	Chemical and semi-chemical pulp	3	4	0	0	0	0	3	0	0	348	6	8
10	Newsprint and mechanical pulp	0	0	0	0	0	0	0	0	0	0	0	0
11	Uncoated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
12	Coated magazine paper	0	0	0	0	0	296	1	0	1	20	47	16
13	Fine paper	0	0	0	0	0	202	1	0	1	10	24	11
14	Kraft paper and other paper	2	2	0	55	0	173	0	0	1	8	21	10
15	Paperboard	0	0	0	0	0	0	0	0	1	10	24	12
16	Corrugated board and paperboard containers	0	0	0	19	13	349	52	0	2	83	50	42
17	Paper and paperboard products excluding containers	17	6	0	12	1	83	1	0	1	9	21	15
18	Newspapers	0	0	0	44	1	4	4	0	1	2	2	1
19	Books, magazines and other printed matters	0	0	0	118	1	10	10	0	2	6	4	2
20	Wood chairs and seats	60	28	0	3	0	0	0	0	0	0	0	0
21	Wood office and shop furniture	58	0	0	4	0	0	0	1	0	0	0	0
22	Wood kitchen furniture	40	48	0	5	0	1	0	0	0	0	0	0
23	Other wood furniture	84	24	0	6	0	1	0	1	0	0	0	0
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	0	0	0	82	24	68	6	0	11	44	13	24
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	0	0	14	37	10	46	7	2	33	84	14	15
28	Products of agriculture, hunting & fishing	0	0	1	1681	0	14007	9	0	0	2	0	0
29	Products from mining and quarrying	0	0	32	108	71	21	0	0	0	283	1	264
30	Food products, beverages and tobacco	0	0	1	1652	8	10083	10	0	5	165	13	11
31	Textiles, wearing apparel and leather products	0	0	0	91	3	14	858	0	2	15	10	28
32	Recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	0	0	3	169	46	54	13	0	824	405	17	64
34	Chemicals and chemical products	0	0	0	1067	81	88	184	0	17	2610	814	114
35	Rubber and plastic products	0	0	6	202	7	434	128	27	27	194	241	71
36	Other non-metallic mineral products	0	0	0	16	8	114	17	0	0	58	23	695
37	Basic metals and fabricated metal products	0	0	9	33	4	231	6	0	33	113	63	182
38	Machinery and equipment	0	0	13	369	232	287	24	1	48	190	62	188
39	Electrical and optical equipment	0	0	6	131	2	15	3	4	3	9	10	3
40	Transport equipment	0	0	0	12	0	0	0	0	0	0	8	0
41	Furniture, excluding 20-23, manufactured goods n.e.c.	0	0	0	14	0	2	25	2	0	1	1	6
42	Electricity, gas and steam, excluding 27	0	0	326	431	117	535	86	1	382	977	162	172
43	Water	0	0	0	0	1	31	3	0	4	14	4	6
44	Construction work, excluding wood construction work	0	0	10	249	58	164	14	1	27	106	32	58
45	Wholesale and retail trade services	782	422	2	1950	32	102	25	8	299	181	49	31
46	Hotel and restaurant services	0	0	3	5	22	142	31	0	26	83	63	28
47	Land transport services; transport services via pipelines	61	24	14	83	667	2568	186	4	127	819	232	551
48	Water transport services	0	0	0	0	3	17	2	7	65	9	3	3
49	Other transport services; post and telecom. services	0	0	5	374	40	694	113	0	94	335	140	172
50	Financial intermediation and insurance services	0	0	1	111	4	28	6	13	5	16	12	6
51	Real estate, renting and business services; R&D services	0	0	34	232	762	3396	806	21	447	1183	632	496
52	Community, social and other services	0	0	7	408	41	425	69	0	71	228	122	83
	Use of domestic products at producer's price	**2753**	**1616**	**490**	**9806**	**2264**	**34703**	**2710**	**94**	**2561**	**8660**	**2970**	**3463**
	Use of imported products at producer's price, total	**282**	**112**	**109**	**1991**	**271**	**5032**	**2013**	**39**	**7045**	**5935**	**2543**	**1199**
	Consumption expenses of non-resident households in Finland	0	0	0	0	0	0	0	0	0	0	0	0
	Value added tax	106	70	0	1	3	19	4	0	3	11	8	4
	Product taxes	7	5	37	243	56	353	43	1	306	324	70	67
	Product subsidies	0	0	0	-403	-1	-4444	-2	0	-1	-5	-3	-1
	Intermediate use at purchaser's price	**3147**	**1802**	**636**	**11637**	**2592**	**35663**	**4768**	**134**	**9914**	**14925**	**5588**	**4730**
	Wages and salaries	1599	587	129	1965	572	5652	1800	44	588	2843	1708	1675
	Employers' social contributions	411	151	42	569	182	1740	509	13	176	856	497	510
	Other taxes on production less subsidies	-8	-3	-5	-7900	-25	-46	-40	-2	-4	-63	-17	-52
	Consumption of fixed capital	138	51	242	3978	484	2420	603	22	498	1373	461	775
	Operating surplus/ mixed income, net	362	133	157	11155	586	2710	524	27	199	3252	917	601
	Value added, gross at producer's price	2502	919	564	9767	1799	12476	3396	104	1457	8261	3566	3509
	Output at producer's price	**5649**	**2721**	**1200**	**21404**	**4391**	**48139**	**8164**	**238**	**11371**	**23186**	**9154**	**8239**

(continues)

Appendix 2 (continues)
Product-by-industry use table 1995 at producer's price (million FIM)

	Product	Industry 37	38	39	40	41	42	43	44	45	46	47	48
1	Saw log, pulpwood and firewood	0	0	0	0	1	10	0	0	0	0	0	0
2	Sawn timber, chips, sawdust and other wood residues	0	1	0	0	39	91	1	186	21	0	0	0
3	Plywood and veneer	0	0	0	0	9	0	0	0	0	0	0	0
4	Particle board and fibreboard	0	0	0	1	20	0	0	0	0	0	0	0
5	Prefabricated wooden houses	0	0	0	0	0	0	0	0	0	0	0	0
6	Builder's joinery and carpentry	0	0	0	0	4	0	0	0	0	0	0	0
7	Wooden containers	93	91	54	7	2	0	0	0	0	0	0	0
8	Other wood products	0	1	0	0	4	0	0	0	0	0	0	0
9	Chemical and semi-chemical pulp	0	0	0	0	0	0	0	0	0	0	0	0
10	Newsprint and mechanical pulp	0	0	0	0	0	0	0	0	46	0	0	0
11	Uncoated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
12	Coated magazine paper	5	3	3	1	2	2	0	2	53	2	13	22
13	Fine paper	3	2	2	1	1	1	0	1	37	1	9	15
14	Kraft paper and other paper	3	2	2	0	1	1	0	1	32	1	8	13
15	Paperboard	3	3	2	1	1	0	0	0	37	1	0	0
16	Corrugated board and paperboard containers	63	29	162	7	37	1	0	0	0	0	0	0
17	Paper and paperboard products excluding containers	13	8	22	1	2	1	0	1	207	1	4	8
18	Newspapers	5	6	6	1	0	2	0	3	377	3	15	27
19	Books, magazines and other printed matters	12	16	16	4	1	5	1	8	1021	9	41	73
20	Wood chairs and seats	0	2	1	10	4	0	0	0	13	0	1	3
21	Wood office and shop furniture	1	2	1	12	41	0	0	0	15	0	2	3
22	Wood kitchen furniture	1	2	1	15	7	0	0	0	19	1	2	4
23	Other wood furniture	1	3	2	20	8	1	0	1	26	1	3	5
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	46	72	27	32	3	0	3	0	36	102	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	80	22	13	11	2	373	7	12	69	0	8	0
28	Products of agriculture, hunting & fishing	1	1	1	0	0	16	0	0	20	123	0	2
29	Products from mining and quarrying	356	3	4	0	0	830	0	1059	0	0	0	0
30	Food products, beverages and tobacco	36	54	42	11	3	16	2	0	749	4675	0	83
31	Textiles, wearing apparel and leather products	17	23	21	10	15	8	1	103	88	18	8	4
32	Recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	773	44	32	23	10	82	2	163	334	0	876	150
34	Chemicals and chemical products	433	71	157	91	61	2	16	790	185	0	1	1
35	Rubber and plastic products	49	158	218	120	48	150	53	899	1140	12	94	0
36	Other non-metallic mineral products	51	31	7	110	18	1	6	3676	131	1	4	7
37	Basic metals and fabricated metal products	14151	2889	875	1122	210	224	0	5081	78	0	2	4
38	Machinery and equipment	294	5360	175	826	15	336	24	743	0	0	740	0
39	Electrical and optical equipment	67	705	9442	158	28	154	1	628	543	15	57	113
40	Transport equipment	3	399	1	891	0	0	0	0	0	0	427	33
41	Furniture, excluding 20-23, manufactured goods n.e.c.	64	4	3	18	157	0	0	53	61	1	6	12
42	Electricity, gas and steam, excluding 27	929	259	156	127	31	8542	81	257	800	0	98	0
43	Water	9	16	18	7	2	8	1	0	75	0	0	0
44	Construction work, excluding wood construction work	110	173	65	78	6	259	8	1131	72	203	0	0
45	Wholesale and retail trade services	569	361	413	132	84	46	4	3747	4844	838	1295	478
46	Hotel and restaurant services	175	239	211	53	15	80	8	36	334	0	20	4
47	Land transport services; transport services via pipelines	1477	674	479	195	77	374	11	1238	3416	0	620	3
48	Water transport services	17	13	10	3	1	6	0	25	53	0	8	1
49	Other transport services; post and telecom. services	574	527	440	138	45	139	17	259	3322	39	494	1079
50	Financial intermediation and insurance services	34	47	41	10	3	16	1	231	486	72	262	104
51	Real estate, renting and business services; R&D services	3416	4025	4016	1914	276	883	83	384	8579	4260	517	580
52	Community, social and other services	361	511	530	128	31	189	19	619	1617	637	128	0
	Use of domestic products at producer's price	**24295**	**16850**	**17672**	**6289**	**1327**	**12846**	**351**	**21340**	**28939**	**11018**	**5762**	**2829**
	Use of imported products at producer's price, total	**9987**	**9578**	**17104**	**3789**	**706**	**2854**	**90**	**5306**	**3647**	**739**	**782**	**1517**
	Consumption expenses of non-resident households in Finland	0	0	0	0	0	0	0	0	0	0	0	0
	Value added tax	23	32	28	7	2	11	1	932	46	0	2	0
	Product taxes	189	196	351	71	18	975	7	102	969	856	2228	53
	Product subsidies	-9	-12	-11	-3	-1	-4	0	-3	-18	0	-80	-1
	Intermediate use at purchaser's price	**34486**	**26644**	**35144**	**10153**	**2053**	**16682**	**448**	**27678**	**33583**	**12612**	**8695**	**4398**
	Wages and salaries	5837	7762	6975	3364	718	2474	287	11048	23808	4740	5870	1602
	Employers' social contributions	1752	2403	2028	986	210	805	90	2966	6261	1080	1648	472
	Other taxes on production less subsidies	-123	-127	-112	-162	-79	-98	-27	-19	110	-177	171	-144
	Consumption of fixed capital	1927	1483	1305	686	160	4640	659	1752	7547	659	3033	1557
	Operating surplus/ mixed income, net	4705	3597	6737	592	456	3015	486	3478	11987	1404	8216	-331
	Value added, gross at producer's price	14098	15118	16933	5466	1464	10837	1495	19225	49713	7706	18938	3156
	Output at producer's price	**48584**	**41762**	**52077**	**15619**	**3516**	**27519**	**1943**	**46903**	**83296**	**20318**	**27633**	**7554**

(continues)

Appendix 2 (continues)
Product-by-industry use table 1995 at producer's price (million FIM)

	Product	Industry 49	50	51	52	Financial intermed. serv. indir.	Intermediate use (total)	Cons.exp. of househ.	Cons.exp. of non-profit institutions	Governm. final cons. Individual	Governm. final cons. Collective	Gross fixed capital formation	Changes in inventories
1	Saw log, pulpwood and firewood	0	8	30	0	0	13336	521	0	0	0	907	313
2	Sawn timber, chips, sawdust and other wood residues	0	0	9	9	0	4869	0	0	0	0	0	55
3	Plywood and veneer	0	0	0	0	0	267	0	0	0	0	0	2
4	Particle board and fibreboard	0	0	0	0	0	444	0	0	0	0	0	4
5	Prefabricated wooden houses	0	0	0	0	0	747	0	0	0	0	0	4
6	Builder's joinery and carpentry	0	0	0	0	0	1818	0	0	0	0	0	11
7	Wooden containers	0	0	0	0	0	573	0	0	0	0	0	3
8	Other wood products	0	0	0	0	0	27	212	0	0	0	0	2
9	Chemical and semi-chemical pulp	0	0	0	0	0	11503	0	0	0	0	0	126
10	Newsprint and mechanical pulp	0	0	0	0	0	1147	0	0	0	0	0	36
11	Uncoated magazine paper	0	0	0	0	0	1011	0	0	0	0	0	58
12	Coated magazine paper	24	27	228	146	0	1066	0	0	0	0	0	99
13	Fine paper	16	18	169	101	0	2090	0	0	0	0	0	73
14	Kraft paper and other paper	14	16	105	87	0	2038	0	0	0	0	0	63
15	Paperboard	13	15	25	82	0	1094	0	0	0	0	0	74
16	Corrugated board and paperboard containers	0	0	0	0	0	1808	0	0	0	0	0	6
17	Paper and paperboard products excluding containers	10	8	64	104	0	731	580	0	0	0	0	10
18	Newspapers	77	34	452	1562	0	2671	1407	0	0	0	0	5
19	Books, magazines and other printed matters	205	92	1222	4226	0	7214	2362	0	0	0	0	15
20	Wood chairs and seats	3	3	22	18	0	243	33	0	0	0	0	159
21	Wood office and shop furniture	4	3	26	22	0	325	132	0	0	0	0	194
22	Wood kitchen furniture	5	4	32	27	0	274	258	0	0	0	0	237
23	Other wood furniture	7	6	44	38	0	356	296	0	0	0	0	327
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	2506	0
25	Wood products in repairs of buildings	51	80	2333	172	0	3523	0	0	0	0	1997	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	92	0	0	0	2732	0
27	Electrical energy and heat produced by wood	15	22	305	168	0	1370	1063	0	0	0	0	0
28	Products of agriculture, hunting & fishing	4	0	2	115	0	15966	3399	0	0	0	494	158
29	Products from mining and quarrying	0	0	0	0	0	3561	16	0	0	0	0	161
30	Food products, beverages and tobacco	167	14	92	1893	0	20145	20913	0	0	0	0	92
31	Textiles, wearing apparel and leather products	29	2	41	161	0	1628	2089	0	0	0	351	104
32	Recorded media	0	0	0	0	0	0	263	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	435	30	345	336	0	5440	1942	0	0	0	0	-136
34	Chemicals and chemical products	1	1	80	477	0	10431	809	0	417	0	0	145
35	Rubber and plastic products	132	0	22	394	0	5054	252	0	0	0	0	103
36	Other non-metallic mineral products	9	8	58	96	0	5273	76	0	0	0	0	114
37	Basic metals and fabricated metal products	5	4	30	107	0	25836	145	0	0	0	2173	1466
38	Machinery and equipment	0	0	161	456	0	11893	237	0	0	0	7476	429
39	Electrical and optical equipment	468	122	939	837	0	14538	362	0	0	0	3825	826
40	Transport equipment	473	0	0	478	0	2724	338	0	0	0	365	805
41	Furniture, excluding 20-23, manufactured goods n.e.c.	15	112	107	120	0	798	966	0	0	0	0	269
42	Electricity, gas and steam, excluding 27	178	249	3533	1950	0	26896	3658	0	0	0	0	0
43	Water	4	35	1403	93	0	1762	0	0	0	0	0	0
44	Construction work, excluding wood construction work	5918	158	5113	342	0	15147	182	0	0	0	31666	0
45	Wholesale and retail trade services	1291	438	4781	7546	0	31772	45562	0	974	0	4268	0
46	Hotel and restaurant services	627	116	298	904	0	4005	14633	0	0	0	0	0
47	Land transport services; transport services via pipelines	433	68	82	881	0	20821	5112	0	449	0	210	29
48	Water transport services	13	5	5	32	0	419	555	0	0	0	1	0
49	Other transport services; post and telecom. services	3302	637	3043	2946	0	22164	7910	193	1	8978	54	57
50	Financial intermediation and insurance services	35	1419	1194	863	14142	19266	5897	0	0	0	0	0
51	Real estate, renting and business services; R&D services	2529	3616	16434	5268	0	70911	62887	235	0	2097	9917	0
52	Community, social and other services	72	344	4509	11811	0	26509	19675	11506	78592	34040	0	0
Use of domestic products at producer's price		**16584**	**7714**	**47339**	**44869**	**14142**	**423499**	**204834**	**11933**	**80432**	**45115**	**68942**	**6498**
Use of imported products at producer's price, total		**3359**	**574**	**5408**	**7196**	**0**	**111463**	**26056**	**138**	**1343**	**858**	**14615**	**2139**
Consumption expenses of non-resident households in Finland		0	0	0	0	0	0	-7537	0	0	0	0	0
Value added tax		307	1303	1210	6160	0	10412	30089	0	317	0	3989	0
Product taxes		401	237	653	979	0	10516	21692	0	127	0	1926	-66
Product subsidies		-19	-6	-11	-54	0	-5118	-1098	0	-14	0	-188	-13
Intermediate use at purchaser's price		**20632**	**9822**	**54600**	**59150**	**14142**	**550773**	**274037**	**12071**	**82205**	**45973**	**89285**	**8556**
Wages and salaries		9289	7545	17064	75042	0	219929						
Employers' social contributions		2527	2212	4353	23556	-2029	62114						
Other taxes on production less subsidies		-62	-239	-411	-172	0	-10602						
Consumption of fixed capital		7656	3025	27880	12007	0	98120						
Operating surplus/ mixed income, net		5548	6055	29656	4427	-12113	121269						
Value added, gross at producer's price		24958	18598	78542	114860	-14142	490830						
Output at producer's price		**45590**	**28420**	**133142**	**174010**	**0**	**1041603**						

(continues)

Appendix 2 (continues)
Product-by-industry use table 1995 at producer's price (million FIM)

	Product	Exports	Total use
1	Saw log, pulpwood and firewood	336	15414
2	Sawn timber, chips, sawdust and other wood residues	7482	12406
3	Plywood and veneer	2494	2763
4	Particle board and fibreboard	371	819
5	Prefabricated wooden houses	486	1237
6	Builder's joinery and carpentry	998	2827
7	Wooden containers	17	593
8	Other wood products	31	272
9	Chemical and semi-chemical pulp	4568	16196
10	Newsprint and mechanical pulp	3217	4400
11	Uncoated magazine paper	6648	7717
12	Coated magazine paper	10256	11421
13	Fine paper	6806	8969
14	Kraft paper and other paper	4239	6340
15	Paperboard	7945	9112
16	Corrugated board and paperboard containers	492	2306
17	Paper and paperboard products excluding containers	3248	4568
18	Newspapers	11	4094
19	Books, magazines and other printed matters	1823	11414
20	Wood chairs and seats	216	650
21	Wood office and shop furniture	151	802
22	Wood kitchen furniture	141	910
23	Other wood furniture	482	1461
24	Wood products in new buildings	0	2506
25	Wood products in repairs of buildings	0	5519
26	Wood products in do-it-yourself build., repairs of build.	0	2823
27	Electrical energy and heat produced by wood	2	2435
28	Products of agriculture, hunting & fishing	1789	21807
29	Products from mining and quarrying	481	4219
30	Food products, beverages and tobacco	3740	44891
31	Textiles, wearing apparel and leather products	3163	7335
32	Recorded media	29	292
33	Coke, refined petroleum products and nuclear fuel	3351	10597
34	Chemicals and chemical products	9349	21150
35	Rubber and plastic products	2811	8220
36	Other non-metallic mineral products	1977	7441
37	Basic metals and fabricated metal products	17231	46852
38	Machinery and equipment	21912	41947
39	Electrical and optical equipment	30000	49551
40	Transport equipment	9377	13611
41	Furniture, excluding 20-23, manufactured goods n.e.c.	1157	3190
42	Electricity, gas and steam, excluding 27	25	30579
43	Water	0	1763
44	Construction work, excluding wood construction work	0	46995
45	Wholesale and retail trade services	2438	85013
46	Hotel and restaurant services	827	19465
47	Land transport services; transport services via pipelines	2809	29430
48	Water transport services	5080	6054
49	Other transport services; post and telecom. services	5348	44705
50	Financial intermediation and insurance services	848	26011
51	Real estate, renting and business services; R&D services	10798	156844
52	Community, social and other services	425	170747
Use of domestic products at producer's price		**197429**	**1038682**
Use of imported products at producer's price, total		**6123**	**156612**
Consumption expenses of non-resident households in Finland		7537	0
Value added tax		0	44807
Product taxes		0	34196
Product subsidies		-152	-6583
Intermediate use at purchaser's price		**210937**	**1267714**

Appendix 3
Product-by-industry use table 1995 of imports at producer's price (million FIM)

Product		Industry											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Saw log, pulpwood and firewood	0	81	74	1	3	2	0	0	1097	74	119	204
2	Sawn timber, chips, sawdust and other wood residues	0	33	1	4	21	42	16	4	45	3	5	9
3	Plywood and veneer	0	0	16	0	1	17	4	3	0	0	0	0
4	Particle board and fibreboard	0	0	0	7	1	12	1	1	0	0	0	0
5	Prefabricated wooden houses	0	0	0	0	0	0	0	0	0	0	0	0
6	Builder's joinery and carpentry	0	0	0	0	9	6	0	0	0	0	0	0
7	Wooden containers	0	0	1	1	0	0	0	0	0	1	2	3
8	Other wood products	0	0	0	0	0	0	1	0	0	0	0	0
9	Chemical and semi-chemical pulp	0	0	0	0	0	0	0	0	8	43	70	120
10	Newsprint and mechanical pulp	0	0	0	0	0	0	0	0	0	1	2	3
11	Uncoated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
12	Coated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
13	Fine paper	0	0	0	0	0	0	0	0	0	5	7	13
14	Kraft paper and other paper	0	0	18	17	0	0	0	0	3	5	9	15
15	Paperboard	0	0	13	14	0	0	0	0	0	5	9	15
16	Corrugated board and paperboard containers	0	2	1	0	0	1	0	0	1	3	5	9
17	Paper and paperboard products excluding containers	1	0	0	0	0	1	0	0	0	0	0	0
18	Newspapers	0	0	0	0	0	0	0	0	0	0	0	0
19	Books, magazines and other printed matters	0	0	0	0	0	0	0	0	0	0	0	0
20	Wood chairs and seats	0	0	0	0	0	0	0	0	0	0	0	0
21	Wood office and shop furniture	0	0	0	0	0	0	0	0	0	0	0	0
22	Wood kitchen furniture	0	0	0	0	0	0	0	0	0	0	0	0
23	Other wood furniture	0	0	0	0	0	0	0	0	0	0	0	0
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	0	0	0	0	0	0	0	0	0	0	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	0	0	0	0	0	0	0	0	0	0	0	0
28	Products of agriculture, hunting & fishing	0	0	0	0	0	0	0	0	0	18	29	50
29	Products from mining and quarrying	0	7	4	1	0	0	0	0	83	157	253	434
30	Food products, beverages and tobacco	0	0	0	0	0	2	0	0	0	26	42	72
31	Textiles, wearing apparel and leather products	18	0	0	0	0	1	0	8	0	0	0	1
32	Recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	40	6	5	9	0	0	0	0	27	9	14	24
34	Chemicals and chemical products	1	12	67	34	3	39	0	2	488	136	220	376
35	Rubber and plastic products	0	5	7	1	3	11	0	1	1	4	6	11
36	Other non-metallic mineral products	0	0	2	0	24	48	0	0	6	0	1	1
37	Basic metals and fabricated metal products	4	12	1	1	13	57	7	2	9	3	5	8
38	Machinery and equipment	0	19	6	3	4	8	1	0	24	15	26	49
39	Electrical and optical equipment	14	4	2	0	2	0	0	0	3	2	3	6
40	Transport equipment	0	0	0	0	0	0	0	0	0	0	0	0
41	Furniture, excluding 20-23, manufactured goods n.e.c.	1	0	0	0	0	0	0	0	0	0	0	0
42	Electricity, gas and steam, excluding 27	0	7	2	1	0	1	0	0	16	11	18	31
43	Water	0	0	0	0	0	0	0	0	0	0	0	0
44	Construction work, excluding wood construction work	0	0	0	0	0	0	0	0	0	0	0	0
45	Wholesale and retail trade services	7	1	0	0	0	0	0	0	2	1	1	2
46	Hotel and restaurant services	36	26	10	2	4	7	1	1	20	11	20	39
47	Land transport services; transport services via pipelines	0	22	4	1	1	2	0	0	13	11	16	24
48	Water transport services	2	1	0	0	0	0	0	0	1	1	1	2
49	Other transport services; post and telecom. services	11	38	8	2	2	4	1	0	24	15	22	35
50	Financial intermediation and insurance services	2	2	1	0	0	0	0	0	1	1	1	2
51	Real estate, renting and business services; R&D services	0	48	19	5	9	16	2	2	38	22	39	75
52	Community, social and other services	0	0	0	0	0	0	0	0	0	0	0	0
Use of imported products at producer's price, total		138	327	261	105	102	279	34	23	1911	582	947	1630

(continues)

Appendix 3 (continues)
Product-by-industry use table 1995 of imports at producer's price (million FIM)

Product		Industry											
		13	14	15	16	17	18	19	20	21	22	23	24
1	Saw log, pulpwood and firewood	147	117	142	0	12	0	0	0	0	0	0	0
2	Sawn timber, chips, sawdust and other wood residues	6	5	6	0	0	0	0	2	0	4	11	25
3	Plywood and veneer	0	0	0	0	0	0	0	5	1	1	4	9
4	Particle board and fibreboard	0	0	0	0	0	0	0	7	5	21	11	5
5	Prefabricated wooden houses	0	0	0	0	0	0	0	0	0	0	0	2
6	Builder's joinery and carpentry	0	0	0	0	0	0	0	0	0	0	6	15
7	Wooden containers	2	2	2	1	0	0	1	0	0	0	0	0
8	Other wood products	0	0	0	0	0	0	0	0	0	0	1	0
9	Chemical and semi-chemical pulp	86	69	84	0	2	0	0	0	0	0	0	1
10	Newsprint and mechanical pulp	2	2	2	0	0	24	12	0	0	0	0	0
11	Uncoated magazine paper	0	0	0	0	0	0	5	0	0	0	0	0
12	Coated magazine paper	0	0	0	0	0	0	2	0	0	0	0	0
13	Fine paper	9	7	9	8	23	5	70	0	0	0	0	0
14	Kraft paper and other paper	11	9	10	49	211	0	11	0	0	0	1	0
15	Paperboard	11	8	10	204	20	0	9	0	0	0	0	0
16	Corrugated board and paperboard containers	7	5	6	12	7	0	5	1	0	1	1	0
17	Paper and paperboard products excluding containers	0	0	0	1	13	0	2	0	0	0	0	8
18	Newspapers	0	0	0	0	0	0	0	0	0	0	0	0
19	Books, magazines and other printed matters	0	0	0	1	1	7	13	0	0	0	0	0
20	Wood chairs and seats	0	0	0	0	0	0	0	11	0	0	1	3
21	Wood office and shop furniture	0	0	0	0	0	0	0	3	5	5	0	1
22	Wood kitchen furniture	0	0	0	0	0	0	0	0	1	0	0	0
23	Other wood furniture	0	0	0	0	0	0	0	2	4	3	1	5
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	0	0	0	0	0	0	0	0	0	0	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	0	0	0	0	0	0	0	0	0	0	0	0
28	Products of agriculture, hunting & fishing	36	29	35	0	10	0	0	0	0	0	0	0
29	Products from mining and quarrying	312	248	301	0	1	0	0	1	0	0	0	0
30	Food products, beverages and tobacco	51	41	50	5	8	0	1	0	0	0	2	0
31	Textiles, wearing apparel and leather products	0	0	0	2	11	1	4	67	0	3	1	0
32	Recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	18	14	17	1	1	0	1	0	0	0	0	0
34	Chemicals and chemical products	271	216	262	39	39	44	221	13	6	9	19	0
35	Rubber and plastic products	8	6	7	29	39	2	12	13	5	7	4	0
36	Other non-metallic mineral products	1	1	1	0	0	0	0	1	1	2	4	0
37	Basic metals and fabricated metal products	6	5	6	24	11	0	9	17	21	28	17	0
38	Machinery and equipment	35	25	42	4	8	9	13	3	2	2	4	0
39	Electrical and optical equipment	4	3	5	2	0	3	5	2	3	2	3	0
40	Transport equipment	0	0	0	0	0	0	0	0	0	0	0	0
41	Furniture, excluding 20-23, manufactured goods n.e.c.	0	0	0	0	0	0	0	1	1	1	0	0
42	Electricity, gas and steam, excluding 27	22	18	21	1	1	1	3	0	0	0	1	0
43	Water	0	0	0	0	0	0	0	0	0	0	0	0
44	Construction work, excluding wood construction work	0	0	0	0	0	0	0	0	0	0	0	0
45	Wholesale and retail trade services	1	1	1	2	0	0	2	0	0	0	0	32
46	Hotel and restaurant services	28	19	33	7	13	22	32	2	1	2	3	0
47	Land transport services; transport services via pipelines	15	10	24	2	2	1	1	0	0	0	1	0
48	Water transport services	1	1	2	0	1	1	1	0	0	0	0	0
49	Other transport services; post and telecom. services	23	16	33	5	5	19	29	1	1	1	2	0
50	Financial intermediation and insurance services	2	1	2	0	1	1	2	0	0	0	0	0
51	Real estate, renting and business services; R&D services	66	58	21	15	28	138	225	6	2	6	10	0
52	Community, social and other services	0	0	0	0	0	115	170	0	0	0	0	0
Use of imported products at producer's price, total		1178	933	1134	414	469	396	858	159	58	101	109	108

(continues)

Appendix 3 (continues)
Product-by-industry use table 1995 of imports at producer's price (million FIM)

Product		Industry											
		25	26	27	28	29	30	31	32	33	34	35	36
1	Saw log, pulpwood and firewood	0	0	0	0	0	8	0	0	0	0	0	0
2	Sawn timber, chips, sawdust and other wood residues	55	21	0	18	0	0	0	0	0	3	1	1
3	Plywood and veneer	2	1	0	0	0	0	0	0	0	0	0	0
4	Particle board and fibreboard	20	7	0	0	0	0	0	0	0	0	0	0
5	Prefabricated wooden houses	0	6	0	0	0	0	0	0	0	0	0	0
6	Builder's joinery and carpentry	35	7	0	0	0	0	0	0	0	0	0	0
7	Wooden containers	0	0	0	0	0	2	1	0	0	3	2	6
8	Other wood products	0	0	0	0	0	0	0	0	0	0	0	0
9	Chemical and semi-chemical pulp	0	1	0	0	0	0	0	0	0	187	3	2
10	Newsprint and mechanical pulp	0	0	0	0	0	0	0	0	0	0	0	0
11	Uncoated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
12	Coated magazine paper	0	0	0	0	0	1	0	0	0	0	1	4
13	Fine paper	0	0	0	0	0	17	0	0	0	5	11	3
14	Kraft paper and other paper	0	0	0	4	0	15	0	0	0	4	10	3
15	Paperboard	0	0	0	0	0	0	0	0	0	5	11	3
16	Corrugated board and paperboard containers	0	0	0	5	1	34	3	0	0	8	4	4
17	Paper and paperboard products excluding containers	68	23	0	3	0	8	0	0	0	1	2	2
18	Newspapers	0	0	0	0	0	0	0	0	0	0	0	0
19	Books, magazines and other printed matters	0	0	0	6	0	0	2	0	0	0	1	0
20	Wood chairs and seats	9	4	0	1	0	0	0	0	0	0	0	0
21	Wood office and shop furniture	10	0	0	1	0	0	0	0	0	0	0	0
22	Wood kitchen furniture	1	1	0	1	0	0	0	0	0	0	0	0
23	Other wood furniture	12	3	0	1	0	0	0	0	0	0	0	0
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	0	0	0	0	0	0	0	0	0	0	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	0	0	0	1	0	1	0	0	1	2	0	0
28	Products of agriculture, hunting & fishing	0	0	0	168	0	1652	36	0	0	7	78	0
29	Products from mining and quarrying	0	0	61	41	33	59	9	0	6021	320	6	181
30	Food products, beverages and tobacco	0	0	0	171	2	1482	87	0	0	63	2	5
31	Textiles, wearing apparel and leather products	0	0	1	167	5	29	1118	0	4	20	111	35
32	Recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	0	0	18	125	42	51	8	0	667	251	12	37
34	Chemicals and chemical products	0	0	0	219	16	503	519	0	211	4450	1586	133
35	Rubber and plastic products	0	0	1	113	5	294	59	23	9	87	367	67
36	Other non-metallic mineral products	0	0	0	5	2	49	8	0	0	24	11	348
37	Basic metals and fabricated metal products	0	0	0	13	8	191	23	0	6	48	78	162
38	Machinery and equipment	0	0	5	534	83	62	5	0	10	42	38	81
39	Electrical and optical equipment	0	0	5	128	2	15	3	4	3	9	27	3
40	Transport equipment	0	0	0	2	0	0	0	0	0	0	12	0
41	Furniture, excluding 20-23, manufactured goods n.e.c.	0	0	0	7	0	1	27	0	0	3	0	0
42	Electricity, gas and steam, excluding 27	0	0	10	15	4	12	2	0	6	23	5	6
43	Water	0	0	0	0	0	0	0	0	0	0	0	0
44	Construction work, excluding wood construction work	0	0	0	0	0	0	0	0	0	0	0	0
45	Wholesale and retail trade services	69	37	0	157	1	5	1	0	10	7	2	1
46	Hotel and restaurant services	0	0	2	5	15	97	21	0	18	57	43	19
47	Land transport services; transport services via pipelines	1	0	0	1	14	36	3	0	2	26	4	9
48	Water transport services	0	0	0	0	1	4	1	4	1	3	2	1
49	Other transport services; post and telecom. services	0	0	1	41	8	39	10	0	27	37	15	12
50	Financial intermediation and insurance services	0	0	0	17	1	6	1	3	1	3	2	1
51	Real estate, renting and business services; R&D services	0	0	4	24	28	360	64	4	47	235	98	69
52	Community, social and other services	0	0	0	0	0	0	0	0	0	0	0	0
Use of imported products at producer's price, total		282	112	109	1991	271	5032	2013	39	7045	5935	2543	1199

(continues)

Appendix 3 (continues)
Product-by-industry use table 1995 of imports at producer's price (million FIM)

Product		Industry											
		37	38	39	40	41	42	43	44	45	46	47	48
1	Saw log, pulpwood and firewood	0	0	0	0	0	0	0	0	0	0	0	0
2	Sawn timber, chips, sawdust and other wood residues	0	0	0	0	3	4	0	49	1	0	0	0
3	Plywood and veneer	0	0	0	0	2	0	0	0	0	0	0	0
4	Particle board and fibreboard	0	0	0	0	4	0	0	0	0	0	0	0
5	Prefabricated wooden houses	0	0	0	0	0	0	0	0	0	0	0	0
6	Builder's joinery and carpentry	0	0	0	0	0	0	0	0	0	0	0	0
7	Wooden containers	8	8	5	1	0	0	0	0	0	0	0	0
8	Other wood products	0	0	0	0	1	0	0	0	0	0	0	0
9	Chemical and semi-chemical pulp	0	0	0	0	0	0	0	0	0	0	0	0
10	Newsprint and mechanical pulp	0	0	0	0	0	0	0	0	5	0	0	0
11	Uncoated magazine paper	0	0	0	0	0	0	0	0	0	0	0	0
12	Coated magazine paper	1	0	0	0	0	0	0	0	1	0	1	0
13	Fine paper	0	0	0	0	0	0	0	0	3	0	1	1
14	Kraft paper and other paper	0	0	0	0	0	0	0	0	2	0	0	1
15	Paperboard	0	0	0	0	0	0	0	0	3	0	0	0
16	Corrugated board and paperboard containers	7	4	16	1	3	0	0	0	0	0	0	0
17	Paper and paperboard products excluding containers	1	1	2	0	0	0	0	0	95	1	2	5
18	Newspapers	0	0	0	0	0	0	0	0	2	0	0	0
19	Books, magazines and other printed matters	3	1	1	0	0	0	0	0	37	0	1	3
20	Wood chairs and seats	0	1	0	3	1	0	0	0	2	0	0	0
21	Wood office and shop furniture	0	1	0	4	5	0	0	0	3	0	0	1
22	Wood kitchen furniture	0	1	0	5	0	0	0	0	3	0	0	1
23	Other wood furniture	0	1	0	7	2	0	0	0	5	0	0	1
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	0	0	0	0	0	0	0	0	0	0	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	2	1	0	0	0	11	0	0	2	0	0	0
28	Products of agriculture, hunting & fishing	0	0	0	0	0	0	0	0	4	24	0	0
29	Products from mining and quarrying	2138	9	2	0	25	1587	0	16	0	0	0	0
30	Food products, beverages and tobacco	3	6	4	1	3	1	0	0	63	394	0	7
31	Textiles, wearing apparel and leather products	37	43	36	20	36	13	1	181	116	20	15	7
32	Recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	216	14	11	16	17	480	1	95	106	0	86	164
34	Chemicals and chemical products	289	115	320	99	70	4	6	351	214	0	7	1
35	Rubber and plastic products	48	215	136	125	42	36	13	437	613	13	142	0
36	Other non-metallic mineral products	82	27	57	50	22	0	2	652	30	0	2	4
37	Basic metals and fabricated metal products	5895	1777	1011	827	289	6	0	1014	272	0	6	1
38	Machinery and equipment	567	5162	109	1039	7	128	45	824	0	0	161	0
39	Electrical and optical equipment	100	744	14656	214	32	130	1	502	531	14	61	111
40	Transport equipment	4	654	2	1113	0	0	0	0	0	0	139	6
41	Furniture, excluding 20-23, manufactured goods n.e.c.	3	2	4	7	87	0	0	8	27	1	2	5
42	Electricity, gas and steam, excluding 27	28	6	4	3	1	264	3	9	19	0	3	0
43	Water	0	0	0	0	0	0	0	0	0	0	0	0
44	Construction work, excluding wood construction work	0	0	0	0	0	0	0	0	0	0	0	0
45	Wholesale and retail trade services	46	20	23	4	7	2	0	327	370	77	42	29
46	Hotel and restaurant services	119	163	144	36	10	54	5	33	216	0	19	4
47	Land transport services; transport services via pipelines	48	14	9	5	2	2	0	20	63	0	4	0
48	Water transport services	5	7	6	2	0	2	0	1	10	0	1	739
49	Other transport services; post and telecom. services	66	63	53	22	5	17	2	21	155	4	13	388
50	Financial intermediation and insurance services	7	9	8	2	1	3	0	35	111	11	39	16
51	Real estate, renting and business services; R&D services	261	507	481	182	28	106	10	713	566	129	34	24
52	Community, social and other services	0	0	0	0	0	0	0	18	0	50	0	0
Use of imported products at producer's price, total		9987	9578	17104	3789	706	2854	90	5306	3647	739	782	1517

(continues)

Appendix 3 (continues)
Product-by-industry use table 1995 of imports at producer's price (million FIM)

	Product	Industry 49	50	51	52	Financial intermed. serv. indir.	Intermediate use (total)	Cons.exp. of househ.	Cons.exp. of non-profit institutions	Governm. final cons. Individual	Governm. final cons. Collective	Gross fixed capital formation	Changes in inventories
1	Saw log, pulpwood and firewood	0	0	0	0	0	2079	0	0	0	0	0	83
2	Sawn timber, chips, sawdust and other wood residues	0	0	1	0	0	401	0	0	0	0	0	5
3	Plywood and veneer	0	0	0	0	0	66	0	0	0	0	0	0
4	Particle board and fibreboard	0	0	0	0	0	103	0	0	0	0	0	1
5	Prefabricated wooden houses	0	0	0	0	0	8	0	0	0	0	0	0
6	Builder's joinery and carpentry	0	0	0	0	0	79	0	0	0	0	0	1
7	Wooden containers	0	0	0	0	0	52	0	0	0	0	0	0
8	Other wood products	0	0	0	0	0	3	37	0	0	0	0	0
9	Chemical and semi-chemical pulp	0	0	0	0	0	678	0	0	0	0	0	1
10	Newsprint and mechanical pulp	0	0	0	0	0	51	0	0	0	0	0	0
11	Uncoated magazine paper	0	0	0	0	0	5	0	0	0	0	0	1
12	Coated magazine paper	0	0	1	1	0	14	0	0	0	0	0	1
13	Fine paper	1	1	13	7	0	222	0	0	0	0	0	1
14	Kraft paper and other paper	1	1	8	6	0	426	0	0	0	0	0	1
15	Paperboard	1	1	2	6	0	353	0	0	0	0	0	1
16	Corrugated board and paperboard containers	0	0	0	0	0	156	0	0	0	0	0	2
17	Paper and paperboard products excluding containers	6	5	37	61	0	350	358	0	0	0	0	3
18	Newspapers	0	0	0	2	0	5	7	0	0	0	0	0
19	Books, magazines and other printed matters	12	3	41	142	0	278	787	0	0	0	0	1
20	Wood chairs and seats	1	0	4	3	0	45	76	0	0	0	0	8
21	Wood office and shop furniture	1	1	5	4	0	49	23	0	0	0	0	10
22	Wood kitchen furniture	1	1	6	5	0	28	8	0	0	0	0	12
23	Other wood furniture	1	1	8	7	0	65	52	0	0	0	0	17
24	Wood products in new buildings	0	0	0	0	0	0	0	0	0	0	0	0
25	Wood products in repairs of buildings	0	0	0	0	0	0	0	0	0	0	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	0	0	0	0	0	0	0	0	0	0	0
27	Electrical energy and heat produced by wood	0	0	3	3	0	31	31	0	0	0	0	0
28	Products of agriculture, hunting & fishing	1	0	0	12	0	2191	1434	0	0	0	3	-64
29	Products from mining and quarrying	0	0	0	0	0	12309	36	0	0	0	0	-509
30	Food products, beverages and tobacco	14	1	8	164	0	2783	2863	0	0	0	0	19
31	Textiles, wearing apparel and leather products	51	3	68	211	0	2468	3734	0	0	0	256	67
32	Recorded media	0	0	0	0	0	0	263	0	0	0	0	0
33	Coke, refined petroleum products and nuclear fuel	205	20	242	164	0	3238	411	0	0	0	0	-93
34	Chemicals and chemical products	2	1	133	869	0	12635	1603	0	856	0	0	30
35	Rubber and plastic products	42	0	32	221	0	3320	432	0	0	0	0	55
36	Other non-metallic mineral products	5	4	29	88	0	1591	87	0	0	0	0	17
37	Basic metals and fabricated metal products	46	3	14	23	0	11977	198	0	0	0	240	328
38	Machinery and equipment	0	0	35	312	0	9552	1063	0	0	0	5378	286
39	Electrical and optical equipment	212	120	980	941	0	19615	1456	0	0	0	4895	1081
40	Transport equipment	72	0	0	688	0	2693	3045	0	0	0	3287	720
41	Furniture, excluding 20-23, manufactured goods n.e.c.	6	9	52	106	0	361	990	0	0	0	0	48
42	Electricity, gas and steam, excluding 27	5	3	34	39	0	659	107	0	0	0	0	0
43	Water	0	0	0	0	0	0	0	0	0	0	0	0
44	Construction work, excluding wood construction work	0	0	0	0	0	0	0	0	0	0	0	0
45	Wholesale and retail trade services	78	23	286	574	0	2251	1449	0	43	0	137	0
46	Hotel and restaurant services	830	76	108	547	0	2978	2338	0	0	0	0	0
47	Land transport services; transport services via pipelines	7	1	1	11	0	433	30	0	7	0	5	3
48	Water transport services	8	3	4	24	0	846	418	0	0	0	0	0
49	Other transport services; post and telecom. services	1624	70	148	243	0	3382	733	0	0	104	0	0
50	Financial intermediation and insurance services	5	69	241	207	0	817	1192	0	0	0	0	0
51	Real estate, renting and business services; R&D services	122	153	2855	1078	0	9028	332	18	0	754	415	0
52	Community, social and other services	0	0	10	427	0	791	463	119	437	0	0	0
Use of imported products at producer's price, total		3359	574	5408	7196	0	111463	26056	138	1343	858	14615	2139

(continues)

Appendix 3 (continues)
Product-by-industry use table 1995 of imports at producer's price (million FIM)

	Product	Exports	Total use
1	Saw log, pulpwood and firewood	7	2162
2	Sawn timber, chips, sawdust and other wood residues	14	406
3	Plywood and veneer	0	67
4	Particle board and fibreboard	0	104
5	Prefabricated wooden houses	1	8
6	Builder's joinery and carpentry	1	80
7	Wooden containers	0	52
8	Other wood products	0	41
9	Chemical and semi-chemical pulp	8	679
10	Newsprint and mechanical pulp	6	52
11	Uncoated magazine paper	12	6
12	Coated magazine paper	18	15
13	Fine paper	12	223
14	Kraft paper and other paper	8	427
15	Paperboard	14	354
16	Corrugated board and paperboard containers	3	157
17	Paper and paperboard products excluding containers	20	711
18	Newspapers	0	13
19	Books, magazines and other printed matters	1	1066
20	Wood chairs and seats	2	129
21	Wood office and shop furniture	1	83
22	Wood kitchen furniture	1	49
23	Other wood furniture	4	134
24	Wood products in new buildings	0	0
25	Wood products in repairs of buildings	0	0
26	Wood products in do-it-yourself build., repairs of build.	0	0
27	Electrical energy and heat produced by wood	0	62
28	Products of agriculture, hunting & fishing	58	3564
29	Products from mining and quarrying	12	11836
30	Food products, beverages and tobacco	22	5664
31	Textiles, wearing apparel and leather products	176	6525
32	Recorded media	0	263
33	Coke, refined petroleum products and nuclear fuel	15	3555
34	Chemicals and chemical products	435	15124
35	Rubber and plastic products	87	3807
36	Other non-metallic mineral products	49	1696
37	Basic metals and fabricated metal products	242	12743
38	Machinery and equipment	271	16279
39	Electrical and optical equipment	2023	27047
40	Transport equipment	2578	9744
41	Furniture, excluding 20-23, manufactured goods n.e.c.	20	1399
42	Electricity, gas and steam, excluding 27	0	766
43	Water	0	0
44	Construction work, excluding wood construction work	0	0
45	Wholesale and retail trade services	0	3879
46	Hotel and restaurant services	0	5316
47	Land transport services; transport services via pipelines	0	477
48	Water transport services	0	1264
49	Other transport services; post and telecom. services	0	4219
50	Financial intermediation and insurance services	0	2009
51	Real estate, renting and business services; R&D services	0	10548
52	Community, social and other services	0	1810
Use of imported products at producer's price, total		6123	156612

Appendix 4
Industry-by-industry input-output table 1995 at producer's price (million FIM), including non-financial economic (number of employees and working hours) and environmental (emission tons) variables

		Industry											
Industry		1	2	3	4	5	6	7	8	9	10	11	12
1	Forestry	311	6013	683	6	113	73	0	2	3455	232	375	642
2	Sawmilling, planing and impregnation of wood	1	362	29	82	233	468	178	40	886	63	102	174
3	Manufacture of plywood and veneer sheets	0	7	82	3	7	59	15	8	14	1	2	3
4	Manufacture of particle board and fibreboard	0	0	1	33	4	34	4	2	0	0	0	0
5	Manufacture of wooden houses	0	6	1	0	5	4	1	0	6	0	1	1
6	Manufacture of builders' joinery and carpentry	0	2	0	0	142	101	1	0	3	1	1	1
7	Manufacture of wooden containers	0	3	7	4	1	2	2	1	0	13	21	37
8	Manufacture of other wood products	0	0	0	0	0	2	5	0	1	0	0	0
9	Manufacture of chemical pulp	1	9	5	3	3	7	2	1	220	1002	1622	2774
10	Manufacture of mechanical pulp and newsprint	0	2	1	0	0	1	0	0	3	23	38	65
11	Manufacture of uncoated magazine paper	0	3	1	0	1	2	0	0	4	2	4	6
12	Manufacture of coated magazine paper	0	6	2	1	1	3	0	0	7	4	6	11
13	Manufacture of fine paper	0	4	1	1	1	2	0	0	5	55	89	152
14	Manufacture of kraft paper and other paper	3	3	23	21	1	2	0	0	33	63	102	174
15	Manufacture of paperboard	3	4	18	19	1	3	0	0	5	26	42	72
16	Manufacture of corrugated board and paperboard containers	0	29	8	6	2	9	0	0	4	60	97	165
17	Manufacture of paper and paperboard products excluding 16	1	1	1	0	0	4	0	0	1	2	3	5
18	Publishing and printing of newspapers	3	12	3	1	2	4	0	0	7	5	8	15
19	Publishing of books, magazines and other printed matter	10	9	3	1	1	3	0	0	5	5	8	15
20	Manufacture of chairs and seats, use of wood	1	0	0	0	0	0	0	0	0	0	0	0
21	Manufacture of office and shop furniture, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
22	Manufacture of kitchen furniture, use of wood	0	0	0	1	1	1	0	0	0	0	0	0
23	Manufacture of other furniture, use of wood	1	0	0	0	1	0	0	0	0	0	0	0
24	Construction of new buildings, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
25	Renovation of buildings, use of wood	0	22	8	2	4	7	1	0	0	17	31	58
26	Do-it-yourself construction and renovation, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
27	Electricity and hot water supply, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
28	Agriculture, hunting & fishing	0	0	0	0	0	0	0	0	0	-2	-3	-6
29	Mining and quarrying	0	11	5	2	0	1	0	0	26	46	74	127
30	Manufacture of food products, beverages and tobacco	3	11	6	2	1	5	0	0	15	38	62	106
31	Manufacture of textiles, wearing apparel and leather products	11	1	0	0	1	1	0	4	1	1	1	2
32	Reproduction of recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Manuf. of coke, refined petroleum products and nuclear fuel	83	16	6	6	1	2	1	0	32	15	24	41
34	Manufacture of chemicals and chemical products	21	23	134	68	7	67	1	4	579	169	273	466
35	Manufacture of rubber and plastic products	1	9	7	1	4	16	0	2	3	8	13	23
36	Manufacture of other non-metallic mineral products	1	5	4	1	29	58	0	0	21	3	6	9
37	Manufacture of basic metals and metal products	4	46	13	7	22	91	11	3	38	22	35	60
38	Manufacture of machinery and equipment	1	88	25	14	18	33	3	1	107	65	115	217
39	Manufacture of electrical machinery and apparatus	16	11	4	1	3	3	0	0	9	5	9	17
40	Manufacture of motor vehicles	0	3	1	0	1	3	0	0	2	1	2	4
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	2	1	0	0	1	1	0	0	0	0	0	1
42	Electricity, gas and steam supply, excluding 27	4	346	125	56	19	42	7	3	622	424	687	1176
43	Collection, purification and distribution of water	0	3	1	0	1	1	0	0	1	1	2	3
44	Construction, excluding wood construction	99	51	20	5	9	17	2	1	0	41	72	136
45	Wholesale and retail trade	362	26	7	3	6	10	2	1	35	10	17	31
46	Hotels and restaurants	36	38	14	3	5	10	1	1	28	16	29	55
47	Land transport; transport via pipelines	24	948	185	52	58	103	20	10	380	327	484	725
48	Water transport	6	32	5	1	1	2	0	0	10	8	12	18
49	Other transport; post and telecommunications	59	248	68	20	27	49	8	4	173	105	160	253
50	Financial intermediation and insurance	16	16	5	1	3	5	1	0	11	6	11	22
51	Real estate, renting and business activities; R&D	0	384	117	29	74	140	15	15	260	150	265	505
52	Community, social and other service activities	0	88	32	8	15	28	3	2	63	36	64	122
Use of domestic products at producer's price		1085	8903	1662	464	827	1479	286	109	7075	3070	4966	8486
Use of imported products at producer's price, total		138	327	261	105	102	279	34	23	1911	582	947	1630
Consumption expenses of non-resident households in Finland		0	0	0	0	0	0	0	0	0	0	0	0
Value added tax		4	5	2	1	1	1	0	0	6	2	4	7
Product taxes		114	33	16	5	5	9	2	1	77	31	51	87
Product subsidies		-3	-2	-1	0	0	0	0	0	-2	-1	-1	-3
Intermediate use at purchaser's price		1338	9266	1940	574	934	1767	322	133	9067	3684	5966	10208
Wages and salaries		1782	1280	740	123	244	627	91	64	773	472	765	1309
Employers' social contributions		470	400	236	37	68	186	26	19	249	145	235	401
Other taxes on production less subsidies		-278	-89	-16	-3	-4	-15	-5	-3	-50	-7	-11	-19
Consumption of fixed capital		2146	706	126	25	29	119	40	24	2462	336	545	932
Operating surplus/ mixed income, net		8924	1077	192	38	45	182	61	37	3881	530	859	1469
Value added, gross at producer's price		13044	3373	1278	219	382	1099	212	140	7315	1477	2392	4093
Output at producer's price		14382	12639	3217	794	1316	2867	535	273	16381	5162	8358	14300
Number of domestic employees		24600	12037	7034	1081	2334	5727	850	736	4592	2742	4439	7595
Domestic working hours, 1000 hours		46100	19873	11618	1779	3734	9547	1430	1219	7692	4469	7236	12381
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		246 583	82 592	53 280	90 270	2 973	22 218	53	46	616 859	52 422	548 988	904 108
Methane (CH_4) emissions, tons		19	96	512	126	15	22	0	1	0	0	0	0
Nitrous oxide (N_2O) emissions, tons		6	1	0	2	0	0	0	0	0	0	0	0
CO_2 equivalents, tons (Global warming potential GWP)		248876	84959	64101	93649	3292	22677	58	57	616862	52422	548988	904108
Sulphur dioxide (SO_2) emissions, tons		0	155	205	242	15	131	0	0	7 269	67	313	501
Nitrogen oxides (NOx) emissions, tons		3 057	638	1 850	317	60	123	1	2	11 416	479	1 051	1 582
SO2 equivalents, tons (Acidification potential AP)		2140	602	1500	464	57	217	1	1	15260	402	1049	1609

(continues)

Appendix 4 (continues)
Industry-by-industry input-output table 1995 at producer's price (million FIM), including non-financial economic (number of employees and working hours) and environmental (emission tons) variables

Industry		13	14	15	16	17	18	19	20	21	22	23	24
1	Forestry	462	368	447	0	8	0	0	1	0	16	4	0
2	Sawmilling, planing and impregnation of wood	125	100	121	1	1	1	1	20	6	49	126	307
3	Manufacture of plywood and veneer sheets	2	2	2	1	0	0	1	27	7	12	24	35
4	Manufacture of particle board and fibreboard	0	0	0	1	0	0	0	33	26	102	53	14
5	Manufacture of wooden houses	1	1	1	0	0	0	0	0	0	0	2	165
6	Manufacture of builders' joinery and carpentry	1	1	1	3	0	0	0	0	0	2	77	380
7	Manufacture of wooden containers	26	21	25	7	3	0	6	1	1	1	1	5
8	Manufacture of other wood products	0	0	0	1	0	0	0	3	0	4	4	0
9	Manufacture of chemical pulp	1994	1588	1929	1	54	2	5	1	0	1	2	10
10	Manufacture of mechanical pulp and newsprint	47	37	45	0	3	584	279	0	0	0	0	0
11	Manufacture of uncoated magazine paper	5	4	4	1	17	6	998	0	0	0	1	0
12	Manufacture of coated magazine paper	8	7	7	3	8	4	162	1	0	1	1	1
13	Manufacture of fine paper	110	87	105	38	106	54	708	0	0	0	1	0
14	Manufacture of kraft paper and other paper	125	100	121	114	494	3	111	0	0	1	2	3
15	Manufacture of paperboard	52	41	49	477	53	3	46	0	0	0	1	0
16	Manufacture of corrugated board and paperboard containers	119	94	115	55	37	3	36	8	4	9	13	2
17	Manufacture of paper and paperboard products excluding 16	4	3	4	8	38	2	12	1	1	0	0	1
18	Publishing and printing of newspapers	12	10	6	3	6	24	39	1	1	1	2	0
19	Publishing of books, magazines and other printed matter	12	9	9	8	15	31	57	1	1	1	2	0
20	Manufacture of chairs and seats, use of wood	0	0	0	0	0	0	0	50	23	26	5	27
21	Manufacture of office and shop furniture, use of wood	0	0	0	0	0	0	0	12	21	23	2	6
22	Manufacture of kitchen furniture, use of wood	0	0	0	0	0	0	0	8	13	13	7	24
23	Manufacture of other furniture, use of wood	0	0	0	0	0	0	0	9	13	10	5	28
24	Construction of new buildings, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
25	Renovation of buildings, use of wood	42	61	5	2	4	10	15	1	0	1	2	0
26	Do-it-yourself construction and renovation, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
27	Electricity and hot water supply, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
28	Agriculture, hunting & fishing	-4	-3	-4	0	0	0	0	0	0	0	0	0
29	Mining and quarrying	91	72	89	0	1	1	2	0	0	0	0	0
30	Manufacture of food products, beverages and tobacco	76	61	73	8	12	7	16	1	0	1	4	2
31	Manufacture of textiles, wearing apparel and leather products	2	1	1	2	9	2	4	27	0	1	1	1
32	Reproduction of recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Manuf. of coke, refined petroleum products and nuclear fuel	30	24	28	3	3	5	11	1	1	1	2	0
34	Manufacture of chemicals and chemical products	335	266	326	41	42	37	175	18	8	12	26	2
35	Manufacture of rubber and plastic products	16	13	15	36	48	5	21	14	6	8	5	2
36	Manufacture of other non-metallic mineral products	6	5	7	1	1	1	2	1	0	1	3	0
37	Manufacture of basic metals and metal products	43	34	44	11	9	8	39	32	36	49	32	1
38	Manufacture of machinery and equipment	156	111	185	11	21	44	66	6	4	5	8	1
39	Manufacture of electrical machinery and apparatus	13	10	10	4	3	13	21	4	4	4	6	2
40	Manufacture of motor vehicles	3	3	2	1	1	3	6	2	1	2	1	0
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0	0	0	0	0	0	1	3	3	4	2	0
42	Electricity, gas and steam supply, excluding 27	846	674	817	24	45	42	97	15	5	10	18	3
43	Collection, purification and distribution of water	2	2	3	0	1	5	7	1	0	0	1	0
44	Construction, excluding wood construction	98	130	30	5	9	24	35	2	1	2	4	0
45	Wholesale and retail trade	23	18	21	36	8	16	46	3	1	3	4	343
46	Hotels and restaurants	39	27	48	10	18	43	63	3	1	3	5	0
47	Land transport; transport via pipelines	444	287	712	83	112	40	66	24	10	26	34	16
48	Water transport	12	8	18	1	2	3	5	0	0	0	1	2
49	Other transport; post and telecommunications	163	112	231	48	54	547	810	14	6	15	22	1
50	Financial intermediation and insurance	17	14	13	4	7	20	31	2	1	2	3	0
51	Real estate, renting and business activities; R&D	443	392	140	95	178	645	1050	53	20	51	91	0
52	Community, social and other service activities	90	66	94	21	40	1167	1732	10	3	9	16	0
Use of domestic products at producer's price		6094	4861	5899	1170	1475	3407	6785	417	229	486	622	1389
Use of imported products at producer's price, total		1178	933	1134	414	469	396	858	159	58	101	109	108
Consumption expenses of non-resident households in Finland		0	0	0	0	0	0	0	0	0	0	0	0
Value added tax		5	4	5	2	2	4	7	0	0	0	1	56
Product taxes		62	50	60	13	16	24	48	4	2	4	5	4
Product subsidies		-2	-1	-2	-1	-1	-1	-3	0	0	0	0	0
Intermediate use at purchaser's price		7337	5846	7096	1598	1960	3829	7697	580	288	591	736	1557
Wages and salaries		941	749	910	438	394	1583	2706	258	138	200	286	468
Employers' social contributions		289	230	279	139	118	469	770	75	41	60	77	120
Other taxes on production less subsidies		-14	-11	-13	-3	-3	-34	-64	-56	-9	-21	-38	-2
Consumption of fixed capital		670	534	648	132	130	432	818	93	16	35	64	40
Operating surplus/ mixed income, net		1056	842	1021	208	204	544	1030	191	32	72	132	106
Value added, gross at producer's price		2942	2344	2845	914	843	2994	5260	562	218	347	520	733
Output at producer's price		10279	8190	9941	2512	2803	6823	12956	1141	507	938	1256	2290
Number of domestic employees		5459	4350	5280	2567	2277	12820	20830	2634	1271	2184	3275	4270
Domestic working hours, 1000 hours		8899	7091	8606	4151	3774	18284	33419	4235	2063	3497	5347	9278
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		558 963	223 488	992 242	54 444	79 439	782	33 686	4 659	499	3 743	2 524	139 963
Methane (CH_4) emissions, tons		0	0	0	0	0	0	0	2	1	5	2	22
Nitrous oxide (N_2O) emissions, tons		0	0	0	0	0	0	0	0	0	0	0	0
CO_2 equivalents, tons (Global warming potential GWP)		558963	223489	992242	54450	79439	782	33686	4710	513	3887	2565	140431
Sulphur dioxide (SO_2) emissions, tons		289	841	1 993	63	56	0	10	9	3	16	13	41
Nitrogen oxides (NOx) emissions, tons		784	1 259	2 575	119	138	0	23	23	2	15	8	2 013
SO2 equivalents, tons (Acidification potential AP)		838	1722	3795	147	153	0	26	25	4	27	19	1450

(continues)

Appendix 4 (continues)
Industry-by-industry input-output table 1995 at producer's price (million FIM), including non-financial economic (number of employees and working hours) and environmental (emission tons) variables

	Industry	Industry 25	26	27	28	29	30	31	32	33	34	35	36
1	Forestry	0	0	0	0	0	1	1	0	0	0	0	4
2	Sawmilling, planing and impregnation of wood	669	252	4	34	2	13	2	0	3	16	12	13
3	Manufacture of plywood and veneer sheets	20	9	0	1	1	3	1	0	1	2	4	1
4	Manufacture of particle board and fibreboard	57	20	0	0	0	0	0	0	0	0	4	0
5	Manufacture of wooden houses	18	590	0	0	0	1	0	0	0	0	0	0
6	Manufacture of builders' joinery and carpentry	862	180	0	1	1	3	0	0	0	1	1	2
7	Manufacture of wooden containers	3	3	0	0	3	17	6	0	0	32	8	59
8	Manufacture of other wood products	1	0	0	0	0	0	0	0	0	0	0	0
9	Manufacture of chemical pulp	10	7	1	29	6	19	9	0	3	420	29	15
10	Manufacture of mechanical pulp and newsprint	1	0	1	4	3	14	2	0	2	10	4	3
11	Manufacture of uncoated magazine paper	1	1	1	7	4	22	4	0	4	17	6	5
12	Manufacture of coated magazine paper	3	1	2	12	8	332	7	0	8	48	57	23
13	Manufacture of fine paper	2	1	2	8	5	228	5	0	5	30	32	17
14	Manufacture of kraft paper and other paper	4	2	1	60	4	191	4	0	4	24	26	14
15	Manufacture of paperboard	2	1	1	8	5	26	4	0	5	30	31	17
16	Manufacture of corrugated board and paperboard containers	5	1	0	19	14	340	50	0	2	81	49	42
17	Manufacture of paper and paperboard products excluding 16	8	3	0	9	1	46	3	0	1	6	12	8
18	Publishing and printing of newspapers	0	0	1	45	17	75	20	1	9	27	14	11
19	Publishing of books, magazines and other printed matter	1	0	1	127	10	60	20	1	6	25	16	10
20	Manufacture of chairs and seats, use of wood	89	30	0	6	0	2	0	0	0	1	1	0
21	Manufacture of office and shop furniture, use of wood	32	1	0	3	0	1	0	0	0	1	1	0
22	Manufacture of kitchen furniture, use of wood	45	45	0	4	0	1	0	0	0	0	0	0
23	Manufacture of other furniture, use of wood	71	21	0	5	0	1	0	0	0	1	0	0
24	Construction of new buildings, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
25	Renovation of buildings, use of wood	0	0	0	82	24	68	6	0	11	44	13	24
26	Do-it-yourself construction and renovation, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
27	Electricity and hot water supply, use of wood	0	0	6	18	5	22	4	1	15	39	7	7
28	Agriculture, hunting & fishing	0	0	1	1671	0	13921	9	0	0	2	0	0
29	Mining and quarrying	0	0	31	108	73	34	2	0	1	284	3	265
30	Manufacture of food products, beverages and tobacco	5	3	3	1688	18	10196	19	0	14	211	28	20
31	Manufacture of textiles, wearing apparel and leather products	1	1	0	95	5	23	851	0	4	18	11	34
32	Reproduction of recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Manuf. of coke, refined petroleum products and nuclear fuel	0	0	9	176	49	73	17	0	816	420	23	67
34	Manufacture of chemicals and chemical products	5	3	5	1026	88	146	180	0	35	2487	774	119
35	Manufacture of rubber and plastic products	5	2	6	203	10	433	129	26	29	193	235	71
36	Manufacture of other non-metallic mineral products	1	1	0	18	13	129	19	0	2	65	24	688
37	Manufacture of basic metals and metal products	3	1	17	68	25	295	20	1	54	179	81	193
38	Manufacture of machinery and equipment	2	1	12	349	220	292	29	1	48	186	63	181
39	Manufacture of electrical machinery and apparatus	3	2	6	146	15	65	15	5	10	28	21	13
40	Manufacture of motor vehicles	1	0	0	16	4	22	4	0	3	9	13	7
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	1	0	0	16	1	7	26	2	1	4	3	10
42	Electricity, gas and steam supply, excluding 27	7	4	303	425	115	515	84	1	360	917	154	164
43	Collection, purification and distribution of water	0	0	1	0	2	33	4	0	5	15	5	7
44	Construction, excluding wood construction	0	0	10	249	58	164	14	1	27	106	32	58
45	Wholesale and retail trade	749	404	2	1870	37	126	30	8	290	183	52	34
46	Hotels and restaurants	0	0	3	9	21	140	30	0	25	81	61	28
47	Land transport; transport via pipelines	57	23	13	80	630	2428	176	4	120	776	220	521
48	Water transport	5	3	0	12	4	25	3	7	68	15	7	5
49	Other transport; post and telecommunications	3	1	5	377	42	700	115	0	96	337	141	173
50	Financial intermediation and insurance	0	0	1	115	18	88	20	13	13	37	23	14
51	Real estate, renting and business activities; R&D	0	0	28	194	636	2834	672	18	373	988	528	414
52	Community, social and other service activities	0	0	8	411	66	531	94	1	85	264	141	99
Use of domestic products at producer's price		2753	1616	490	9806	2264	34703	2710	94	2561	8660	2970	3463
Use of imported products at producer's price, total		282	112	109	1991	271	5032	2013	39	7045	5935	2543	1199
Consumption expenses of non-resident households in Finland		0	0	0	0	0	0	0	0	0	0	0	0
Value added tax		106	70	0	1	3	19	4	0	3	11	8	4
Product taxes		7	5	37	243	56	353	43	1	306	324	70	67
Product subsidies		0	0	0	-403	-1	-4444	-2	0	-1	-5	-3	-1
Intermediate use at purchaser's price		3147	1802	636	11637	2592	35663	4768	134	9914	14925	5588	4730
Wages and salaries		1599	587	129	1965	572	5652	1800	44	588	2843	1708	1675
Employers' social contributions		411	151	42	569	182	1740	509	13	176	856	497	510
Other taxes on production less subsidies		-8	-3	-5	-7900	-25	-46	-40	-2	-4	-63	-17	-52
Consumption of fixed capital		138	51	242	3978	484	2420	603	22	498	1373	461	775
Operating surplus/ mixed income, net		362	133	157	11155	586	2710	524	27	199	3252	917	601
Value added, gross at producer's price		2502	919	564	9767	1799	12476	3396	104	1457	8261	3566	3509
Output at producer's price		5649	2721	1200	21404	4391	48139	8164	238	11371	23186	9154	8239
Number of domestic employees		14575	5353	866	163500	5500	46200	21687	342	3300	18800	13900	13808
Domestic working hours, 1000 hours		31666	11631	1375	342600	9600	75500	34779	526	5500	30900	22600	22514
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		81 031	24 555	3 021 000	1790552,6	267160	853682	105164	15119	2656456	1381583	78043	796142
Methane (CH_4) emissions, tons		13	4	394	83589	28	85	11	0	365	352	10	70
Nitrous oxide (N_2O) emissions, tons		0	0	925	14037	8	68	3	2	151	4810	5	19
CO_2 equivalents, tons (Global warming potential GWP)		81302	24637	3316024	7897542	270200	876674	106289	15605	2711032	2880086	79772	803473
Sulphur dioxide (SO_2) emissions, tons		24	7	5 521	1964	917	2910	187	44	5710	12855	764	1152
Nitrogen oxides (NOx) emissions, tons		1 165	353	3 988	10767	716	1548	897	192	5895	3884	215	4024
SO2 equivalents, tons (Acidification potential AP)		839	254	8313	9501	1418	3994	815	178	9837	15574	914	3969

(continues)

Appendix 4 (continues)
Industry-by-industry input-output table 1995 at producer's price (million FIM), including non-financial economic (number of employees and working hours) and environmental (emission tons) variables

		Industry											
Industry		37	38	39	40	41	42	43	44	45	46	47	48
1	Forestry	0	0	0	0	1	10	0	0	0	0	0	0
2	Sawmilling, planing and impregnation of wood	15	11	7	3	39	118	2	182	38	3	2	1
3	Manufacture of plywood and veneer sheets	3	5	2	2	11	7	0	3	6	2	1	0
4	Manufacture of particle board and fibreboard	1	1	1	1	18	0	0	0	1	1	0	0
5	Manufacture of wooden houses	1	2	0	0	0	1	0	2	1	0	0	0
6	Manufacture of builders' joinery and carpentry	3	11	1	2	5	1	0	9	4	1	2	0
7	Manufacture of wooden containers	89	87	52	7	2	0	0	0	0	0	0	0
8	Manufacture of other wood products	2	1	0	0	4	0	0	1	1	0	0	0
9	Manufacture of chemical pulp	23	9	9	5	3	18	1	28	30	3	4	0
10	Manufacture of mechanical pulp and newsprint	16	14	9	5	1	20	0	6	75	8	2	1
11	Manufacture of uncoated magazine paper	26	22	15	8	1	32	1	9	46	12	4	2
12	Manufacture of coated magazine paper	50	41	29	15	4	57	1	17	133	23	19	25
13	Manufacture of fine paper	36	30	21	11	3	41	1	13	94	16	14	17
14	Manufacture of kraft paper and other paper	29	24	17	9	3	33	1	10	77	13	12	15
15	Manufacture of paperboard	35	29	21	10	3	39	1	11	92	16	5	3
16	Manufacture of corrugated board and paperboard containers	105	40	159	11	36	3	0	17	16	1	2	0
17	Manufacture of paper and paperboard products excluding 16	14	7	14	2	2	1	0	3	119	2	3	5
18	Publishing and printing of newspapers	74	85	84	39	6	20	2	13	514	85	25	36
19	Publishing of books, magazines and other printed matter	72	61	61	25	5	15	2	28	1145	49	49	80
20	Manufacture of chairs and seats, use of wood	2	4	2	18	25	1	0	1	24	1	2	5
21	Manufacture of office and shop furniture, use of wood	9	4	7	8	21	1	0	5	12	0	1	2
22	Manufacture of kitchen furniture, use of wood	1	3	2	15	8	0	0	1	20	1	2	4
23	Manufacture of other furniture, use of wood	12	5	3	18	8	1	0	4	23	1	2	5
24	Construction of new buildings, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
25	Renovation of buildings, use of wood	46	72	27	32	3	0	3	0	36	102	0	0
26	Do-it-yourself construction and renovation, use of wood	0	0	0	0	0	0	0	0	0	0	0	0
27	Electricity and hot water supply, use of wood	38	14	7	6	1	170	3	7	35	1	5	0
28	Agriculture, hunting & fishing	1	1	1	0	0	16	0	0	20	126	0	2
29	Mining and quarrying	361	10	10	3	1	822	0	1061	23	5	3	1
30	Manufacture of food products, beverages and tobacco	81	95	77	28	6	87	3	45	861	4700	17	90
31	Manufacture of textiles, wearing apparel and leather products	29	36	41	15	16	10	1	138	113	26	12	6
32	Reproduction of recorded media	0	0	0	0	0	0	0	0	0	0	0	0
33	Manuf. of coke, refined petroleum products and nuclear fuel	785	62	47	31	12	227	3	168	371	14	863	149
34	Manufacture of chemicals and chemical products	463	102	179	98	60	126	17	793	284	24	29	7
35	Manufacture of rubber and plastic products	69	186	282	125	49	157	51	885	1133	22	98	4
36	Manufacture of other non-metallic mineral products	66	47	17	114	19	13	6	3628	158	8	8	8
37	Manufacture of basic metals and metal products	13427	2894	880	1106	207	452	4	4862	208	28	45	10
38	Manufacture of machinery and equipment	486	5067	261	843	20	323	23	769	65	28	716	7
39	Manufacture of electrical machinery and apparatus	160	818	9331	196	33	169	3	672	670	70	78	120
40	Manufacture of motor vehicles	333	475	44	868	7	11	1	123	44	18	404	33
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	162	28	16	27	151	3	0	104	71	3	7	12
42	Electricity, gas and steam supply, excluding 27	886	324	166	137	31	7948	76	285	823	25	114	7
43	Collection, purification and distribution of water	11	23	19	8	2	16	1	0	76	1	1	0
44	Construction, excluding wood construction	110	173	65	78	6	259	8	1131	72	203	0	0
45	Wholesale and retail trade	574	379	429	142	82	51	5	3593	4711	838	1245	462
46	Hotels and restaurants	170	232	206	52	14	77	7	40	335	7	20	4
47	Land transport; transport via pipelines	1397	640	454	185	73	354	10	1171	3244	0	588	9
48	Water transport	29	27	24	7	2	10	1	49	99	5	17	4
49	Other transport; post and telecommunications	583	537	451	143	46	141	17	269	3341	54	496	1075
50	Financial intermediation and insurance	94	118	112	44	8	31	3	238	638	148	271	114
51	Real estate, renting and business activities; R&D	2851	3359	3352	1597	230	737	69	321	7160	3555	431	484
52	Community, social and other service activities	468	636	655	189	40	216	21	625	1879	769	144	19
Use of domestic products at producer's price		24295	16850	17672	6289	1327	12846	351	21340	28939	11018	5762	2829
Use of imported products at producer's price, total		9987	9578	17104	3789	706	2854	90	5306	3647	739	782	1517
Consumption expenses of non-resident households in Finland		0	0	0	0	0	0	0	0	0	0	0	0
Value added tax		23	32	28	7	2	11	1	932	46	0	2	0
Product taxes		189	196	351	71	18	975	7	102	969	856	2228	53
Product subsidies		-9	-12	-11	-3	-1	-4	0	-3	-18	0	-80	-1
Intermediate use at purchaser's price		34486	26644	35144	10153	2053	16682	448	27678	33583	12612	8695	4398
Wages and salaries		5837	7762	6975	3364	718	2474	287	11048	23808	4740	5870	1602
Employers' social contributions		1752	2403	2028	986	210	805	90	2966	6261	1080	1648	472
Other taxes on production less subsidies		-123	-127	-112	-162	-79	-98	-27	-19	110	-177	171	-144
Consumption of fixed capital		1927	1483	1305	686	160	4640	659	1752	7547	659	3033	1557
Operating surplus/ mixed income, net		4705	3597	6737	592	456	3015	486	3478	11987	1404	8216	-331
Value added, gross at producer's price		14098	15118	16933	5466	1464	10837	1495	19225	49713	7706	18938	3156
Output at producer's price		48584	41762	52077	15619	3516	27519	1943	46903	83296	20318	27633	7554
Number of domestic employees		45615	55693	50907	24192	7527	16634	2600	102857	243200	59600	71300	11200
Domestic working hours, 1000 hours		75425	93888	84612	37988	12049	26425	4000	212782	444200	103100	143800	22100
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		1316550	92940	37844	92360	37183	17628477	5889	293120	311823	65023	3149022	287389
Methane (CH_4) emissions, tons		3879	21	6	12	9	1135	2	9	32	17	450	8
Nitrous oxide (N_2O) emissions, tons		36	10	2	3	2	635	1	120	9	2	280	119
CO_2 equivalents, tons (Global warming potential GWP)		1409035	96355	38499	93608	38034	17849029	6362	330535	315232	65971	3245396	324405
Sulphur dioxide (SO_2) emissions, tons		7100	224	49	301	71	32230	13	87	1532	54	1042	1314
Nitrogen oxides (NOx) emissions, tons		2433	449	218	275	147	33278	29	5373	325	72	41066	5040
SO2 equivalents, tons (Acidification potential AP)		8804	539	201	494	174	55524	33	3848	1759	105	29788	4842

(continues)

Appendix 4 (continues)
Industry-by-industry input-output table 1995 at producer's price (million FIM), including non-financial economic (number of employees and working hours) and environmental (emission tons) variables

	Industry	Industry 49	50	51	52	Financial intermed. serv. indir.	Intermediate use (total)	Cons.exp. of househ.	Cons.exp. of non-profit institutions	Governm. final cons. Individual	Governm. final cons. Collective	Gross fixed capital formation
1	Forestry	0	8	30	0	0	13264	518	0	0	0	902
2	Sawmilling, planing and impregnation of wood	4	5	46	27	0	5000	164	0	1	2	12
3	Manufacture of plywood and veneer sheets	2	2	13	6	0	425	48	0	0	1	8
4	Manufacture of particle board and fibreboard	0	1	2	1	0	415	9	0	0	0	1
5	Manufacture of wooden houses	0	0	1	1	0	817	6	0	0	0	3
6	Manufacture of builders' joinery and carpentry	1	1	4	3	0	1817	19	0	0	0	15
7	Manufacture of wooden containers	0	0	1	0	0	560	15	0	0	0	0
8	Manufacture of other wood products	0	0	1	0	0	36	182	0	0	0	1
9	Manufacture of chemical pulp	4	3	25	26	0	11975	127	0	13	1	8
10	Manufacture of mechanical pulp and newsprint	6	8	44	22	0	1411	177	0	1	4	24
11	Manufacture of uncoated magazine paper	10	12	72	35	0	1441	286	1	2	6	38
12	Manufacture of coated magazine paper	40	48	350	206	0	1804	490	1	3	11	66
13	Manufacture of fine paper	28	33	257	144	0	2616	352	1	2	8	47
14	Manufacture of kraft paper and other paper	23	28	173	120	0	2422	281	1	1	6	38
15	Manufacture of paperboard	24	29	109	123	0	1595	341	1	2	7	46
16	Manufacture of corrugated board and paperboard containers	2	1	6	7	0	1882	43	0	1	0	12
17	Manufacture of paper and paperboard products excluding 16	9	7	54	113	0	542	336	0	0	1	5
18	Publishing and printing of newspapers	120	100	725	1516	0	3829	2469	5	1	41	192
19	Publishing of books, magazines and other printed matter	235	128	1402	4364	0	8204	3177	3	5	21	96
20	Manufacture of chairs and seats, use of wood	6	6	40	33	0	433	153	0	0	0	2
21	Manufacture of office and shop furniture, use of wood	3	2	16	14	0	211	82	0	0	0	4
22	Manufacture of kitchen furniture, use of wood	5	5	33	27	0	294	252	0	0	0	2
23	Manufacture of other furniture, use of wood	6	5	38	32	0	333	246	0	0	0	3
24	Construction of new buildings, use of wood	0	0	0	0	0	0	0	0	0	0	2506
25	Renovation of buildings, use of wood	51	80	2333	172	0	3523	0	0	0	0	1997
26	Do-it-yourself construction and renovation, use of wood	0	0	0	0	0	0	92	0	0	0	2732
27	Electricity and hot water supply, use of wood	8	11	144	81	0	656	514	0	0	0	7
28	Agriculture, hunting & fishing	5	0	2	116	0	15875	3395	0	0	0	491
29	Mining and quarrying	5	4	20	11	0	3691	112	0	2	3	13
30	Manufacture of food products, beverages and tobacco	196	44	262	1998	0	21307	21672	2	15	18	106
31	Manufacture of textiles, wearing apparel and leather products	36	9	78	183	0	1867	2251	0	2	4	381
32	Reproduction of recorded media	0	0	0	0	0	2	203	0	0	0	0
33	Manuf. of coke, refined petroleum products and nuclear fuel	438	46	453	384	0	6038	2188	1	1	8	36
34	Manufacture of chemicals and chemical products	29	19	206	551	0	10956	1363	1	402	6	71
35	Manufacture of rubber and plastic products	140	11	83	427	0	5342	537	0	3	4	85
36	Manufacture of other non-metallic mineral products	15	14	87	110	0	5445	210	0	2	3	28
37	Manufacture of basic metals and metal products	41	36	242	239	0	26310	791	2	10	14	2298
38	Manufacture of machinery and equipment	46	24	265	498	0	12128	695	1	1	14	7082
39	Manufacture of electrical machinery and apparatus	499	167	1147	930	0	15565	1328	3	4	26	3992
40	Manufacture of motor vehicles	453	15	70	476	0	3498	589	1	0	9	461
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	17	108	111	126	0	1039	968	0	1	1	23
42	Electricity, gas and steam supply, excluding 27	188	250	3396	1910	0	25719	4078	1	9	8	168
43	Collection, purification and distribution of water	4	36	1407	93	0	1800	0	0	0	1	10
44	Construction, excluding wood construction	5918	158	5113	342	0	15147	182	0	0	0	31666
45	Wholesale and retail trade	1258	449	4717	7272	0	31023	44165	2	933	17	4170
46	Hotels and restaurants	595	114	333	987	0	4090	14091	126	863	374	0
47	Land transport; transport via pipelines	427	67	94	848	0	19782	4870	1	424	50	199
48	Water transport	53	13	49	123	0	814	1582	0	6	0	26
49	Other transport; post and telecommunications	3292	646	3089	2965	0	22334	8188	192	3	8926	97
50	Financial intermediation and insurance	79	1483	1484	956	0	20517	7007	4	0	37	175
51	Real estate, renting and business activities; R&D	2110	3017	13715	4397	0	59181	52484	196	0	1750	8277
52	Community, social and other service activities	153	458	4994	11852	0	28526	21506	11386	77722	33731	323
Use of domestic products at producer's price		16584	7714	47339	44869	14142	423499	204834	11933	80432	45115	68942
Use of imported products at producer's price, total		3359	574	5408	7196	0	111463	26056	138	1343	858	14615
Consumption expenses of non-resident households in Finland		0	0	0	0	0	0	-7537	0	0	0	0
Value added tax		307	1303	1210	6160	0	10412	30089	0	317	0	3989
Product taxes		401	237	653	979	0	10516	21692	0	127	0	1926
Product subsidies		-19	-6	-11	-54	0	-5118	-1098	0	-14	0	-188
Intermediate use at purchaser's price		20632	9822	54600	59150	14142	550773	274037	12071	82205	45973	89285
Wages and salaries		9289	7545	17064	75042	0	219929					
Employers' social contributions		2527	2212	4353	23556	-2029	62114					
Other taxes on production less subsidies		-62	-239	-411	-172	0	-10602					
Consumption of fixed capital		7656	3025	27880	12007	0	98120					
Operating surplus/ mixed income, net		5548	6055	29656	4427	-12113	121269					
Value added, gross at producer's price		24958	18598	78542	114860	-14142	490830					
Output at producer's price		45590	28420	133142	174010	0	1041603					
Number of domestic employees		75083	48100	137700	661300	0	2062324					
Domestic working hours, 1000 hours		122953	77600	244600	998600	0	3528376					
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		1328464	0	646358	598930	0	7841410					
Methane (CH_4) emissions, tons		578	0	95	111	0	1234					
Nitrous oxide (N_2O) emissions, tons		202	0	17	25	0	935					
CO_2 equivalents, tons (Global warming potential GWP)		1403100	0	653731	608862	0	8157170					
Sulphur dioxide (SO_2) emissions, tons		242	0	210	948	0	17785					
Nitrogen oxides (NOx) emissions, tons		15005	0	699	818	0	33039					
SO2 equivalents, tons (Acidification potential AP)		10745	0	699	1520	0	40912					

(continues)

Appendix 4 (continues)

Industry-by-industry input-output table 1995 at producer's price (million FIM), including non-financial (number of employees and working hours) and environmental (emission tons) variables

Industry		Changes in inventories	Exports	Total use
1	Forestry	312	335	15331
2	Sawmilling, planing and impregnation of wood	58	7265	12502
3	Manufacture of plywood and veneer sheets	6	2575	3063
4	Manufacture of particle board and fibreboard	4	361	791
5	Manufacture of wooden houses	5	554	1385
6	Manufacture of builders' joinery and carpentry	14	1035	2901
7	Manufacture of wooden containers	4	23	603
8	Manufacture of other wood products	2	40	261
9	Manufacture of chemical pulp	130	4882	17135
10	Manufacture of mechanical pulp and newsprint	38	3386	5040
11	Manufacture of uncoated magazine paper	60	6920	8753
12	Manufacture of coated magazine paper	103	10723	13199
13	Manufacture of fine paper	76	7143	10245
14	Manufacture of kraft paper and other paper	64	4439	7252
15	Manufacture of paperboard	76	8192	10259
16	Manufacture of corrugated board and paperboard containers	11	677	2625
17	Manufacture of paper and paperboard products excluding 16	7	1742	2632
18	Publishing and printing of newspapers	5	260	6801
19	Publishing of books, magazines and other printed matter	20	2162	13688
20	Manufacture of chairs and seats, use of wood	277	316	1181
21	Manufacture of office and shop furniture, use of wood	110	129	536
22	Manufacture of kitchen furniture, use of wood	231	172	950
23	Manufacture of other furniture, use of wood	273	409	1264
24	Construction of new buildings, use of wood	0	0	2506
25	Renovation of buildings, use of wood	0	0	5519
26	Do-it-yourself construction and renovation, use of wood	0	0	2823
27	Electricity and hot water supply, use of wood	0	15	1194
28	Agriculture, hunting & fishing	157	1781	21699
29	Mining and quarrying	159	505	4485
30	Manufacture of food products, beverages and tobacco	95	3960	47175
31	Manufacture of textiles, wearing apparel and leather products	106	3238	7849
32	Reproduction of recorded media	0	23	228
33	Manuf. of coke, refined petroleum products and nuclear fuel	-133	3338	11476
34	Manufacture of chemicals and chemical products	138	9039	21975
35	Manufacture of rubber and plastic products	117	3112	9200
36	Manufacture of other non-metallic mineral products	118	2019	7827
37	Manufacture of basic metals and metal products	1413	17169	48007
38	Manufacture of machinery and equipment	470	21362	41753
39	Manufacture of electrical machinery and apparatus	825	29971	51714
40	Manufacture of motor vehicles	791	9303	14652
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	268	1266	3565
42	Electricity, gas and steam supply, excluding 27	5	349	30339
43	Collection, purification and distribution of water	1	29	1839
44	Construction, excluding wood construction	0	0	46995
45	Wholesale and retail trade	0	2425	82735
46	Hotels and restaurants	0	790	20334
47	Land transport; transport via pipelines	28	2682	28036
48	Water transport	0	5137	7564
49	Other transport; post and telecommunications	57	5354	45151
50	Financial intermediation and insurance	0	1038	28778
51	Real estate, renting and business activities; R&D	0	9012	130899
52	Community, social and other service activities	0	773	173968
Use of domestic products at producer's price		6498	197429	1038682
Use of imported products at producer's price, total		2139	6123	156612
Consumption expenses of non-resident households in Finland		0	7537	0
Value added tax		0	0	44807
Product taxes		-66	0	34196
Product subsidies		-13	-152	-6583
Intermediate use at purchaser's price		8556	210937	1267714

Appendix 5
Industry-by-industry direct requirements matrix (domestic and imports total) 1995, including coefficients for primary inputs, non-financial economic variables and environmental variables (relative to million FIM output)

	Industry	Industry 1	2	3	4	5	6	7	8	9	10	11	12
1	Forestry	0,0216	0,4821	0,2353	0,0079	0,0876	0,0261	0,0000	0,0066	0,2779	0,0592	0,0592	0,0592
2	Sawmilling, planing and impregnation of wood	0,0001	0,0312	0,0093	0,1084	0,1929	0,1778	0,3626	0,1605	0,0569	0,0128	0,0128	0,0128
3	Manufacture of plywood and veneer sheets	0,0000	0,0006	0,0306	0,0044	0,0065	0,0265	0,0348	0,0397	0,0009	0,0002	0,0002	0,0002
4	Manufacture of particle board and fibreboard	0,0000	0,0000	0,0004	0,0499	0,0040	0,0161	0,0094	0,0089	0,0000	0,0000	0,0000	0,0000
5	Manufacture of wooden houses	0,0000	0,0005	0,0004	0,0004	0,0040	0,0014	0,0013	0,0008	0,0004	0,0001	0,0001	0,0001
6	Manufacture of builders' joinery and carpentry	0,0000	0,0001	0,0001	0,0004	0,1143	0,0373	0,0012	0,0006	0,0002	0,0001	0,0001	0,0001
7	Manufacture of wooden containers	0,0000	0,0003	0,0025	0,0058	0,0007	0,0006	0,0039	0,0032	0,0000	0,0028	0,0028	0,0028
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0001	0,0002	0,0007	0,0108	0,0002	0,0001	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0000	0,0007	0,0015	0,0036	0,0022	0,0025	0,0037	0,0021	0,0140	0,2025	0,2024	0,2024
10	Manufacture of mechanical pulp and newsprint	0,0000	0,0002	0,0002	0,0003	0,0003	0,0004	0,0002	0,0002	0,0002	0,0047	0,0047	0,0047
11	Manufacture of uncoated magazine paper	0,0000	0,0003	0,0004	0,0006	0,0004	0,0006	0,0004	0,0004	0,0002	0,0004	0,0004	0,0004
12	Manufacture of coated magazine paper	0,0000	0,0005	0,0006	0,0010	0,0007	0,0010	0,0007	0,0007	0,0004	0,0008	0,0008	0,0008
13	Manufacture of fine paper	0,0000	0,0003	0,0004	0,0007	0,0005	0,0007	0,0005	0,0005	0,0003	0,0115	0,0115	0,0115
14	Manufacture of kraft paper and other paper	0,0002	0,0003	0,0126	0,0481	0,0004	0,0006	0,0004	0,0012	0,0022	0,0132	0,0132	0,0132
15	Manufacture of paperboard	0,0003	0,0003	0,0096	0,0416	0,0007	0,0011	0,0005	0,0014	0,0003	0,0060	0,0060	0,0060
16	Manufacture of corrugated board and paperboard containers	0,0000	0,0024	0,0025	0,0075	0,0021	0,0035	0,0001	0,0001	0,0003	0,0122	0,0122	0,0122
17	Manufacture of paper and paperboard products excluding 16	0,0001	0,0001	0,0003	0,0006	0,0001	0,0020	0,0001	0,0001	0,0000	0,0004	0,0004	0,0004
18	Publishing and printing of newspapers	0,0002	0,0010	0,0011	0,0011	0,0015	0,0013	0,0008	0,0014	0,0004	0,0009	0,0010	0,0010
19	Publishing of books, magazines and other printed matter	0,0007	0,0007	0,0010	0,0012	0,0011	0,0012	0,0006	0,0009	0,0003	0,0010	0,0010	0,0011
20	Manufacture of chairs and seats, use of wood	0,0000	0,0000	0,0000	0,0000	0,0003	0,0001	0,0004	0,0000	0,0000	0,0000	0,0000	0,0000
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0003	0,0001	0,0003	0,0000	0,0000	0,0000	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0014	0,0007	0,0005	0,0008	0,0002	0,0000	0,0000	0,0000	0,0000
23	Manufacture of other furniture, use of wood	0,0000	0,0000	0,0000	0,0001	0,0006	0,0001	0,0008	0,0000	0,0000	0,0000	0,0000	0,0000
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0000	0,0017	0,0026	0,0026	0,0028	0,0025	0,0012	0,0013	0,0000	0,0033	0,0037	0,0041
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
28	Agriculture, hunting & fishing	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0031	0,0031	0,0031
29	Mining and quarrying	0,0000	0,0014	0,0025	0,0037	0,0004	0,0003	0,0002	0,0002	0,0066	0,0392	0,0392	0,0392
30	Manufacture of food products, beverages and tobacco	0,0002	0,0008	0,0021	0,0022	0,0009	0,0024	0,0005	0,0009	0,0009	0,0124	0,0124	0,0124
31	Manufacture of textiles, wearing apparel and leather products	0,0020	0,0001	0,0001	0,0001	0,0009	0,0007	0,0001	0,0443	0,0001	0,0002	0,0002	0,0002
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0086	0,0018	0,0034	0,0190	0,0012	0,0009	0,0014	0,0014	0,0036	0,0045	0,0046	0,0046
34	Manufacture of chemicals and chemical products	0,0015	0,0028	0,0623	0,1278	0,0077	0,0370	0,0025	0,0219	0,0651	0,0591	0,0590	0,0589
35	Manufacture of rubber and plastic products	0,0001	0,0011	0,0044	0,0020	0,0049	0,0096	0,0011	0,0107	0,0003	0,0023	0,0023	0,0023
36	Manufacture of other non-metallic mineral products	0,0001	0,0004	0,0019	0,0011	0,0400	0,0369	0,0002	0,0003	0,0016	0,0008	0,0007	0,0007
37	Manufacture of basic metals and metal products	0,0006	0,0046	0,0043	0,0102	0,0265	0,0516	0,0324	0,0174	0,0029	0,0048	0,0048	0,0048
38	Manufacture of machinery and equipment	0,0000	0,0085	0,0096	0,0222	0,0170	0,0143	0,0063	0,0065	0,0080	0,0154	0,0168	0,0186
39	Manufacture of electrical machinery and apparatus	0,0021	0,0012	0,0016	0,0018	0,0038	0,0010	0,0011	0,0016	0,0007	0,0013	0,0014	0,0016
40	Manufacture of motor vehicles	0,0000	0,0002	0,0003	0,0004	0,0007	0,0010	0,0006	0,0006	0,0001	0,0002	0,0002	0,0003
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0002	0,0000	0,0001	0,0001	0,0004	0,0003	0,0004	0,0001	0,0000	0,0000	0,0000	0,0000
42	Electricity, gas and steam supply, excluding 27	0,0002	0,0280	0,0396	0,0713	0,0146	0,0149	0,0128	0,0108	0,0390	0,0843	0,0843	0,0844
43	Collection, purification and distribution of water	0,0000	0,0003	0,0003	0,0003	0,0005	0,0004	0,0002	0,0004	0,0000	0,0002	0,0002	0,0002
44	Construction, excluding wood construction	0,0069	0,0041	0,0061	0,0061	0,0067	0,0058	0,0029	0,0029	0,0000	0,0078	0,0086	0,0095
45	Wholesale and retail trade	0,0257	0,0021	0,0023	0,0034	0,0048	0,0036	0,0043	0,0032	0,0022	0,0021	0,0022	0,0023
46	Hotels and restaurants	0,0050	0,0051	0,0076	0,0075	0,0068	0,0059	0,0041	0,0045	0,0029	0,0054	0,0059	0,0065
47	Land transport; transport via pipelines	0,0017	0,0767	0,0587	0,0672	0,0446	0,0367	0,0387	0,0358	0,0240	0,0655	0,0598	0,0524
48	Water transport	0,0005	0,0027	0,0016	0,0018	0,0009	0,0007	0,0005	0,0006	0,0006	0,0017	0,0016	0,0014
49	Other transport; post and telecommunications	0,0048	0,0226	0,0236	0,0280	0,0222	0,0186	0,0163	0,0167	0,0121	0,0231	0,0218	0,0201
50	Financial intermediation and insurance	0,0013	0,0014	0,0018	0,0018	0,0021	0,0019	0,0012	0,0018	0,0008	0,0014	0,0015	0,0017
51	Real estate, renting and business activities; R&D	0,0000	0,0342	0,0421	0,0417	0,0623	0,0544	0,0303	0,0622	0,0182	0,0333	0,0365	0,0405
52	Community, social and other service activities	0,0000	0,0070	0,0099	0,0098	0,0110	0,0096	0,0058	0,0079	0,0038	0,0070	0,0076	0,0085
	Use of domestic products at producer's price	0,0754	0,7044	0,5165	0,5848	0,6285	0,5158	0,5349	0,3983	0,4319	0,5947	0,5942	0,5934
	Use of imported products at producer's price, total	0,0096	0,0259	0,0812	0,1325	0,0771	0,0973	0,0642	0,0856	0,1167	0,1127	0,1133	0,1140
	Consumption expenses of non-resident households in Finland	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	Value added tax	0,0003	0,0004	0,0005	0,0006	0,0005	0,0004	0,0004	0,0003	0,0004	0,0005	0,0005	0,0005
	Product taxes	0,0079	0,0026	0,0049	0,0058	0,0036	0,0031	0,0031	0,0025	0,0047	0,0061	0,0061	0,0061
	Product subsidies	-0,0002	-0,0001	-0,0002	-0,0002	-0,0002	-0,0002	-0,0002	-0,0001	-0,0001	-0,0002	-0,0002	-0,0002
	Intermediate use at purchaser's price	0,0930	0,7331	0,6029	0,7236	0,7096	0,6165	0,6025	0,4866	0,5535	0,7138	0,7138	0,7138
	Wages and salaries	0,1239	0,1013	0,2300	0,1548	0,1852	0,2189	0,1702	0,2340	0,0472	0,0915	0,0915	0,0915
	Employers' social contributions	0,0327	0,0316	0,0732	0,0472	0,0518	0,0649	0,0490	0,0680	0,0152	0,0281	0,0281	0,0281
	Other taxes on production less subsidies	-0,0193	-0,0071	-0,0049	-0,0039	-0,0028	-0,0052	-0,0094	-0,0111	-0,0030	-0,0013	-0,0013	-0,0013
	Consumption of fixed capital	0,1492	0,0558	0,0391	0,0310	0,0223	0,0415	0,0743	0,0881	0,1503	0,0652	0,0652	0,0652
	Operating surplus/ mixed income, net	0,6205	0,0852	0,0597	0,0473	0,0340	0,0634	0,1134	0,1344	0,2369	0,1028	0,1028	0,1028
	Value added, gross at producer's price	0,9070	0,2669	0,3971	0,2764	0,2904	0,3835	0,3975	0,5134	0,4465	0,2862	0,2862	0,2862
	Output at producer's price	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000
	Number of domestic employees	1,7104	0,9523	2,1863	1,3623	1,7737	1,9977	1,5909	2,7008	0,2803	0,5311	0,5311	0,5311
	Domestic working hours, 1000 hours	3,2054	1,5723	3,6110	2,2414	2,8369	3,3300	2,6751	4,4732	0,4696	0,8658	0,8658	0,8658
	Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons	17,1451	6,5347	16,5596	113,7615	2,2586	7,7499	0,0987	0,1678	37,6559	10,1560	65,6855	63,2230
	Methane (CH_4) emissions, tons	0,0013	0,0076	0,1591	0,1590	0,0115	0,0076	0,0004	0,0020	0,0000	0,0000	0,0000	0,0000
	Nitrous oxide (N_2O) emissions, tons	0,0004	0,0001	0,0001	0,0030	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	CO_2 equivalents, tons (Global warming potential GWP)	17,3045	6,7220	19,9228	118,0191	2,5010	7,9103	0,1080	0,2095	37,6561	10,1560	65,6855	63,2231
	Sulphur dioxide (SO_2) emissions, tons	0,0000	0,0123	0,0637	0,3053	0,0114	0,0457	0,0006	0,0003	0,4437	0,0130	0,0374	0,0351
	Nitrogen oxides (NOx) emissions, tons	0,2126	0,0505	0,5750	0,3995	0,0453	0,0428	0,0013	0,0059	0,6969	0,0927	0,1258	0,1106
	SO2 equivalents, tons (Acidification potential AP)	0,1488	0,0476	0,4662	0,5849	0,0431	0,0757	0,0015	0,0045	0,9316	0,0779	0,1255	0,1125

(continues)

Appendix 5 (continues)
Industry-by-industry direct requirements matrix (domestic and imports total) 1995, including coefficients for primary inputs, non-financial economic variables and environmental variables (relative to million FIM output)

	Industry	Industry 13	14	15	16	17	18	19	20	21	22	23	24
1	Forestry	0,0592	0,0592	0,0592	0,0000	0,0070	0,0000	0,0000	0,0011	0,0000	0,0173	0,0031	0,0000
2	Sawmilling, planing and impregnation of wood	0,0128	0,0128	0,0128	0,0003	0,0002	0,0001	0,0001	0,0192	0,0118	0,0564	0,1092	0,1452
3	Manufacture of plywood and veneer sheets	0,0002	0,0002	0,0002	0,0006	0,0000	0,0001	0,0001	0,0281	0,0152	0,0143	0,0222	0,0195
4	Manufacture of particle board and fibreboard	0,0000	0,0000	0,0000	0,0006	0,0000	0,0000	0,0000	0,0345	0,0615	0,1314	0,0508	0,0083
5	Manufacture of wooden houses	0,0001	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0002	0,0001	0,0003	0,0016	0,0729
6	Manufacture of builders' joinery and carpentry	0,0001	0,0001	0,0001	0,0013	0,0000	0,0000	0,0000	0,0003	0,0006	0,0021	0,0656	0,1729
7	Manufacture of wooden containers	0,0028	0,0028	0,0028	0,0029	0,0012	0,0000	0,0005	0,0007	0,0018	0,0012	0,0005	0,0024
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0005	0,0000	0,0000	0,0000	0,0030	0,0007	0,0045	0,0042	0,0002
9	Manufacture of chemical pulp	0,2024	0,2023	0,2025	0,0006	0,0198	0,0002	0,0004	0,0007	0,0006	0,0010	0,0017	0,0049
10	Manufacture of mechanical pulp and newsprint	0,0047	0,0047	0,0047	0,0002	0,0011	0,0891	0,0224	0,0002	0,0003	0,0002	0,0003	0,0001
11	Manufacture of uncoated magazine paper	0,0005	0,0005	0,0004	0,0003	0,0063	0,0008	0,0774	0,0003	0,0004	0,0004	0,0004	0,0001
12	Manufacture of coated magazine paper	0,0008	0,0008	0,0007	0,0011	0,0029	0,0006	0,0126	0,0006	0,0007	0,0006	0,0008	0,0002
13	Manufacture of fine paper	0,0115	0,0115	0,0115	0,0183	0,0462	0,0087	0,0601	0,0004	0,0005	0,0004	0,0005	0,0002
14	Manufacture of kraft paper and other paper	0,0132	0,0132	0,0132	0,0648	0,2515	0,0005	0,0094	0,0003	0,0004	0,0017	0,0022	0,0013
15	Manufacture of paperboard	0,0061	0,0061	0,0060	0,2711	0,0259	0,0005	0,0042	0,0004	0,0005	0,0004	0,0005	0,0002
16	Manufacture of corrugated board and paperboard containers	0,0122	0,0122	0,0122	0,0265	0,0158	0,0005	0,0031	0,0073	0,0077	0,0103	0,0110	0,0008
17	Manufacture of paper and paperboard products excluding 16	0,0004	0,0004	0,0004	0,0035	0,0184	0,0003	0,0011	0,0008	0,0015	0,0005	0,0003	0,0041
18	Publishing and printing of newspapers	0,0012	0,0013	0,0006	0,0013	0,0022	0,0035	0,0030	0,0012	0,0010	0,0014	0,0018	0,0000
19	Publishing of books, magazines and other printed matter	0,0012	0,0012	0,0010	0,0036	0,0058	0,0055	0,0055	0,0011	0,0011	0,0012	0,0014	0,0001
20	Manufacture of chairs and seats, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0532	0,0465	0,0283	0,0044	0,0131
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0133	0,0499	0,0305	0,0019	0,0032
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0070	0,0269	0,0141	0,0054	0,0109
23	Manufacture of other furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0094	0,0321	0,0140	0,0050	0,0146
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0041	0,0074	0,0005	0,0008	0,0013	0,0015	0,0012	0,0008	0,0007	0,0010	0,0013	0,0000
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001
28	Agriculture, hunting & fishing	0,0031	0,0031	0,0031	0,0000	0,0036	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
29	Mining and quarrying	0,0392	0,0392	0,0392	0,0002	0,0004	0,0002	0,0001	0,0010	0,0001	0,0002	0,0003	0,0001
30	Manufacture of food products, beverages and tobacco	0,0124	0,0124	0,0123	0,0054	0,0074	0,0010	0,0013	0,0008	0,0007	0,0010	0,0045	0,0010
31	Manufacture of textiles, wearing apparel and leather products	0,0002	0,0002	0,0001	0,0017	0,0072	0,0004	0,0006	0,0819	0,0003	0,0046	0,0012	0,0002
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0046	0,0046	0,0045	0,0017	0,0013	0,0009	0,0009	0,0013	0,0014	0,0011	0,0016	0,0001
34	Manufacture of chemicals and chemical products	0,0589	0,0588	0,0591	0,0315	0,0291	0,0119	0,0306	0,0278	0,0270	0,0219	0,0358	0,0009
35	Manufacture of rubber and plastic products	0,0023	0,0023	0,0023	0,0260	0,0311	0,0011	0,0025	0,0236	0,0210	0,0164	0,0065	0,0009
36	Manufacture of other non-metallic mineral products	0,0007	0,0007	0,0008	0,0002	0,0003	0,0002	0,0002	0,0021	0,0020	0,0029	0,0056	0,0002
37	Manufacture of basic metals and metal products	0,0048	0,0047	0,0049	0,0141	0,0073	0,0011	0,0036	0,0435	0,1121	0,0822	0,0391	0,0005
38	Manufacture of machinery and equipment	0,0186	0,0165	0,0228	0,0061	0,0104	0,0078	0,0062	0,0086	0,0111	0,0077	0,0096	0,0003
39	Manufacture of electrical machinery and apparatus	0,0017	0,0016	0,0015	0,0024	0,0012	0,0024	0,0020	0,0053	0,0140	0,0068	0,0074	0,0007
40	Manufacture of motor vehicles	0,0003	0,0003	0,0002	0,0003	0,0005	0,0005	0,0005	0,0013	0,0021	0,0016	0,0010	0,0002
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0000	0,0000	0,0000	0,0001	0,0001	0,0000	0,0001	0,0030	0,0071	0,0054	0,0021	0,0002
42	Electricity, gas and steam supply, excluding 27	0,0844	0,0844	0,0843	0,0099	0,0163	0,0063	0,0077	0,0132	0,0106	0,0115	0,0149	0,0015
43	Collection, purification and distribution of water	0,0002	0,0002	0,0003	0,0002	0,0003	0,0007	0,0005	0,0005	0,0004	0,0005	0,0007	-0,0001
44	Construction, excluding wood construction	0,0095	0,0158	0,0031	0,0019	0,0032	0,0035	0,0027	0,0019	0,0016	0,0022	0,0030	0,0000
45	Wholesale and retail trade	0,0024	0,0023	0,0022	0,0150	0,0030	0,0025	0,0037	0,0025	0,0026	0,0035	0,0029	0,1635
46	Hotels and restaurants	0,0065	0,0057	0,0081	0,0065	0,0111	0,0094	0,0073	0,0042	0,0035	0,0049	0,0065	0,0000
47	Land transport; transport via pipelines	0,0447	0,0363	0,0740	0,0335	0,0409	0,0059	0,0051	0,0215	0,0209	0,0287	0,0279	0,0071
48	Water transport	0,0012	0,0010	0,0019	0,0007	0,0010	0,0006	0,0005	0,0004	0,0004	0,0005	0,0006	0,0009
49	Other transport; post and telecommunications	0,0181	0,0155	0,0265	0,0208	0,0211	0,0831	0,0647	0,0137	0,0124	0,0172	0,0194	0,0006
50	Financial intermediation and insurance	0,0018	0,0018	0,0015	0,0017	0,0029	0,0031	0,0026	0,0016	0,0013	0,0018	0,0024	0,0000
51	Real estate, renting and business activities; R&D	0,0495	0,0549	0,0162	0,0436	0,0735	0,1148	0,0985	0,0519	0,0429	0,0600	0,0801	0,0000
52	Community, social and other service activities	0,0088	0,0081	0,0094	0,0084	0,0143	0,1879	0,1468	0,0083	0,0069	0,0096	0,0128	0,0000
Use of domestic products at producer's price		0,5928	0,5935	0,5934	0,4659	0,5261	0,4993	0,5237	0,3650	0,4511	0,5177	0,4949	0,6065
Use of imported products at producer's price, total		0,1146	0,1139	0,1140	0,1647	0,1672	0,0580	0,0663	0,1393	0,1139	0,1079	0,0871	0,0472
Consumption expenses of non-resident households in Finland		0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Value added tax		0,0005	0,0005	0,0005	0,0007	0,0008	0,0005	0,0006	0,0004	0,0004	0,0005	0,0005	0,0245
Product taxes		0,0061	0,0061	0,0061	0,0050	0,0055	0,0035	0,0037	0,0033	0,0037	0,0041	0,0038	0,0016
Product subsidies		-0,0002	-0,0002	-0,0002	-0,0003	-0,0003	-0,0002	-0,0002	-0,0002	-0,0002	-0,0002	-0,0002	0,0000
Intermediate use at purchaser's price		0,7138	0,7138	0,7138	0,6361	0,6993	0,5612	0,5940	0,5079	0,5690	0,6300	0,5861	0,6799
Wages and salaries		0,0915	0,0915	0,0915	0,1746	0,1404	0,2320	0,2088	0,2262	0,2729	0,2137	0,2275	0,2045
Employers' social contributions		0,0281	0,0281	0,0281	0,0554	0,0421	0,0688	0,0594	0,0658	0,0818	0,0642	0,0609	0,0526
Other taxes on production less subsidies		-0,0013	-0,0013	-0,0013	-0,0011	-0,0009	-0,0049	-0,0049	-0,0488	-0,0186	-0,0225	-0,0306	-0,0010
Consumption of fixed capital		0,0652	0,0652	0,0652	0,0524	0,0463	0,0633	0,0631	0,0816	0,0312	0,0376	0,0512	0,0176
Operating surplus/ mixed income, net		0,1028	0,1028	0,1028	0,0826	0,0729	0,0797	0,0795	0,1673	0,0639	0,0770	0,1050	0,0464
Value added, gross at producer's price		0,2862	0,2862	0,2862	0,3639	0,3007	0,4388	0,4060	0,4921	0,4310	0,3700	0,4139	0,3201
Output at producer's price		1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000
Number of domestic employees		0,5311	0,5311	0,5311	1,0219	0,8122	1,8790	1,6078	2,3076	2,5067	2,3281	2,6064	1,8650
Domestic working hours, 1000 hours		0,8658	0,8658	0,8658	1,6528	1,3463	2,6798	2,5794	3,7104	4,0698	3,7280	4,2554	4,0520
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		54,3795	27,2872	99,8176	21,6767	28,3369	0,1146	2,6000	4,0825	0,9842	3,9896	2,0089	61,1272
Methane (CH_4) emissions, tons		0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0021	0,0013	0,0056	0,0015	0,0097
Nitrous oxide (N_2O) emissions, tons		0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000
CO_2 equivalents, tons (Global warming potential GWP)		54,3795	27,2872	99,8177	21,6791	28,3369	0,1146	2,6000	4,1270	1,0112	4,1433	2,0417	61,3317
Sulphur dioxide (SO_2) emissions, tons		0,0281	0,1027	0,2005	0,0252	0,0201	0,0000	0,0007	0,0076	0,0062	0,0173	0,0107	0,0177
Nitrogen oxides (NOx) emissions, tons		0,0763	0,1537	0,2590	0,0474	0,0492	0,0000	0,0018	0,0201	0,0035	0,0159	0,0064	0,8792
SO2 equivalents, tons (Acidification potential AP)		0,0815	0,2103	0,3818	0,0583	0,0545	0,0000	0,0020	0,0217	0,0086	0,0284	0,0152	0,6331

(continues)

Appendix 5 (continues)
Industry-by-industry direct requirements matrix (domestic and imports total) 1995, including coefficients for primary inputs, non-financial economic variables and environmental variables (relative to million FIM output)

	Industry	Industry 25	26	27	28	29	30	31	32	33	34	35	36
1	Forestry	0,0000	0,0000	0,0003	0,0000	0,0000	0,0002	0,0001	0,0000	0,0000	0,0000	0,0000	0,0005
2	Sawmilling, planing and impregnation of wood	0,1282	0,1003	0,0039	0,0025	0,0006	0,0003	0,0002	0,0009	0,0003	0,0008	0,0014	0,0016
3	Manufacture of plywood and veneer sheets	0,0039	0,0040	0,0002	0,0001	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0005	0,0001
4	Manufacture of particle board and fibreboard	0,0135	0,0096	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0005	0,0000
5	Manufacture of wooden houses	0,0031	0,2190	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,1588	0,0688	0,0000	0,0000	0,0002	0,0001	0,0001	0,0001	0,0000	0,0000	0,0001	0,0002
7	Manufacture of wooden containers	0,0006	0,0010	0,0000	0,0000	0,0008	0,0004	0,0008	0,0000	0,0000	0,0015	0,0011	0,0079
8	Manufacture of other wood products	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0019	0,0028	0,0006	0,0013	0,0014	0,0004	0,0012	0,0005	0,0002	0,0262	0,0035	0,0021
10	Manufacture of mechanical pulp and newsprint	0,0002	0,0001	0,0006	0,0002	0,0006	0,0003	0,0003	0,0005	0,0002	0,0004	0,0004	0,0003
11	Manufacture of uncoated magazine paper	0,0003	0,0002	0,0010	0,0003	0,0010	0,0005	0,0004	0,0009	0,0003	0,0007	0,0007	0,0006
12	Manufacture of coated magazine paper	0,0005	0,0003	0,0018	0,0005	0,0017	0,0069	0,0008	0,0015	0,0007	0,0021	0,0064	0,0034
13	Manufacture of fine paper	0,0003	0,0002	0,0013	0,0004	0,0013	0,0051	0,0006	0,0010	0,0005	0,0015	0,0047	0,0025
14	Manufacture of kraft paper and other paper	0,0008	0,0010	0,0010	0,0030	0,0010	0,0043	0,0005	0,0008	0,0004	0,0012	0,0039	0,0021
15	Manufacture of paperboard	0,0003	0,0002	0,0012	0,0004	0,0011	0,0005	0,0005	0,0010	0,0005	0,0015	0,0047	0,0024
16	Manufacture of corrugated board and paperboard containers	0,0009	0,0004	0,0001	0,0011	0,0034	0,0078	0,0065	0,0001	0,0002	0,0038	0,0058	0,0057
17	Manufacture of paper and paperboard products excluding 16	0,0135	0,0095	0,0000	0,0006	0,0001	0,0011	0,0003	0,0003	0,0001	0,0003	0,0014	0,0012
18	Publishing and printing of newspapers	0,0000	0,0000	0,0006	0,0021	0,0038	0,0015	0,0024	0,0025	0,0008	0,0011	0,0016	0,0014
19	Publishing of books, magazines and other printed matter	0,0002	0,0002	0,0005	0,0062	0,0023	0,0012	0,0027	0,0039	0,0006	0,0011	0,0018	0,0012
20	Manufacture of chairs and seats, use of wood	0,0173	0,0125	0,0000	0,0003	0,0001	0,0000	0,0001	0,0013	0,0000	0,0000	0,0001	0,0001
21	Manufacture of office and shop furniture, use of wood	0,0075	0,0005	0,0000	0,0002	0,0000	0,0000	0,0000	0,0017	0,0000	0,0000	0,0001	0,0001
22	Manufacture of kitchen furniture, use of wood	0,0080	0,0167	0,0000	0,0002	0,0001	0,0000	0,0000	0,0001	0,0000	0,0000	0,0001	0,0000
23	Manufacture of other furniture, use of wood	0,0146	0,0090	0,0000	0,0003	0,0000	0,0000	0,0000	0,0020	0,0000	0,0000	0,0000	0,0001
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0000	0,0000	0,0000	0,0039	0,0055	0,0014	0,0007	0,0004	0,0010	0,0019	0,0014	0,0029
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0001	0,0001	0,0058	0,0009	0,0012	0,0005	0,0005	0,0047	0,0014	0,0018	0,0008	0,0009
28	Agriculture, hunting & fishing	0,0000	0,0000	0,0005	0,0859	0,0001	0,3235	0,0055	0,0000	0,0000	0,0004	0,0086	0,0000
29	Mining and quarrying	0,0001	0,0001	0,0766	0,0069	0,0243	0,0019	0,0013	0,0002	0,5296	0,0260	0,0010	0,0541
30	Manufacture of food products, beverages and tobacco	0,0009	0,0010	0,0028	0,0869	0,0045	0,2426	0,0130	0,0010	0,0013	0,0118	0,0033	0,0031
31	Manufacture of textiles, wearing apparel and leather products	0,0002	0,0002	0,0007	0,0123	0,0023	0,0011	0,2412	0,0004	0,0007	0,0016	0,0134	0,0083
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0001	0,0001	0,0225	0,0141	0,0207	0,0026	0,0031	0,0011	0,1304	0,0289	0,0037	0,0126
34	Manufacture of chemicals and chemical products	0,0009	0,0009	0,0041	0,0582	0,0238	0,0135	0,0856	0,0010	0,0216	0,2992	0,2577	0,0306
35	Manufacture of rubber and plastic products	0,0008	0,0008	0,0061	0,0148	0,0033	0,0151	0,0231	0,2054	0,0033	0,0121	0,0657	0,0168
36	Manufacture of other non-metallic mineral products	0,0002	0,0002	0,0004	0,0011	0,0032	0,0037	0,0032	0,0003	0,0002	0,0038	0,0038	0,1258
37	Manufacture of basic metals and metal products	0,0005	0,0005	0,0146	0,0038	0,0076	0,0101	0,0052	0,0024	0,0053	0,0098	0,0174	0,0431
38	Manufacture of machinery and equipment	0,0003	0,0003	0,0143	0,0412	0,0691	0,0073	0,0042	0,0047	0,0051	0,0098	0,0110	0,0318
39	Manufacture of electrical machinery and apparatus	0,0006	0,0007	0,0095	0,0128	0,0039	0,0017	0,0022	0,0381	0,0011	0,0016	0,0052	0,0020
40	Manufacture of motor vehicles	0,0002	0,0002	0,0004	0,0008	0,0009	0,0005	0,0005	0,0010	0,0003	0,0004	0,0028	0,0009
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0001	0,0001	0,0001	0,0010	0,0002	0,0002	0,0064	0,0096	0,0001	0,0003	0,0004	0,0013
42	Electricity, gas and steam supply, excluding 27	0,0013	0,0015	0,2609	0,0205	0,0269	0,0109	0,0105	0,0060	0,0322	0,0406	0,0174	0,0206
43	Collection, purification and distribution of water	-0,0001	-0,0001	0,0005	0,0000	0,0004	0,0007	0,0005	0,0004	0,0004	0,0007	0,0005	0,0008
44	Construction, excluding wood construction	0,0000	0,0000	0,0082	0,0116	0,0133	0,0034	0,0017	0,0022	0,0024	0,0046	0,0035	0,0070
45	Wholesale and retail trade	0,1448	0,1621	0,0017	0,0947	0,0086	0,0027	0,0039	0,0339	0,0264	0,0082	0,0059	0,0042
46	Hotels and restaurants	0,0000	0,0000	0,0042	0,0007	0,0081	0,0049	0,0062	0,0027	0,0038	0,0060	0,0113	0,0057
47	Land transport; transport via pipelines	0,0103	0,0085	0,0113	0,0038	0,1466	0,0512	0,0220	0,0156	0,0108	0,0346	0,0245	0,0643
48	Water transport	0,0008	0,0009	0,0004	0,0006	0,0011	0,0006	0,0005	0,0474	0,0060	0,0007	0,0010	0,0007
49	Other transport; post and telecommunications	0,0005	0,0005	0,0050	0,0195	0,0114	0,0154	0,0153	0,0000	0,0108	0,0161	0,0170	0,0224
50	Financial intermediation and insurance	0,0000	0,0000	0,0011	0,0062	0,0042	0,0019	0,0026	0,0674	0,0012	0,0017	0,0028	0,0019
51	Real estate, renting and business activities; R&D	0,0000	0,0000	0,0268	0,0102	0,1512	0,0663	0,0902	0,0904	0,0370	0,0527	0,0683	0,0586
52	Community, social and other service activities	0,0000	0,0000	0,0069	0,0192	0,0150	0,0110	0,0115	0,0029	0,0075	0,0114	0,0154	0,0120
	Use of domestic products at producer's price	0,4873	0,5939	0,4081	0,4581	0,5155	0,7209	0,3320	0,3934	0,2252	0,3735	0,3244	0,4203
	Use of imported products at producer's price, total	0,0498	0,0412	0,0907	0,0930	0,0616	0,1045	0,2465	0,1652	0,6196	0,2560	0,2778	0,1455
	Consumption expenses of non-resident households in Finland	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	Value added tax	0,0187	0,0256	0,0003	0,0000	0,0007	0,0004	0,0005	0,0005	0,0003	0,0005	0,0009	0,0005
	Product taxes	0,0012	0,0017	0,0310	0,0113	0,0127	0,0073	0,0052	0,0035	0,0269	0,0140	0,0076	0,0081
	Product subsidies	0,0000	0,0000	-0,0001	-0,0188	-0,0003	-0,0923	-0,0002	-0,0002	-0,0001	-0,0002	-0,0004	-0,0002
	Intermediate use at purchaser's price	0,5571	0,6623	0,5300	0,5437	0,5903	0,7408	0,5840	0,5625	0,8719	0,6437	0,6104	0,5741
	Wages and salaries	0,2830	0,2158	0,1073	0,0918	0,1303	0,1174	0,2205	0,1865	0,0517	0,1226	0,1866	0,2033
	Employers' social contributions	0,0727	0,0555	0,0349	0,0266	0,0414	0,0361	0,0623	0,0533	0,0155	0,0369	0,0543	0,0619
	Other taxes on production less subsidies	-0,0014	-0,0011	-0,0042	-0,3691	-0,0057	-0,0010	-0,0049	-0,0071	-0,0004	-0,0027	-0,0019	-0,0063
	Consumption of fixed capital	0,0244	0,0186	0,2013	0,1859	0,1102	0,0503	0,0739	0,0907	0,0438	0,0592	0,0504	0,0941
	Operating surplus/ mixed income, net	0,0641	0,0489	0,1308	0,5212	0,1335	0,0563	0,0642	0,1142	0,0175	0,1403	0,1002	0,0729
	Value added, gross at producer's price	0,4429	0,3377	0,4700	0,4563	0,4097	0,2592	0,4160	0,4375	0,1281	0,3563	0,3896	0,4259
	Output at producer's price	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000
	Number of domestic employees	2,5803	1,9674	0,7215	7,6389	1,2526	0,9597	2,6564	1,4343	0,2902	0,8108	1,5184	1,6760
	Domestic working hours, 1000 hours	5,6060	4,2746	1,1461	16,0066	2,1863	1,5684	4,2601	2,0944	0,4837	1,3327	2,4688	2,7325
	Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons	14,3454	9,0242	2517,3958	83,6564	60,8422	17,7336	12,8814	63,4624	233,6160	59,5867	8,5255	96,6299
	Methane (CH_4) emissions, tons	0,0023	0,0014	0,3283	3,9054	0,0064	0,0018	0,0013	0,0000	0,0321	0,0152	0,0010	0,0084
	Nitrous oxide (N_2O) emissions, tons	0,0000	0,0000	0,7708	0,6558	0,0018	0,0014	0,0004	0,0066	0,0133	0,2075	0,0005	0,0023
	CO_2 equivalents, tons (Global warming potential GWP)	14,3933	9,0543	2763,2389	368,9811	61,5344	18,2112	13,0192	65,5032	238,4156	124,2161	8,7144	97,5196
	Sulphur dioxide (SO_2) emissions, tons	0,0042	0,0026	4,6006	0,0918	0,2088	0,0604	0,0229	0,1836	0,5022	0,5544	0,0835	0,1398
	Nitrogen oxides (NOx) emissions, tons	0,2062	0,1297	3,3232	0,5031	0,1629	0,0322	0,1099	0,8043	0,5184	0,1675	0,0235	0,4884
	SO2 equivalents, tons (Acidification potential AP)	0,1485	0,0934	6,9269	0,4439	0,3229	0,0830	0,0998	0,7466	0,8651	0,6717	0,0999	0,4817

(continues)

Appendix 5 (continues)
Industry-by-industry direct requirements matrix (domestic and imports total) 1995, including coefficients for primary inputs, non-financial economic variables and environmental variables (relative to million FIM output)

	Industry	Industry 37	38	39	40	41	42	43	44	45	46	47	48
1	Forestry	0,0000	0,0000	0,0000	0,0000	0,0003	0,0004	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
2	Sawmilling, planing and impregnation of wood	0,0003	0,0003	0,0001	0,0002	0,0119	0,0044	0,0010	0,0049	0,0005	0,0002	0,0001	0,0001
3	Manufacture of plywood and veneer sheets	0,0001	0,0001	0,0000	0,0001	0,0036	0,0003	0,0001	0,0001	0,0001	0,0001	0,0000	0,0000
4	Manufacture of particle board and fibreboard	0,0000	0,0000	0,0000	0,0001	0,0063	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0001	0,0003	0,0000	0,0002	0,0014	0,0000	0,0000	0,0002	0,0000	0,0000	0,0001	0,0000
7	Manufacture of wooden containers	0,0020	0,0023	0,0011	0,0005	0,0008	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000	0,0012	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0005	0,0002	0,0002	0,0003	0,0007	0,0007	0,0004	0,0006	0,0004	0,0001	0,0001	0,0001
10	Manufacture of mechanical pulp and newsprint	0,0003	0,0003	0,0002	0,0003	0,0003	0,0007	0,0003	0,0001	0,0010	0,0004	0,0001	0,0002
11	Manufacture of uncoated magazine paper	0,0005	0,0005	0,0003	0,0005	0,0004	0,0012	0,0004	0,0002	0,0006	0,0006	0,0001	0,0003
12	Manufacture of coated magazine paper	0,0010	0,0010	0,0006	0,0010	0,0012	0,0021	0,0008	0,0004	0,0016	0,0011	0,0007	0,0033
13	Manufacture of fine paper	0,0007	0,0007	0,0004	0,0007	0,0009	0,0015	0,0006	0,0003	0,0012	0,0008	0,0005	0,0025
14	Manufacture of kraft paper and other paper	0,0006	0,0006	0,0003	0,0006	0,0008	0,0012	0,0004	0,0002	0,0010	0,0007	0,0004	0,0021
15	Manufacture of paperboard	0,0007	0,0007	0,0004	0,0007	0,0009	0,0014	0,0005	0,0002	0,0011	0,0008	0,0002	0,0003
16	Manufacture of corrugated board and paperboard containers	0,0023	0,0010	0,0033	0,0008	0,0111	0,0001	0,0000	0,0004	0,0002	0,0000	0,0001	0,0001
17	Manufacture of paper and paperboard products excluding 16	0,0003	0,0002	0,0003	0,0001	0,0005	0,0001	0,0001	0,0001	0,0026	0,0001	0,0002	0,0013
18	Publishing and printing of newspapers	0,0015	0,0020	0,0016	0,0025	0,0017	0,0007	0,0009	0,0003	0,0062	0,0042	0,0009	0,0047
19	Publishing of books, magazines and other printed matter	0,0015	0,0015	0,0012	0,0016	0,0016	0,0006	0,0008	0,0006	0,0142	0,0024	0,0018	0,0110
20	Manufacture of chairs and seats, use of wood	0,0000	0,0001	0,0000	0,0013	0,0075	0,0000	0,0000	0,0000	0,0003	0,0001	0,0001	0,0007
21	Manufacture of office and shop furniture, use of wood	0,0002	0,0001	0,0001	0,0008	0,0071	0,0000	0,0001	0,0001	0,0002	0,0000	0,0001	0,0003
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0001	0,0000	0,0013	0,0023	0,0000	0,0000	0,0000	0,0003	0,0001	0,0001	0,0006
23	Manufacture of other furniture, use of wood	0,0003	0,0002	0,0001	0,0016	0,0029	0,0000	0,0000	0,0001	0,0003	0,0001	0,0001	0,0007
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0009	0,0017	0,0005	0,0021	0,0007	0,0000	0,0016	0,0000	0,0004	0,0050	0,0000	0,0000
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0008	0,0003	0,0001	0,0004	0,0003	0,0066	0,0018	0,0002	0,0004	0,0001	0,0002	0,0000
28	Agriculture, hunting & fishing	0,0000	0,0000	0,0000	0,0000	0,0000	0,0006	0,0000	0,0000	0,0003	0,0074	0,0000	0,0004
29	Mining and quarrying	0,0514	0,0005	0,0002	0,0002	0,0072	0,0876	0,0001	0,0230	0,0003	0,0002	0,0001	0,0001
30	Manufacture of food products, beverages and tobacco	0,0017	0,0024	0,0016	0,0019	0,0027	0,0032	0,0017	0,0010	0,0111	0,2507	0,0006	0,0129
31	Manufacture of textiles, wearing apparel and leather products	0,0014	0,0019	0,0015	0,0023	0,0150	0,0008	0,0012	0,0068	0,0027	0,0023	0,0010	0,0018
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0206	0,0018	0,0011	0,0030	0,0081	0,0257	0,0021	0,0056	0,0057	0,0007	0,0343	0,0414
34	Manufacture of chemicals and chemical products	0,0155	0,0052	0,0096	0,0126	0,0371	0,0047	0,0121	0,0244	0,0060	0,0012	0,0013	0,0011
35	Manufacture of rubber and plastic products	0,0024	0,0096	0,0080	0,0160	0,0259	0,0070	0,0330	0,0282	0,0210	0,0017	0,0087	0,0005
36	Manufacture of other non-metallic mineral products	0,0030	0,0018	0,0014	0,0105	0,0117	0,0005	0,0041	0,0912	0,0023	0,0004	0,0004	0,0016
37	Manufacture of basic metals and metal products	0,3977	0,1119	0,0363	0,1238	0,1410	0,0166	0,0021	0,1253	0,0058	0,0014	0,0018	0,0014
38	Manufacture of machinery and equipment	0,0217	0,2449	0,0071	0,1205	0,0076	0,0164	0,0351	0,0340	0,0008	0,0014	0,0317	0,0009
39	Manufacture of electrical machinery and apparatus	0,0053	0,0374	0,4606	0,0262	0,0185	0,0109	0,0017	0,0250	0,0144	0,0042	0,0051	0,0306
40	Manufacture of motor vehicles	0,0069	0,0270	0,0009	0,1268	0,0019	0,0004	0,0004	0,0026	0,0005	0,0009	0,0196	0,0053
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0034	0,0007	0,0004	0,0022	0,0676	0,0001	0,0002	0,0024	0,0012	0,0002	0,0003	0,0021
42	Electricity, gas and steam supply, excluding 27	0,0188	0,0079	0,0033	0,0090	0,0091	0,2984	0,0406	0,0063	0,0101	0,0012	0,0042	0,0009
43	Collection, purification and distribution of water	0,0002	0,0006	0,0004	0,0005	0,0005	0,0006	0,0006	0,0000	0,0009	0,0000	0,0000	0,0000
44	Construction, excluding wood construction	0,0023	0,0042	0,0013	0,0050	0,0018	0,0094	0,0039	0,0241	0,0009	0,0100	0,0000	0,0000
45	Wholesale and retail trade	0,0128	0,0095	0,0087	0,0093	0,0255	0,0019	0,0025	0,0836	0,0610	0,0450	0,0466	0,0650
46	Hotels and restaurants	0,0060	0,0094	0,0067	0,0057	0,0069	0,0048	0,0065	0,0016	0,0066	0,0004	0,0014	0,0010
47	Land transport; transport via pipelines	0,0297	0,0157	0,0089	0,0121	0,0215	0,0129	0,0053	0,0254	0,0397	0,0000	0,0214	0,0012
48	Water transport	0,0007	0,0008	0,0006	0,0005	0,0008	0,0005	0,0005	0,0011	0,0013	0,0002	0,0006	0,0984
49	Other transport; post and telecommunications	0,0134	0,0144	0,0097	0,0106	0,0144	0,0057	0,0098	0,0062	0,0420	0,0029	0,0184	0,1937
50	Financial intermediation and insurance	0,0021	0,0030	0,0023	0,0030	0,0024	0,0012	0,0017	0,0058	0,0090	0,0078	0,0112	0,0171
51	Real estate, renting and business activities; R&D	0,0640	0,0926	0,0736	0,1139	0,0734	0,0306	0,0407	0,0220	0,0927	0,1813	0,0168	0,0671
52	Community, social and other service activities	0,0096	0,0152	0,0126	0,0121	0,0113	0,0078	0,0108	0,0137	0,0226	0,0403	0,0052	0,0025
Use of domestic products at producer's price		0,5001	0,4035	0,3393	0,4026	0,3775	0,4668	0,1805	0,4550	0,3474	0,5423	0,2085	0,3744
Use of imported products at producer's price, total		0,2056	0,2293	0,3284	0,2426	0,2007	0,1037	0,0461	0,1131	0,0438	0,0364	0,0283	0,2008
Consumption expenses of non-resident households in Finland		0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Value added tax		0,0005	0,0008	0,0005	0,0005	0,0006	0,0004	0,0005	0,0199	0,0006	0,0000	0,0001	0,0001
Product taxes		0,0039	0,0047	0,0067	0,0046	0,0051	0,0354	0,0037	0,0022	0,0116	0,0421	0,0806	0,0071
Product subsidies		-0,0002	-0,0003	-0,0002	-0,0002	-0,0002	-0,0001	-0,0002	-0,0001	-0,0002	0,0000	-0,0029	-0,0001
Intermediate use at purchaser's price		0,7098	0,6380	0,6748	0,6500	0,5837	0,6062	0,2307	0,5901	0,4032	0,6207	0,3147	0,5822
Wages and salaries		0,1201	0,1859	0,1339	0,2154	0,2042	0,0899	0,1477	0,2355	0,2858	0,2333	0,2124	0,2121
Employers' social contributions		0,0361	0,0575	0,0389	0,0631	0,0596	0,0293	0,0463	0,0632	0,0752	0,0532	0,0596	0,0625
Other taxes on production less subsidies		-0,0025	-0,0030	-0,0022	-0,0104	-0,0225	-0,0036	-0,0139	-0,0004	0,0013	-0,0087	0,0062	-0,0191
Consumption of fixed capital		0,0397	0,0355	0,0251	0,0439	0,0454	0,1686	0,3391	0,0374	0,0906	0,0324	0,1098	0,2061
Operating surplus/ mixed income, net		0,0968	0,0861	0,1294	0,0379	0,1295	0,1096	0,2501	0,0741	0,1439	0,0691	0,2973	-0,0438
Value added, gross at producer's price		0,2902	0,3620	0,3252	0,3500	0,4163	0,3938	0,7693	0,4099	0,5968	0,3793	0,6853	0,4178
Output at producer's price		1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000
Number of domestic employees		0,9389	1,3336	0,9775	1,5489	2,1406	0,6045	1,3379	2,1930	2,9197	2,9333	2,5803	1,4826
Domestic working hours, 1000 hours		1,5525	2,2482	1,6247	2,4321	3,4267	0,9602	2,0584	4,5367	5,3328	5,0743	5,2040	2,9254
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		27,0983	2,2255	0,7267	5,9132	10,5743	640,5940	3,0306	6,2495	3,7436	3,2002	113,9600	38,0424
Methane (CH_4) emissions, tons		0,0798	0,0005	0,0001	0,0007	0,0026	0,0412	0,0008	0,0002	0,0004	0,0008	0,0163	0,0010
Nitrous oxide (N_2O) emissions, tons		0,0007	0,0002	0,0000	0,0002	0,0006	0,0231	0,0007	0,0026	0,0001	0,0001	0,0101	0,0157
CO_2 equivalents, tons (Global warming potential GWP)		29,0019	2,3073	0,7393	5,9931	10,8162	648,6085	3,2737	7,0472	3,7845	3,2469	117,4476	42,9424
Sulphur dioxide (SO_2) emissions, tons		0,1461	0,0054	0,0009	0,0193	0,0202	1,1712	0,0068	0,0018	0,0184	0,0027	0,0377	0,1740
Nitrogen oxides (NOx) emissions, tons		0,0501	0,0108	0,0042	0,0176	0,0417	1,2093	0,0150	0,1146	0,0039	0,0036	1,4861	0,6671
SO2 equivalents, tons (Acidification potential AP)		0,1812	0,0129	0,0039	0,0316	0,0494	2,0177	0,0172	0,0820	0,0211	0,0052	1,0780	0,6410

(continues)

Appendix 5 (continues)
Industry-by-industry direct requirements matrix (domestic and imports total) 1995, including coefficients for primary inputs, non-financial economic variables and environmental variables (relative to million FIM output)

		Industry			
Industry		49	50	51	52
1	Forestry	0,0000	0,0003	0,0002	0,0000
2	Sawmilling, planing and impregnation of wood	0,0001	0,0002	0,0004	0,0002
3	Manufacture of plywood and veneer sheets	0,0000	0,0001	0,0001	0,0000
4	Manufacture of particle board and fibreboard	0,0000	0,0000	0,0000	0,0000
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0000	0,0000	0,0000	0,0000
7	Manufacture of wooden containers	0,0000	0,0000	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0001	0,0001	0,0002	0,0002
10	Manufacture of mechanical pulp and newsprint	0,0001	0,0003	0,0003	0,0001
11	Manufacture of uncoated magazine paper	0,0002	0,0004	0,0005	0,0002
12	Manufacture of coated magazine paper	0,0009	0,0017	0,0026	0,0012
13	Manufacture of fine paper	0,0006	0,0012	0,0020	0,0009
14	Manufacture of kraft paper and other paper	0,0005	0,0010	0,0014	0,0007
15	Manufacture of paperboard	0,0006	0,0011	0,0008	0,0007
16	Manufacture of corrugated board and paperboard containers	0,0000	0,0000	0,0000	0,0000
17	Manufacture of paper and paperboard products excluding 16	0,0003	0,0004	0,0007	0,0010
18	Publishing and printing of newspapers	0,0026	0,0035	0,0055	0,0087
19	Publishing of books, magazines and other printed matter	0,0054	0,0046	0,0108	0,0259
20	Manufacture of chairs and seats, use of wood	0,0002	0,0002	0,0003	0,0002
21	Manufacture of office and shop furniture, use of wood	0,0001	0,0001	0,0002	0,0001
22	Manufacture of kitchen furniture, use of wood	0,0001	0,0002	0,0003	0,0002
23	Manufacture of other furniture, use of wood	0,0002	0,0002	0,0003	0,0002
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0011	0,0028	0,0175	0,0010
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0002	0,0004	0,0011	0,0005
28	Agriculture, hunting & fishing	0,0001	0,0000	0,0000	0,0007
29	Mining and quarrying	0,0001	0,0002	0,0002	0,0001
30	Manufacture of food products, beverages and tobacco	0,0046	0,0016	0,0020	0,0124
31	Manufacture of textiles, wearing apparel and leather products	0,0019	0,0004	0,0011	0,0023
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0141	0,0023	0,0052	0,0031
34	Manufacture of chemicals and chemical products	0,0007	0,0007	0,0025	0,0082
35	Manufacture of rubber and plastic products	0,0040	0,0004	0,0009	0,0037
36	Manufacture of other non-metallic mineral products	0,0004	0,0006	0,0009	0,0011
37	Manufacture of basic metals and metal products	0,0019	0,0014	0,0019	0,0015
38	Manufacture of machinery and equipment	0,0010	0,0009	0,0023	0,0047
39	Manufacture of electrical machinery and apparatus	0,0156	0,0101	0,0160	0,0107
40	Manufacture of motor vehicles	0,0115	0,0005	0,0005	0,0067
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0005	0,0041	0,0012	0,0013
42	Electricity, gas and steam supply, excluding 27	0,0042	0,0089	0,0258	0,0112
43	Collection, purification and distribution of water	0,0001	0,0013	0,0106	0,0005
44	Construction, excluding wood construction	0,1298	0,0056	0,0384	0,0020
45	Wholesale and retail trade	0,0293	0,0166	0,0376	0,0451
46	Hotels and restaurants	0,0313	0,0067	0,0033	0,0088
47	Land transport; transport via pipelines	0,0095	0,0024	0,0007	0,0049
48	Water transport	0,0013	0,0006	0,0004	0,0008
49	Other transport; post and telecommunications	0,1078	0,0252	0,0243	0,0184
50	Financial intermediation and insurance	0,0019	0,0546	0,0130	0,0067
51	Real estate, renting and business activities; R&D	0,0490	0,1115	0,1245	0,0315
52	Community, social and other service activities	0,0034	0,0161	0,0376	0,0706
Use of domestic products at producer's price		0,3638	0,2714	0,3556	0,2579
Use of imported products at producer's price, total		0,0737	0,0202	0,0406	0,0414
Consumption expenses of non-resident households in Finland		0,0000	0,0000	0,0000	0,0000
Value added tax		0,0067	0,0458	0,0091	0,0354
Product taxes		0,0088	0,0083	0,0049	0,0056
Product subsidies		-0,0004	-0,0002	-0,0001	-0,0003
Intermediate use at purchaser's price		0,4526	0,3456	0,4101	0,3399
Wages and salaries		0,2038	0,2655	0,1282	0,4312
Employers' social contributions		0,0554	0,0778	0,0327	0,1354
Other taxes on production less subsidies		-0,0014	-0,0084	-0,0031	-0,0010
Consumption of fixed capital		0,1679	0,1064	0,2094	0,0690
Operating surplus/ mixed income, net		0,1217	0,2131	0,2227	0,0254
Value added, gross at producer's price		0,5474	0,6544	0,5899	0,6601
Output at producer's price		1,0000	1,0000	1,0000	1,0000
Number of domestic employees		1,6469	1,6925	1,0342	3,8003
Domestic working hours, 1000 hours		2,6969	2,7305	1,8371	5,7387
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		29,1395	0,0000	4,8547	3,4419
Methane (CH_4) emissions, tons		0,0127	0,0000	0,0007	0,0006
Nitrous oxide (N_2O) emissions, tons		0,0044	0,0000	0,0001	0,0001
CO_2 equivalents, tons (Global warming potential GWP)		30,7766	0,0000	4,9100	3,4990
Sulphur dioxide (SO_2) emissions, tons		0,0053	0,0000	0,0016	0,0054
Nitrogen oxides (NOx) emissions, tons		0,3291	0,0000	0,0053	0,0047
SO2 equivalents, tons (Acidification potential AP)		0,2357	0,0000	0,0053	0,0087

Appendix 6
Industry-by-industry multiplier matrix 1995 and total factor multipliers excluding imports (relative to million FIM output)

	Industry	Industry 1	2	3	4	5	6	7	8	9	10	11	12
1	Forestry	1,0224	0,5022	0,2311	0,0727	0,1938	0,1207	0,1776	0,0905	0,2475	0,1060	0,1060	0,1061
2	Sawmilling, planing and impregnation of wood	0,0003	1,0308	0,0122	0,1168	0,2049	0,1783	0,3484	0,1554	0,0574	0,0274	0,0274	0,0275
3	Manufacture of plywood and veneer sheets	0,0000	0,0007	1,0264	0,0051	0,0085	0,0222	0,0288	0,0313	0,0010	0,0006	0,0007	0,0007
4	Manufacture of particle board and fibreboard	0,0000	0,0001	0,0005	1,0432	0,0047	0,0129	0,0075	0,0070	0,0000	0,0001	0,0001	0,0002
5	Manufacture of wooden houses	0,0000	0,0005	0,0005	0,0005	1,0043	0,0015	0,0016	0,0009	0,0004	0,0002	0,0002	0,0002
6	Manufacture of builders' joinery and carpentry	0,0000	0,0007	0,0009	0,0014	0,1133	1,0376	0,0021	0,0013	0,0004	0,0011	0,0011	0,0012
7	Manufacture of wooden containers	0,0000	0,0004	0,0025	0,0059	0,0013	0,0012	1,0041	0,0033	0,0002	0,0029	0,0029	0,0029
8	Manufacture of other wood products	0,0000	0,0000	0,0001	0,0002	0,0003	0,0007	0,0096	1,0002	0,0001	0,0001	0,0001	0,0001
9	Manufacture of chemical pulp	0,0004	0,0020	0,0065	0,0189	0,0050	0,0060	0,0058	0,0045	1,0158	0,2064	0,2064	0,2064
10	Manufacture of mechanical pulp and newsprint	0,0001	0,0005	0,0007	0,0013	0,0009	0,0010	0,0007	0,0007	0,0004	1,0053	0,0053	0,0053
11	Manufacture of uncoated magazine paper	0,0001	0,0007	0,0009	0,0014	0,0011	0,0012	0,0009	0,0009	0,0006	0,0011	1,0011	0,0012
12	Manufacture of coated magazine paper	0,0002	0,0010	0,0014	0,0023	0,0018	0,0021	0,0014	0,0014	0,0010	0,0019	0,0019	1,0019
13	Manufacture of fine paper	0,0002	0,0010	0,0014	0,0027	0,0017	0,0019	0,0013	0,0013	0,0008	0,0123	0,0123	0,0123
14	Manufacture of kraft paper and other paper	0,0003	0,0009	0,0083	0,0301	0,0016	0,0024	0,0015	0,0020	0,0025	0,0144	0,0144	0,0145
15	Manufacture of paperboard	0,0003	0,0012	0,0068	0,0272	0,0022	0,0029	0,0015	0,0021	0,0008	0,0083	0,0083	0,0083
16	Manufacture of corrugated board and paperboard containers	0,0001	0,0026	0,0032	0,0093	0,0035	0,0047	0,0015	0,0011	0,0007	0,0130	0,0130	0,0130
17	Manufacture of paper and paperboard products excluding 16	0,0001	0,0002	0,0004	0,0009	0,0005	0,0019	0,0002	0,0003	0,0001	0,0006	0,0006	0,0006
18	Publishing and printing of newspapers	0,0005	0,0020	0,0023	0,0028	0,0033	0,0029	0,0022	0,0028	0,0012	0,0023	0,0024	0,0025
19	Publishing of books, magazines and other printed matter	0,0013	0,0028	0,0031	0,0040	0,0042	0,0039	0,0028	0,0033	0,0016	0,0033	0,0034	0,0035
20	Manufacture of chairs and seats, use of wood	0,0001	0,0001	0,0002	0,0002	0,0005	0,0003	0,0006	0,0002	0,0001	0,0002	0,0002	0,0002
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0001	0,0001	0,0001	0,0004	0,0002	0,0003	0,0001	0,0000	0,0001	0,0001	0,0001
22	Manufacture of kitchen furniture, use of wood	0,0001	0,0001	0,0001	0,0016	0,0009	0,0006	0,0009	0,0003	0,0001	0,0001	0,0001	0,0001
23	Manufacture of other furniture, use of wood	0,0001	0,0001	0,0001	0,0003	0,0007	0,0003	0,0008	0,0002	0,0001	0,0002	0,0002	0,0002
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0002	0,0029	0,0042	0,0051	0,0057	0,0050	0,0033	0,0034	0,0009	0,0051	0,0055	0,0060
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0001	0,0004	0,0007	0,0012	0,0006	0,0006	0,0004	0,0004	0,0006	0,0012	0,0012	0,0012
28	Agriculture, hunting & fishing	0,0006	0,0015	0,0023	0,0032	0,0020	0,0023	0,0015	0,0015	0,0013	0,0043	0,0044	0,0044
29	Mining and quarrying	0,0004	0,0030	0,0050	0,0090	0,0039	0,0040	0,0027	0,0023	0,0045	0,0155	0,0156	0,0156
30	Manufacture of food products, beverages and tobacco	0,0017	0,0044	0,0071	0,0096	0,0061	0,0070	0,0044	0,0046	0,0040	0,0147	0,0148	0,0150
31	Manufacture of textiles, wearing apparel and leather products	0,0010	0,0008	0,0007	0,0008	0,0014	0,0012	0,0008	0,0183	0,0005	0,0007	0,0007	0,0008
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0069	0,0090	0,0088	0,0183	0,0081	0,0076	0,0075	0,0061	0,0071	0,0110	0,0108	0,0106
34	Manufacture of chemicals and chemical products	0,0023	0,0050	0,0515	0,1066	0,0141	0,0339	0,0078	0,0214	0,0424	0,0501	0,0500	0,0500
35	Manufacture of rubber and plastic products	0,0008	0,0026	0,0045	0,0051	0,0064	0,0087	0,0029	0,0086	0,0018	0,0049	0,0049	0,0049
36	Manufacture of other non-metallic mineral products	0,0009	0,0020	0,0035	0,0036	0,0289	0,0251	0,0020	0,0019	0,0024	0,0033	0,0033	0,0034
37	Manufacture of basic metals and metal products	0,0021	0,0110	0,0132	0,0264	0,0384	0,0552	0,0357	0,0218	0,0084	0,0175	0,0177	0,0179
38	Manufacture of machinery and equipment	0,0006	0,0127	0,0146	0,0314	0,0246	0,0212	0,0136	0,0116	0,0113	0,0241	0,0253	0,0268
39	Manufacture of electrical machinery and apparatus	0,0021	0,0045	0,0049	0,0067	0,0076	0,0054	0,0046	0,0048	0,0031	0,0057	0,0059	0,0061
40	Manufacture of motor vehicles	0,0002	0,0023	0,0022	0,0033	0,0034	0,0035	0,0028	0,0023	0,0012	0,0027	0,0026	0,0025
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0002	0,0003	0,0004	0,0005	0,0010	0,0009	0,0008	0,0005	0,0002	0,0004	0,0004	0,0004
42	Electricity, gas and steam supply, excluding 27	0,0020	0,0457	0,0677	0,1300	0,0421	0,0426	0,0408	0,0321	0,0630	0,1424	0,1426	0,1428
43	Collection, purification and distribution of water	0,0001	0,0009	0,0011	0,0014	0,0018	0,0016	0,0011	0,0014	0,0005	0,0011	0,0012	0,0012
44	Construction, excluding wood construction	0,0085	0,0148	0,0164	0,0194	0,0203	0,0173	0,0135	0,0126	0,0069	0,0188	0,0196	0,0205
45	Wholesale and retail trade	0,0292	0,0261	0,0200	0,0217	0,0252	0,0205	0,0208	0,0167	0,0149	0,0189	0,0190	0,0191
46	Hotels and restaurants	0,0029	0,0056	0,0068	0,0078	0,0075	0,0065	0,0054	0,0049	0,0036	0,0060	0,0063	0,0067
47	Land transport; transport via pipelines	0,0039	0,0847	0,0698	0,0954	0,0747	0,0638	0,0740	0,0560	0,0343	0,0847	0,0792	0,0719
48	Water transport	0,0005	0,0031	0,0020	0,0027	0,0018	0,0016	0,0018	0,0013	0,0011	0,0022	0,0021	0,0020
49	Other transport; post and telecommunications	0,0066	0,0306	0,0322	0,0431	0,0393	0,0335	0,0322	0,0285	0,0185	0,0348	0,0336	0,0320
50	Financial intermediation and insurance	0,0017	0,0041	0,0044	0,0053	0,0058	0,0050	0,0041	0,0045	0,0024	0,0044	0,0045	0,0047
51	Real estate, renting and business activities; R&D	0,0056	0,0493	0,0607	0,0772	0,0978	0,0859	0,0600	0,0849	0,0324	0,0629	0,0660	0,0701
52	Community, social and other service activities	0,0018	0,0135	0,0183	0,0229	0,0242	0,0214	0,0157	0,0175	0,0090	0,0175	0,0183	0,0195
	Total intermediate product requirement	1,1098	1,8918	1,7328	2,0070	2,0517	1,8883	1,9625	1,6815	1,6091	1,9630	1,9639	1,9650
	Operating surplus/ mixed income, net, mill. FIM	0,645398	0,458548	0,276259	0,216747	0,258905	0,233631	0,318604	0,267916	0,440835	0,30972	0,309028	0,308121
	Value added, gross at producer's price, mill. FIM	0,969359	0,916204	0,841993	0,732787	0,828875	0,812396	0,864621	0,849139	0,826637	0,766044	0,765495	0,764777
	Number of domestic employees	1,926908	2,476637	3,359522	2,701274	3,422609	3,319394	2,977265	3,736823	1,172135	1,671443	1,668462	1,664559
	Working hours, 1000 hours	3,599741	4,394435	5,736714	4,609153	5,749599	5,656864	5,131854	6,298249	2,085962	2,913171	2,904337	2,892774
	Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons	21,98322	60,78916	83,75235	237,8755	55,53494	60,45194	48,60463	38,57027	94,92558	136,0272	191,0215	187,8584
	Methane (CH_4) emissions, tons	0,00432	0,019558	0,179791	0,192513	0,031817	0,033009	0,021709	0,020612	0,011332	0,028253	0,028312	0,028389
	Nitrous oxide (N_2O) emissions, tons	0,001599	0,004953	0,015579	0,032854	0,007033	0,011203	0,005124	0,007492	0,012249	0,018799	0,018763	0,018716
	CO_2 equivalents, tons (Global warming potential GWP)	22,56958	62,73532	92,35732	252,1029	58,38334	64,61803	50,64889	41,32555	98,9609	142,4483	197,4326	194,2564
	Sulphur dioxide (SO_2) emissions, tons	0,00938	0,084894	0,194866	0,576836	0,103893	0,151547	0,081103	0,072512	0,560549	0,327061	0,351485	0,34908
	Nitrogen oxides (NOx) emissions, tons	0,23508	0,367838	0,869621	0,824652	0,320979	0,294693	0,266727	0,207533	0,916164	0,608752	0,633498	0,607511
	SO2 equivalents, tons (Acidification potential AP)	0,173936	0,342381	0,803601	1,154093	0,328578	0,357832	0,267812	0,217785	1,201863	0,753187	0,794934	0,774338

(continues)

Appendix 6 (continues)
Industry-by-industry multiplier matrix 1995 and total factor multipliers excluding imports (relative to million FIM output)

		Industry											
Industry		13	14	15	16	17	18	19	20	21	22	23	24
1	Forestry	0,1061	0,1064	0,1057	0,0293	0,0357	0,0116	0,0204	0,0217	0,0194	0,0597	0,0719	0,1094
2	Sawmilling, planing and impregnation of wood	0,0275	0,0281	0,0269	0,0094	0,0097	0,0040	0,0063	0,0266	0,0265	0,0727	0,1229	0,1878
3	Manufacture of plywood and veneer sheets	0,0007	0,0007	0,0006	0,0009	0,0004	0,0002	0,0003	0,0265	0,0170	0,0162	0,0219	0,0211
4	Manufacture of particle board and fibreboard	0,0002	0,0002	0,0001	0,0007	0,0002	0,0001	0,0001	0,0332	0,0614	0,1180	0,0457	0,0114
5	Manufacture of wooden houses	0,0002	0,0002	0,0002	0,0001	0,0001	0,0001	0,0001	0,0003	0,0003	0,0004	0,0018	0,0729
6	Manufacture of builders' joinery and carpentry	0,0012	0,0018	0,0006	0,0019	0,0010	0,0009	0,0008	0,0014	0,0030	0,0036	0,0645	0,1817
7	Manufacture of wooden containers	0,0030	0,0030	0,0029	0,0037	0,0020	0,0004	0,0011	0,0013	0,0026	0,0023	0,0012	0,0028
8	Manufacture of other wood products	0,0001	0,0001	0,0001	0,0005	0,0001	0,0000	0,0000	0,0029	0,0010	0,0044	0,0034	0,0005
9	Manufacture of chemical pulp	0,2064	0,2064	0,2064	0,0552	0,0728	0,0216	0,0389	0,0038	0,0046	0,0060	0,0061	0,0076
10	Manufacture of mechanical pulp and newsprint	0,0053	0,0053	0,0052	0,0020	0,0031	0,0870	0,0233	0,0007	0,0008	0,0009	0,0010	0,0008
11	Manufacture of uncoated magazine paper	0,0012	0,0012	0,0011	0,0012	0,0074	0,0021	0,0782	0,0009	0,0011	0,0011	0,0012	0,0009
12	Manufacture of coated magazine paper	0,0020	0,0020	0,0018	0,0022	0,0043	0,0019	0,0138	0,0015	0,0017	0,0018	0,0019	0,0014
13	Manufacture of fine paper	1,0123	0,0124	0,0122	0,0193	0,0428	0,0105	0,0582	0,0015	0,0018	0,0019	0,0019	0,0014
14	Manufacture of kraft paper and other paper	0,0145	1,0145	0,0144	0,0512	0,1836	0,0027	0,0121	0,0026	0,0037	0,0061	0,0045	0,0027
15	Manufacture of paperboard	0,0084	0,0084	1,0083	0,1969	0,0242	0,0019	0,0061	0,0035	0,0045	0,0063	0,0047	0,0019
16	Manufacture of corrugated board and paperboard containers	0,0130	0,0130	0,0130	1,0261	0,0174	0,0021	0,0055	0,0087	0,0101	0,0125	0,0123	0,0030
17	Manufacture of paper and paperboard products excluding 16	0,0006	0,0006	0,0006	0,0036	1,0142	0,0006	0,0013	0,0010	0,0017	0,0008	0,0007	0,0012
18	Publishing and printing of newspapers	0,0027	0,0028	0,0020	0,0028	0,0041	1,0068	0,0060	0,0025	0,0026	0,0032	0,0036	0,0025
19	Publishing of books, magazines and other printed matter	0,0037	0,0037	0,0032	0,0059	0,0086	0,0122	1,0110	0,0033	0,0036	0,0041	0,0045	0,0044
20	Manufacture of chairs and seats, use of wood	0,0002	0,0003	0,0001	0,0002	0,0002	0,0002	0,0002	1,0468	0,0514	0,0312	0,0045	0,0131
21	Manufacture of office and shop furniture, use of wood	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0122	1,0441	0,0269	0,0020	0,0032
22	Manufacture of kitchen furniture, use of wood	0,0001	0,0002	0,0001	0,0001	0,0001	0,0002	0,0001	0,0077	0,0281	1,0152	0,0057	0,0113
23	Manufacture of other furniture, use of wood	0,0002	0,0002	0,0001	0,0001	0,0002	0,0002	0,0002	0,0088	0,0271	0,0124	1,0042	0,0130
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	1,0000
25	Renovation of buildings, use of wood	0,0061	0,0096	0,0020	0,0030	0,0053	0,0048	0,0046	0,0028	0,0029	0,0037	0,0043	0,0024
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0012	0,0012	0,0012	0,0006	0,0007	0,0006	0,0007	0,0005	0,0006	0,0006	0,0006	0,0005
28	Agriculture, hunting & fishing	0,0044	0,0044	0,0045	0,0036	0,0045	0,0034	0,0035	0,0016	0,0016	0,0020	0,0030	0,0023
29	Mining and quarrying	0,0156	0,0157	0,0154	0,0055	0,0060	0,0032	0,0045	0,0026	0,0033	0,0037	0,0034	0,0022
30	Manufacture of food products, beverages and tobacco	0,0150	0,0149	0,0152	0,0113	0,0139	0,0102	0,0105	0,0046	0,0050	0,0060	0,0091	0,0069
31	Manufacture of textiles, wearing apparel and leather products	0,0008	0,0008	0,0007	0,0015	0,0044	0,0010	0,0010	0,0276	0,0021	0,0030	0,0013	0,0014
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0104	0,0102	0,0111	0,0071	0,0073	0,0052	0,0058	0,0057	0,0075	0,0083	0,0076	0,0054
34	Manufacture of chemicals and chemical products	0,0500	0,0500	0,0500	0,0345	0,0343	0,0140	0,0269	0,0285	0,0319	0,0330	0,0347	0,0129
35	Manufacture of rubber and plastic products	0,0049	0,0050	0,0048	0,0178	0,0209	0,0036	0,0046	0,0161	0,0152	0,0124	0,0068	0,0064
36	Manufacture of other non-metallic mineral products	0,0034	0,0039	0,0028	0,0021	0,0027	0,0030	0,0028	0,0028	0,0029	0,0034	0,0057	0,0076
37	Manufacture of basic metals and metal products	0,0179	0,0185	0,0175	0,0150	0,0146	0,0100	0,0131	0,0494	0,1160	0,0873	0,0473	0,0187
38	Manufacture of machinery and equipment	0,0266	0,0246	0,0310	0,0156	0,0188	0,0129	0,0133	0,0121	0,0162	0,0152	0,0151	0,0096
39	Manufacture of electrical machinery and apparatus	0,0063	0,0063	0,0058	0,0057	0,0060	0,0083	0,0075	0,0076	0,0148	0,0099	0,0100	0,0056
40	Manufacture of motor vehicles	0,0025	0,0023	0,0029	0,0023	0,0026	0,0030	0,0028	0,0031	0,0047	0,0042	0,0032	0,0020
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0004	0,0004	0,0004	0,0004	0,0005	0,0006	0,0005	0,0033	0,0073	0,0055	0,0023	0,0008
42	Electricity, gas and steam supply, excluding 27	0,1431	0,1434	0,1419	0,0573	0,0680	0,0342	0,0468	0,0353	0,0375	0,0459	0,0451	0,0267
43	Collection, purification and distribution of water	0,0013	0,0013	0,0010	0,0012	0,0017	0,0024	0,0021	0,0015	0,0015	0,0018	0,0021	0,0009
44	Construction, excluding wood construction	0,0206	0,0270	0,0137	0,0128	0,0178	0,0246	0,0221	0,0103	0,0107	0,0138	0,0154	0,0097
45	Wholesale and retail trade	0,0191	0,0198	0,0183	0,0282	0,0192	0,0253	0,0245	0,0133	0,0151	0,0191	0,0191	0,1714
46	Hotels and restaurants	0,0067	0,0062	0,0077	0,0071	0,0098	0,0101	0,0088	0,0047	0,0048	0,0061	0,0069	0,0038
47	Land transport; transport via pipelines	0,0643	0,0563	0,0929	0,0613	0,0632	0,0203	0,0245	0,0367	0,0417	0,0554	0,0534	0,0461
48	Water transport	0,0018	0,0016	0,0025	0,0014	0,0016	0,0012	0,0011	0,0008	0,0009	0,0012	0,0013	0,0021
49	Other transport; post and telecommunications	0,0302	0,0278	0,0378	0,0360	0,0362	0,1009	0,0829	0,0243	0,0258	0,0331	0,0346	0,0241
50	Financial intermediation and insurance	0,0049	0,0049	0,0043	0,0046	0,0064	0,0071	0,0064	0,0040	0,0041	0,0051	0,0058	0,0040
51	Real estate, renting and business activities; R&D	0,0787	0,0836	0,0474	0,0710	0,1083	0,1347	0,1231	0,0793	0,0797	0,0969	0,1130	0,0526
52	Community, social and other service activities	0,0202	0,0197	0,0195	0,0204	0,0290	0,1963	0,1566	0,0183	0,0185	0,0227	0,0262	0,0145
Total intermediate product requirement		1,9659	1,9709	1,9580	1,8407	1,9357	1,8081	1,8852	1,6162	1,7903	1,9072	1,8693	2,0965
Operating surplus/ mixed income, net, mill. FIM		0,307757	0,307218	0,30874	0,21269	0,222089	0,179674	0,196807	0,256938	0,169423	0,216211	0,248324	0,221777
Value added, gross at producer's price, mill. FIM		0,764633	0,765322	0,763589	0,725054	0,712371	0,856059	0,833387	0,773846	0,771273	0,77574	0,817134	0,837037
Number of domestic employees		1,655223	1,658588	1,679643	2,009496	1,924556	3,423229	3,049464	3,321603	3,771806	3,719675	3,924001	3,851813
Working hours, 1000 hours		2,871069	2,880448	2,923478	3,386737	3,296252	5,212412	4,966288	5,439723	6,215904	6,122878	6,545383	7,51794
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		178,3407	150,5865	226,1897	99,83729	103,447	36,95764	57,78868	45,07741	49,90199	67,5172	56,49845	97,66874
Methane (CH_4) emissions, tons		0,028324	0,028064	0,028935	0,020565	0,024313	0,018159	0,019178	0,025383	0,033698	0,046943	0,033539	0,032101
Nitrous oxide (N_2O) emissions, tons		0,018645	0,01856	0,018943	0,012306	0,013249	0,007274	0,010289	0,008918	0,01001	0,011192	0,011795	0,006014
CO_2 equivalents, tons (Global warming potential GWP)		184,7155	156,9294	232,6697	104,0839	108,0647	39,59392	61,38097	48,37517	53,71286	71,97268	60,85934	100,2072
Sulphur dioxide (SO_2) emissions, tons		0,342167	0,416941	0,514189	0,198771	0,195062	0,07239	0,109685	0,098678	0,122213	0,159468	0,127187	0,093107
Nitrogen oxides (NOx) emissions, tons		0,561569	0,628242	0,786162	0,348844	0,361321	0,151343	0,196569	0,187065	0,191154	0,271492	0,238764	1,073277
SO2 equivalents, tons (Acidification potential AP)		0,735265	0,856711	1,064502	0,442962	0,447988	0,17833	0,247283	0,229624	0,256021	0,349512	0,294322	0,844401

(continues)

Appendix 6 (continues)
Industry-by-industry multiplier matrix 1995 and total factor multipliers excluding imports (relative to million FIM output)

	Industry	Industry 25	26	27	28	29	30	31	32	33	34	35	36
1	Forestry	0,0831	0,1011	0,0051	0,0040	0,0036	0,0054	0,0024	0,0030	0,0012	0,0077	0,0053	0,0060
2	Sawmilling, planing and impregnation of wood	0,1545	0,1560	0,0064	0,0040	0,0035	0,0037	0,0018	0,0027	0,0012	0,0040	0,0037	0,0065
3	Manufacture of plywood and veneer sheets	0,0082	0,0078	0,0004	0,0002	0,0004	0,0003	0,0002	0,0005	0,0001	0,0003	0,0006	0,0005
4	Manufacture of particle board and fibreboard	0,0149	0,0121	0,0001	0,0002	0,0002	0,0002	0,0001	0,0004	0,0001	0,0001	0,0006	0,0002
5	Manufacture of wooden houses	0,0035	0,2179	0,0000	0,0000	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001
6	Manufacture of builders' joinery and carpentry	0,1597	0,0939	0,0003	0,0011	0,0018	0,0011	0,0006	0,0007	0,0004	0,0007	0,0007	0,0012
7	Manufacture of wooden containers	0,0010	0,0016	0,0003	0,0003	0,0011	0,0008	0,0010	0,0003	0,0001	0,0018	0,0013	0,0082
8	Manufacture of other wood products	0,0004	0,0004	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001
9	Manufacture of chemical pulp	0,0046	0,0058	0,0038	0,0058	0,0049	0,0085	0,0039	0,0039	0,0015	0,0234	0,0100	0,0060
10	Manufacture of mechanical pulp and newsprint	0,0008	0,0008	0,0013	0,0012	0,0016	0,0014	0,0009	0,0013	0,0006	0,0010	0,0010	0,0010
11	Manufacture of uncoated magazine paper	0,0009	0,0010	0,0018	0,0015	0,0018	0,0016	0,0011	0,0017	0,0007	0,0013	0,0013	0,0012
12	Manufacture of coated magazine paper	0,0014	0,0015	0,0032	0,0024	0,0031	0,0104	0,0018	0,0031	0,0012	0,0032	0,0073	0,0041
13	Manufacture of fine paper	0,0014	0,0015	0,0025	0,0024	0,0028	0,0081	0,0018	0,0026	0,0011	0,0025	0,0048	0,0035
14	Manufacture of kraft paper and other paper	0,0023	0,0025	0,0020	0,0047	0,0022	0,0082	0,0016	0,0021	0,0008	0,0022	0,0043	0,0032
15	Manufacture of paperboard	0,0019	0,0018	0,0022	0,0016	0,0026	0,0037	0,0024	0,0021	0,0009	0,0028	0,0054	0,0041
16	Manufacture of corrugated board and paperboard containers	0,0027	0,0024	0,0008	0,0027	0,0040	0,0108	0,0075	0,0013	0,0004	0,0046	0,0065	0,0066
17	Manufacture of paper and paperboard products excluding 16	0,0021	0,0016	0,0002	0,0009	0,0004	0,0018	0,0005	0,0007	0,0002	0,0005	0,0015	0,0013
18	Publishing and printing of newspapers	0,0020	0,0025	0,0019	0,0044	0,0061	0,0048	0,0040	0,0044	0,0018	0,0025	0,0029	0,0031
19	Publishing of books, magazines and other printed matter	0,0038	0,0045	0,0023	0,0105	0,0065	0,0078	0,0053	0,0068	0,0023	0,0034	0,0041	0,0040
20	Manufacture of chairs and seats, use of wood	0,0172	0,0123	0,0001	0,0005	0,0004	0,0004	0,0002	0,0017	0,0001	0,0002	0,0002	0,0003
21	Manufacture of office and shop furniture, use of wood	0,0065	0,0012	0,0001	0,0003	0,0002	0,0002	0,0001	0,0016	0,0001	0,0001	0,0001	0,0002
22	Manufacture of kitchen furniture, use of wood	0,0085	0,0171	0,0001	0,0004	0,0002	0,0003	0,0001	0,0003	0,0001	0,0001	0,0001	0,0002
23	Manufacture of other furniture, use of wood	0,0131	0,0083	0,0001	0,0005	0,0003	0,0003	0,0001	0,0019	0,0001	0,0001	0,0002	0,0002
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	1,0018	0,0025	0,0015	0,0059	0,0095	0,0061	0,0032	0,0030	0,0021	0,0038	0,0036	0,0054
26	Do-it-yourself construction and renovation, use of wood	0,0000	1,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0004	0,0005	1,0079	0,0016	0,0019	0,0016	0,0009	0,0050	0,0019	0,0026	0,0013	0,0015
28	Agriculture, hunting & fishing	0,0019	0,0022	0,0034	1,1215	0,0035	0,4126	0,0037	0,0018	0,0014	0,0056	0,0032	0,0025
29	Mining and quarrying	0,0017	0,0021	0,0390	0,0091	1,0203	0,0062	0,0021	0,0018	0,0022	0,0172	0,0037	0,0385
30	Manufacture of food products, beverages and tobacco	0,0059	0,0068	0,0081	0,1171	0,0106	1,3151	0,0071	0,0055	0,0042	0,0170	0,0097	0,0077
31	Manufacture of textiles, wearing apparel and leather products	0,0013	0,0014	0,0009	0,0062	0,0019	0,0033	1,1168	0,0010	0,0006	0,0014	0,0019	0,0055
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0045	0,0054	0,0141	0,0146	0,0208	0,0118	0,0058	0,0049	1,0795	0,0259	0,0077	0,0158
34	Manufacture of chemicals and chemical products	0,0110	0,0106	0,0103	0,0654	0,0272	0,0326	0,0316	0,0146	0,0056	1,1252	0,1006	0,0230
35	Manufacture of rubber and plastic products	0,0055	0,0061	0,0087	0,0158	0,0057	0,0193	0,0199	0,1145	0,0042	0,0117	1,0288	0,0122
36	Manufacture of other non-metallic mineral products	0,0052	0,0091	0,0025	0,0041	0,0062	0,0067	0,0042	0,0021	0,0011	0,0050	0,0047	1,0933
37	Manufacture of basic metals and metal products	0,0153	0,0181	0,0346	0,0157	0,0226	0,0223	0,0090	0,0109	0,0111	0,0191	0,0192	0,0451
38	Manufacture of machinery and equipment	0,0073	0,0103	0,0216	0,0261	0,0666	0,0231	0,0078	0,0086	0,0074	0,0157	0,0127	0,0352
39	Manufacture of electrical machinery and apparatus	0,0047	0,0059	0,0118	0,0138	0,0106	0,0103	0,0054	0,0291	0,0035	0,0050	0,0060	0,0064
40	Manufacture of motor vehicles	0,0017	0,0021	0,0018	0,0025	0,0051	0,0035	0,0018	0,0024	0,0011	0,0021	0,0030	0,0038
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0007	0,0008	0,0005	0,0013	0,0007	0,0010	0,0040	0,0092	0,0003	0,0005	0,0007	0,0019
42	Electricity, gas and steam supply, excluding 27	0,0215	0,0257	0,3672	0,0467	0,0543	0,0477	0,0267	0,0231	0,0535	0,0739	0,0402	0,0446
43	Collection, purification and distribution of water	0,0007	0,0010	0,0014	0,0009	0,0026	0,0023	0,0019	0,0019	0,0011	0,0017	0,0016	0,0020
44	Construction, excluding wood construction	0,0075	0,0100	0,0172	0,0222	0,0266	0,0214	0,0109	0,0107	0,0077	0,0133	0,0122	0,0180
45	Wholesale and retail trade	0,1506	0,1703	0,0112	0,1150	0,0327	0,0581	0,0153	0,0477	0,0352	0,0207	0,0175	0,0197
46	Hotels and restaurants	0,0030	0,0039	0,0048	0,0032	0,0073	0,0064	0,0056	0,0040	0,0034	0,0056	0,0086	0,0059
47	Land transport; transport via pipelines	0,0407	0,0474	0,0275	0,0238	0,1586	0,0807	0,0307	0,0252	0,0162	0,0482	0,0354	0,0848
48	Water transport	0,0018	0,0020	0,0008	0,0012	0,0016	0,0014	0,0007	0,0301	0,0066	0,0012	0,0011	0,0012
49	Other transport; post and telecommunications	0,0193	0,0247	0,0128	0,0354	0,0255	0,0411	0,0248	0,0166	0,0157	0,0254	0,0258	0,0346
50	Financial intermediation and insurance	0,0033	0,0041	0,0033	0,0093	0,0095	0,0086	0,0054	0,0629	0,0028	0,0042	0,0051	0,0051
51	Real estate, renting and business activities; R&D	0,0418	0,0551	0,0568	0,0510	0,1923	0,1180	0,1173	0,1165	0,0514	0,0736	0,0867	0,0897
52	Community, social and other service activities	0,0116	0,0150	0,0168	0,0354	0,0320	0,0363	0,0230	0,0160	0,0139	0,0216	0,0259	0,0239
	Total intermediate product requirement	1,8655	2,0988	1,7215	1,8144	1,8043	2,3776	1,5233	1,6125	1,3487	1,6098	1,5292	1,6888
	Operating surplus/ mixed income, net, mill. FIM	0,20554	0,214777	0,222759	0,667138	0,270979	0,389312	0,136231	0,20221	0,057182	0,231956	0,178326	0,171708
	Value added, gross at producer's price, mill. FIM	0,857995	0,841708	0,77548	0,818605	0,821666	0,854354	0,667319	0,738116	0,27179	0,628371	0,632255	0,749886
	Number of domestic employees	4,168469	3,962722	1,486152	9,685419	2,578971	5,482045	3,596861	2,404017	0,746034	1,628674	2,271747	2,764182
	Working hours, 1000 hours	8,389681	7,735976	2,460229	19,89026	4,600365	10,5572	5,861284	3,887838	1,284654	2,773528	3,777473	4,651175
	Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons	44,81094	44,15062	2785,798	144,818	131,6804	113,1661	44,58432	101,3144	295,8992	138,8298	55,23378	160,52
	Methane (CH_4) emissions, tons	0,019764	0,022293	0,363799	4,386642	0,029328	1,621227	0,019661	0,012062	0,044631	0,046523	0,020336	0,028388
	Nitrous oxide (N_2O) emissions, tons	0,005099	0,005511	0,790465	0,752369	0,014683	0,282909	0,01128	0,016182	0,01956	0,241866	0,026186	0,012604
	CO_2 equivalents, tons (Global warming potential GWP)	46,8066	46,32707	3038,481	470,1718	136,848	234,9137	48,49406	106,5842	302,9	214,7853	63,77859	165,0235
	Sulphur dioxide (SO_2) emissions, tons	0,066515	0,071412	5,099769	0,229737	0,328176	0,223419	0,091343	0,267139	0,623499	0,759553	0,213354	0,258467
	Nitrogen oxides (NOx) emissions, tons	0,361552	0,315756	3,86909	0,713945	0,519539	0,482663	0,234503	0,93174	0,671899	0,414345	0,181823	0,767855
	SO2 equivalents, tons (Acidification potential AP)	0,319601	0,292442	7,808131	0,729498	0,691853	0,561283	0,255495	0,919357	1,093828	1,049595	0,340631	0,795965

(continues)

Appendix 6 (continues)
Industry-by-industry multiplier matrix 1995 and total factor multipliers excluding imports (relative to million FIM output)

		Industry											
Industry		37	38	39	40	41	42	43	44	45	46	47	48
1	Forestry	0,0027	0,0024	0,0015	0,0024	0,0102	0,0058	0,0018	0,0039	0,0024	0,0034	0,0008	0,0022
2	Sawmilling, planing and impregnation of wood	0,0028	0,0027	0,0015	0,0024	0,0153	0,0073	0,0021	0,0057	0,0018	0,0031	0,0006	0,0014
3	Manufacture of plywood and veneer sheets	0,0003	0,0003	0,0002	0,0003	0,0039	0,0005	0,0002	0,0002	0,0002	0,0003	0,0001	0,0002
4	Manufacture of particle board and fibreboard	0,0002	0,0002	0,0001	0,0004	0,0068	0,0001	0,0001	0,0001	0,0002	0,0003	0,0001	0,0002
5	Manufacture of wooden houses	0,0000	0,0001	0,0000	0,0001	0,0001	0,0000	0,0000	0,0001	0,0000	0,0001	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0008	0,0011	0,0005	0,0012	0,0022	0,0004	0,0005	0,0006	0,0006	0,0018	0,0003	0,0005
7	Manufacture of wooden containers	0,0027	0,0027	0,0014	0,0010	0,0012	0,0003	0,0002	0,0011	0,0002	0,0003	0,0001	0,0002
8	Manufacture of other wood products	0,0001	0,0001	0,0000	0,0001	0,0011	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0033	0,0024	0,0018	0,0026	0,0040	0,0043	0,0020	0,0031	0,0036	0,0042	0,0012	0,0034
10	Manufacture of mechanical pulp and newsprint	0,0011	0,0010	0,0007	0,0011	0,0009	0,0015	0,0006	0,0007	0,0022	0,0016	0,0005	0,0013
11	Manufacture of uncoated magazine paper	0,0014	0,0012	0,0008	0,0012	0,0011	0,0021	0,0008	0,0009	0,0022	0,0018	0,0006	0,0016
12	Manufacture of coated magazine paper	0,0023	0,0020	0,0013	0,0021	0,0022	0,0036	0,0014	0,0017	0,0028	0,0045	0,0012	0,0044
13	Manufacture of fine paper	0,0021	0,0018	0,0013	0,0019	0,0021	0,0029	0,0012	0,0015	0,0031	0,0039	0,0011	0,0040
14	Manufacture of kraft paper and other paper	0,0017	0,0014	0,0011	0,0014	0,0023	0,0023	0,0009	0,0012	0,0021	0,0033	0,0008	0,0030
15	Manufacture of paperboard	0,0021	0,0016	0,0016	0,0016	0,0039	0,0025	0,0010	0,0014	0,0019	0,0022	0,0005	0,0010
16	Manufacture of corrugated board and paperboard containers	0,0036	0,0018	0,0042	0,0017	0,0120	0,0009	0,0005	0,0019	0,0009	0,0029	0,0003	0,0007
17	Manufacture of paper and paperboard products excluding 16	0,0006	0,0004	0,0005	0,0004	0,0008	0,0002	0,0002	0,0005	0,0017	0,0008	0,0003	0,0010
18	Publishing and printing of newspapers	0,0036	0,0040	0,0031	0,0045	0,0033	0,0022	0,0017	0,0023	0,0082	0,0076	0,0019	0,0067
19	Publishing of books, magazines and other printed matter	0,0048	0,0047	0,0037	0,0049	0,0045	0,0027	0,0023	0,0041	0,0178	0,0090	0,0036	0,0145
20	Manufacture of chairs and seats, use of wood	0,0003	0,0003	0,0002	0,0015	0,0084	0,0001	0,0001	0,0002	0,0005	0,0004	0,0002	0,0009
21	Manufacture of office and shop furniture, use of wood	0,0004	0,0002	0,0002	0,0007	0,0066	0,0001	0,0001	0,0002	0,0002	0,0002	0,0001	0,0004
22	Manufacture of kitchen furniture, use of wood	0,0002	0,0002	0,0001	0,0012	0,0027	0,0001	0,0001	0,0001	0,0004	0,0003	0,0001	0,0007
23	Manufacture of other furniture, use of wood	0,0005	0,0003	0,0002	0,0014	0,0028	0,0001	0,0001	0,0003	0,0004	0,0003	0,0002	0,0008
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0037	0,0046	0,0026	0,0053	0,0031	0,0017	0,0028	0,0019	0,0030	0,0104	0,0009	0,0024
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0016	0,0009	0,0004	0,0009	0,0008	0,0091	0,0022	0,0008	0,0009	0,0008	0,0004	0,0004
28	Agriculture, hunting & fishing	0,0024	0,0026	0,0019	0,0022	0,0023	0,0039	0,0017	0,0020	0,0062	0,1035	0,0010	0,0067
29	Mining and quarrying	0,0128	0,0026	0,0014	0,0030	0,0028	0,0446	0,0028	0,0291	0,0020	0,0030	0,0009	0,0017
30	Manufacture of food products, beverages and tobacco	0,0072	0,0080	0,0056	0,0066	0,0069	0,0093	0,0050	0,0061	0,0184	0,3082	0,0030	0,0200
31	Manufacture of textiles, wearing apparel and leather products	0,0014	0,0016	0,0014	0,0018	0,0062	0,0010	0,0009	0,0044	0,0021	0,0027	0,0008	0,0015
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0280	0,0064	0,0035	0,0070	0,0087	0,0161	0,0039	0,0115	0,0089	0,0057	0,0358	0,0250
34	Manufacture of chemicals and chemical products	0,0179	0,0072	0,0072	0,0122	0,0264	0,0118	0,0142	0,0275	0,0085	0,0119	0,0032	0,0047
35	Manufacture of rubber and plastic products	0,0042	0,0072	0,0080	0,0110	0,0177	0,0100	0,0284	0,0238	0,0167	0,0077	0,0054	0,0037
36	Manufacture of other non-metallic mineral products	0,0037	0,0033	0,0015	0,0104	0,0079	0,0029	0,0047	0,0881	0,0038	0,0043	0,0012	0,0040
37	Manufacture of basic metals and metal products	1,3903	0,1158	0,0322	0,1160	0,0923	0,0396	0,0086	0,1572	0,0091	0,0127	0,0092	0,0096
38	Manufacture of machinery and equipment	0,0210	1,1432	0,0092	0,0697	0,0119	0,0247	0,0162	0,0284	0,0051	0,0094	0,0325	0,0045
39	Manufacture of electrical machinery and apparatus	0,0094	0,0309	1,2208	0,0215	0,0157	0,0135	0,0039	0,0224	0,0140	0,0109	0,0064	0,0249
40	Manufacture of motor vehicles	0,0117	0,0156	0,0021	1,0614	0,0041	0,0021	0,0012	0,0057	0,0024	0,0025	0,0168	0,0070
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0051	0,0015	0,0007	0,0027	1,0456	0,0005	0,0004	0,0034	0,0013	0,0008	0,0005	0,0021
42	Electricity, gas and steam supply, excluding 27	0,0471	0,0249	0,0134	0,0274	0,0278	1,4200	0,0620	0,0256	0,0258	0,0255	0,0123	0,0130
43	Collection, purification and distribution of water	0,0016	0,0021	0,0016	0,0023	0,0017	0,0016	1,0013	0,0009	0,0024	0,0029	0,0005	0,0013
44	Construction, excluding wood construction	0,0126	0,0144	0,0086	0,0157	0,0109	0,0197	0,0091	1,0321	0,0142	0,0262	0,0056	0,0269
45	Wholesale and retail trade	0,0299	0,0242	0,0193	0,0245	0,0381	0,0128	0,0088	0,0950	1,0740	0,0729	0,0545	0,0800
46	Hotels and restaurants	0,0066	0,0083	0,0060	0,0058	0,0064	0,0055	0,0050	0,0037	0,0063	1,0035	0,0021	0,0040
47	Land transport; transport via pipelines	0,0490	0,0266	0,0155	0,0232	0,0347	0,0315	0,0104	0,0494	0,0485	0,0248	1,0271	0,0112
48	Water transport	0,0013	0,0011	0,0008	0,0009	0,0011	0,0009	0,0006	0,0017	0,0016	0,0009	0,0010	1,0012
49	Other transport; post and telecommunications	0,0269	0,0253	0,0178	0,0216	0,0255	0,0146	0,0142	0,0209	0,0557	0,0241	0,0259	0,1643
50	Financial intermediation and insurance	0,0057	0,0063	0,0048	0,0064	0,0053	0,0038	0,0029	0,0087	0,0115	0,0134	0,0120	0,0188
51	Real estate, renting and business activities; R&D	0,1115	0,1265	0,1000	0,1494	0,1031	0,0649	0,0523	0,0528	0,1211	0,2381	0,0362	0,1021
52	Community, social and other service activities	0,0241	0,0294	0,0239	0,0265	0,0233	0,0192	0,0170	0,0263	0,0378	0,0628	0,0115	0,0153
Total intermediate product requirement		1,8741	1,6736	1,5359	1,6716	1,6288	1,8252	1,2986	1,7609	1,5545	2,0421	1,3214	1,6053
Operating surplus/ mixed income, net, mill. FIM		0,207397	0,173454	0,205503	0,125214	0,219544	0,214783	0,29005	0,170137	0,229096	0,239332	0,3391	0,040151
Value added, gross at producer's price, mill. FIM		0,639106	0,657469	0,554775	0,648233	0,702753	0,743189	0,906811	0,747341	0,884313	0,845154	0,835406	0,71882
Number of domestic employees		2,059254	2,312319	1,700015	2,518059	3,132301	1,479133	1,763988	3,445057	3,936343	5,101957	3,12363	2,514477
Working hours, 1000 hours		3,488966	3,934361	2,861204	4,093449	5,13276	2,463371	2,789155	6,72979	7,122041	9,092479	6,160428	4,727608
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		89,54839	32,30888	17,02079	38,78123	46,45624	947,5979	54,07978	52,14413	36,27107	45,76398	136,9743	63,55607
Methane (CH_4) emissions, tons		0,125525	0,022877	0,011652	0,021606	0,024199	0,081827	0,012323	0,024948	0,028757	0,409644	0,023701	0,031993
Nitrous oxide (N_2O) emissions, tons		0,009779	0,005397	0,003809	0,006212	0,009632	0,045551	0,008224	0,012044	0,008168	0,072746	0,013016	0,023049
CO_2 equivalents, tons (Global warming potential GWP)		95,21593	34,46244	18,44625	41,1607	49,95022	963,4369	56,8879	56,40164	39,40698	76,91777	141,5069	71,37323
Sulphur dioxide (SO_2) emissions, tons		0,300253	0,070202	0,034212	0,092542	0,102573	1,742088	0,107265	0,107221	0,07414	0,084596	0,080154	0,216732
Nitrogen oxides (NOx) emissions, tons		0,246422	0,116188	0,06475	0,125265	0,177517	1,833671	0,132496	0,30813	0,151413	0,167058	1,576771	0,786355
SO2 equivalents, tons (Acidification potential AP)		0,472748	0,151534	0,079537	0,180227	0,226835	3,025658	0,200012	0,322912	0,180129	0,201537	1,183894	0,767181

(continues)

Appendix 6 (continues)
Industry-by-industry multiplier matrix 1995 and total factor multipliers excluding imports (relative to million FIM output)

		Industry			
Industry		49	50	51	52
1	Forestry	0,0017	0,0023	0,0041	0,0019
2	Sawmilling, planing and impregnation of wood	0,0017	0,0017	0,0046	0,0012
3	Manufacture of plywood and veneer sheets	0,0001	0,0002	0,0004	0,0001
4	Manufacture of particle board and fibreboard	0,0001	0,0002	0,0004	0,0001
5	Manufacture of wooden houses	0,0000	0,0000	0,0001	0,0000
6	Manufacture of builders' joinery and carpentry	0,0006	0,0010	0,0033	0,0004
7	Manufacture of wooden containers	0,0002	0,0001	0,0002	0,0001
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0020	0,0024	0,0034	0,0030
10	Manufacture of mechanical pulp and newsprint	0,0009	0,0011	0,0015	0,0018
11	Manufacture of uncoated magazine paper	0,0011	0,0012	0,0019	0,0026
12	Manufacture of coated magazine paper	0,0018	0,0025	0,0037	0,0022
13	Manufacture of fine paper	0,0018	0,0023	0,0036	0,0031
14	Manufacture of kraft paper and other paper	0,0012	0,0017	0,0023	0,0017
15	Manufacture of paperboard	0,0011	0,0015	0,0015	0,0013
16	Manufacture of corrugated board and paperboard containers	0,0007	0,0004	0,0006	0,0006
17	Manufacture of paper and paperboard products excluding 16	0,0004	0,0004	0,0007	0,0009
18	Publishing and printing of newspapers	0,0042	0,0052	0,0075	0,0105
19	Publishing of books, magazines and other printed matter	0,0080	0,0077	0,0147	0,0291
20	Manufacture of chairs and seats, use of wood	0,0003	0,0004	0,0008	0,0003
21	Manufacture of office and shop furniture, use of wood	0,0002	0,0002	0,0003	0,0002
22	Manufacture of kitchen furniture, use of wood	0,0002	0,0003	0,0005	0,0002
23	Manufacture of other furniture, use of wood	0,0003	0,0004	0,0007	0,0003
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0030	0,0056	0,0204	0,0023
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0005	0,0008	0,0017	0,0008
28	Agriculture, hunting & fishing	0,0043	0,0019	0,0023	0,0072
29	Mining and quarrying	0,0049	0,0016	0,0034	0,0014
30	Manufacture of food products, beverages and tobacco	0,0128	0,0057	0,0069	0,0203
31	Manufacture of textiles, wearing apparel and leather products	0,0018	0,0008	0,0013	0,0016
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0143	0,0038	0,0066	0,0045
34	Manufacture of chemicals and chemical products	0,0067	0,0031	0,0060	0,0069
35	Manufacture of rubber and plastic products	0,0081	0,0020	0,0040	0,0046
36	Manufacture of other non-metallic mineral products	0,0135	0,0023	0,0056	0,0019
37	Manufacture of basic metals and metal products	0,0272	0,0069	0,0139	0,0063
38	Manufacture of machinery and equipment	0,0077	0,0033	0,0064	0,0060
39	Manufacture of electrical machinery and apparatus	0,0196	0,0108	0,0152	0,0095
40	Manufacture of motor vehicles	0,0127	0,0015	0,0018	0,0039
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0011	0,0045	0,0014	0,0011
42	Electricity, gas and steam supply, excluding 27	0,0162	0,0223	0,0488	0,0239
43	Collection, purification and distribution of water	0,0011	0,0029	0,0122	0,0012
44	Construction, excluding wood construction	0,1488	0,0166	0,0510	0,0090
45	Wholesale and retail trade	0,0517	0,0288	0,0555	0,0545
46	Hotels and restaurants	0,0155	0,0057	0,0047	0,0075
47	Land transport; transport via pipelines	0,0216	0,0074	0,0099	0,0119
48	Water transport	0,0017	0,0007	0,0008	0,0010
49	Other transport; post and telecommunications	1,0872	0,0336	0,0365	0,0287
50	Financial intermediation and insurance	0,0050	1,0576	0,0150	0,0080
51	Real estate, renting and business activities; R&D	0,0784	0,1379	1,1373	0,0502
52	Community, social and other service activities	0,0152	0,0282	0,0538	1,0847
Total intermediate product requirement		1,6092	1,4294	1,5793	1,4208
Operating surplus/ mixed income, net, mill. FIM		0,196308	0,282315	0,302933	0,075895
Value added, gross at producer's price, mill. FIM		0,831298	0,884913	0,884722	0,874945
Number of domestic employees		2,751022	2,393339	2,049427	4,703796
Working hours, 1000 hours		4,721398	3,934562	3,61489	7,259552
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		55,08669	21,84815	48,91675	27,81379
Methane (CH_4) emissions, tons		0,034766	0,010054	0,014882	0,031679
Nitrous oxide (N_2O) emissions, tons		0,010706	0,003355	0,005893	0,007892
CO_2 equivalents, tons (Global warming potential GWP)		59,1356	23,09929	51,05599	30,92547
Sulphur dioxide (SO_2) emissions, tons		0,05136	0,039219	0,083067	0,051697
Nitrogen oxides (NOx) emissions, tons		0,454671	0,065739	0,124711	0,080697
SO2 equivalents, tons (Acidification potential AP)		0,36963	0,085236	0,170365	0,108185

Appendix 7
Industry-by-industry multiplier matrix 1995 and total factor multipliers including imports (relative to million FIM output)

		Industry											
Industry		1	2	3	4	5	6	7	8	9	10	11	12
1	Forestry	1,0226	0,5110	0,2604	0,0892	0,2100	0,1357	0,2001	0,1039	0,3204	0,1416	0,1416	0,1417
2	Sawmilling, planing and impregnation of wood	0,0004	1,0340	0,0140	0,1270	0,2261	0,1967	0,3818	0,1709	0,0611	0,0307	0,0307	0,0308
3	Manufacture of plywood and veneer sheets	0,0000	0,0007	1,0319	0,0054	0,0105	0,0289	0,0370	0,0414	0,0011	0,0008	0,0008	0,0008
4	Manufacture of particle board and fibreboard	0,0000	0,0001	0,0006	1,0531	0,0067	0,0179	0,0104	0,0096	0,0001	0,0003	0,0003	0,0003
5	Manufacture of wooden houses	0,0000	0,0005	0,0005	0,0005	1,0044	0,0016	0,0016	0,0009	0,0004	0,0002	0,0002	0,0002
6	Manufacture of builders' joinery and carpentry	0,0001	0,0008	0,0011	0,0018	0,1206	1,0402	0,0023	0,0015	0,0006	0,0014	0,0015	0,0015
7	Manufacture of wooden containers	0,0001	0,0005	0,0031	0,0073	0,0019	0,0018	1,0046	0,0038	0,0004	0,0036	0,0036	0,0036
8	Manufacture of other wood products	0,0000	0,0001	0,0001	0,0003	0,0004	0,0008	0,0109	1,0003	0,0001	0,0001	0,0001	0,0001
9	Manufacture of chemical pulp	0,0006	0,0027	0,0114	0,0339	0,0069	0,0091	0,0071	0,0069	1,0189	0,2199	0,2199	0,2199
10	Manufacture of mechanical pulp and newsprint	0,0002	0,0007	0,0010	0,0019	0,0012	0,0013	0,0009	0,0010	0,0006	1,0058	0,0058	0,0058
11	Manufacture of uncoated magazine paper	0,0002	0,0008	0,0011	0,0018	0,0014	0,0016	0,0011	0,0011	0,0008	0,0015	1,0015	0,0015
12	Manufacture of coated magazine paper	0,0002	0,0013	0,0019	0,0032	0,0024	0,0027	0,0018	0,0019	0,0014	0,0027	0,0027	1,0027
13	Manufacture of fine paper	0,0003	0,0013	0,0021	0,0042	0,0023	0,0027	0,0017	0,0019	0,0013	0,0141	0,0141	0,0141
14	Manufacture of kraft paper and other paper	0,0005	0,0013	0,0148	0,0546	0,0026	0,0041	0,0024	0,0034	0,0031	0,0167	0,0167	0,0168
15	Manufacture of paperboard	0,0005	0,0017	0,0119	0,0490	0,0034	0,0049	0,0025	0,0035	0,0013	0,0114	0,0115	0,0115
16	Manufacture of corrugated board and paperboard containers	0,0002	0,0031	0,0041	0,0117	0,0046	0,0062	0,0021	0,0021	0,0014	0,0148	0,0148	0,0148
17	Manufacture of paper and paperboard products excluding 16	0,0002	0,0004	0,0007	0,0013	0,0009	0,0027	0,0005	0,0005	0,0003	0,0009	0,0010	0,0010
18	Publishing and printing of newspapers	0,0007	0,0024	0,0029	0,0040	0,0041	0,0038	0,0028	0,0035	0,0017	0,0034	0,0034	0,0036
19	Publishing of books, magazines and other printed matter	0,0015	0,0034	0,0041	0,0058	0,0054	0,0052	0,0037	0,0044	0,0024	0,0048	0,0049	0,0051
20	Manufacture of chairs and seats, use of wood	0,0001	0,0002	0,0003	0,0004	0,0006	0,0004	0,0007	0,0003	0,0001	0,0003	0,0003	0,0003
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0001	0,0001	0,0002	0,0005	0,0003	0,0004	0,0002	0,0001	0,0002	0,0002	0,0002
22	Manufacture of kitchen furniture, use of wood	0,0001	0,0001	0,0002	0,0017	0,0010	0,0007	0,0010	0,0004	0,0001	0,0002	0,0002	0,0002
23	Manufacture of other furniture, use of wood	0,0001	0,0002	0,0002	0,0004	0,0009	0,0004	0,0010	0,0002	0,0001	0,0003	0,0003	0,0003
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0004	0,0034	0,0051	0,0070	0,0068	0,0062	0,0041	0,0044	0,0017	0,0066	0,0070	0,0075
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0001	0,0006	0,0010	0,0019	0,0009	0,0010	0,0007	0,0007	0,0009	0,0017	0,0017	0,0017
28	Agriculture, hunting & fishing	0,0013	0,0029	0,0049	0,0077	0,0044	0,0052	0,0031	0,0042	0,0030	0,0143	0,0143	0,0144
29	Mining and quarrying	0,0074	0,0170	0,0270	0,0590	0,0244	0,0278	0,0189	0,0169	0,0277	0,0794	0,0793	0,0793
30	Manufacture of food products, beverages and tobacco	0,0033	0,0075	0,0126	0,0190	0,0113	0,0134	0,0081	0,0097	0,0078	0,0289	0,0291	0,0294
31	Manufacture of textiles, wearing apparel and leather products	0,0031	0,0026	0,0026	0,0032	0,0044	0,0041	0,0028	0,0603	0,0021	0,0031	0,0031	0,0031
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0115	0,0155	0,0194	0,0474	0,0166	0,0176	0,0145	0,0131	0,0174	0,0265	0,0263	0,0261
34	Manufacture of chemicals and chemical products	0,0054	0,0133	0,1070	0,2226	0,0385	0,0820	0,0216	0,0589	0,1031	0,1255	0,1255	0,1255
35	Manufacture of rubber and plastic products	0,0017	0,0052	0,0107	0,0126	0,0134	0,0180	0,0063	0,0177	0,0047	0,0110	0,0111	0,0111
36	Manufacture of other non-metallic mineral products	0,0013	0,0030	0,0058	0,0067	0,0551	0,0480	0,0034	0,0036	0,0041	0,0058	0,0058	0,0059
37	Manufacture of basic metals and metal products	0,0050	0,0217	0,0264	0,0528	0,0824	0,1159	0,0729	0,0462	0,0188	0,0374	0,0379	0,0385
38	Manufacture of machinery and equipment	0,0023	0,0218	0,0275	0,0591	0,0445	0,0409	0,0257	0,0227	0,0216	0,0471	0,0488	0,0509
39	Manufacture of electrical machinery and apparatus	0,0065	0,0140	0,0163	0,0243	0,0243	0,0182	0,0149	0,0153	0,0110	0,0207	0,0211	0,0216
40	Manufacture of motor vehicles	0,0005	0,0040	0,0043	0,0071	0,0064	0,0065	0,0051	0,0043	0,0027	0,0058	0,0057	0,0056
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0003	0,0006	0,0007	0,0010	0,0015	0,0014	0,0012	0,0012	0,0004	0,0008	0,0008	0,0008
42	Electricity, gas and steam supply, excluding 27	0,0034	0,0506	0,0793	0,1573	0,0527	0,0561	0,0495	0,0421	0,0729	0,1616	0,1619	0,1622
43	Collection, purification and distribution of water	0,0002	0,0011	0,0015	0,0022	0,0023	0,0021	0,0014	0,0019	0,0008	0,0017	0,0018	0,0018
44	Construction, excluding wood construction	0,0092	0,0171	0,0203	0,0265	0,0247	0,0220	0,0169	0,0163	0,0102	0,0246	0,0253	0,0263
45	Wholesale and retail trade	0,0311	0,0304	0,0268	0,0329	0,0330	0,0288	0,0268	0,0231	0,0216	0,0292	0,0293	0,0295
46	Hotels and restaurants	0,0061	0,0110	0,0139	0,0173	0,0153	0,0138	0,0113	0,0106	0,0082	0,0134	0,0139	0,0145
47	Land transport; transport via pipelines	0,0057	0,0908	0,0802	0,1179	0,0878	0,0788	0,0847	0,0665	0,0434	0,1044	0,0987	0,0913
48	Water transport	0,0008	0,0038	0,0028	0,0039	0,0026	0,0024	0,0025	0,0019	0,0016	0,0032	0,0031	0,0029
49	Other transport; post and telecommunications	0,0088	0,0387	0,0424	0,0603	0,0508	0,0452	0,0416	0,0379	0,0260	0,0483	0,0469	0,0451
50	Financial intermediation and insurance	0,0022	0,0054	0,0062	0,0083	0,0080	0,0072	0,0057	0,0063	0,0038	0,0069	0,0070	0,0072
51	Real estate, renting and business activities; R&D	0,0105	0,0665	0,0894	0,1270	0,1342	0,1240	0,0846	0,1175	0,0531	0,1040	0,1079	0,1129
52	Community, social and other service activities	0,0027	0,0160	0,0228	0,0315	0,0298	0,0276	0,0195	0,0225	0,0126	0,0244	0,0254	0,0266
Total intermediate product requirement		1,1594	2,0321	2,0253	2,5754	2,3948	2,2839	2,2260	1,9896	1,8991	2,4116	2,4146	2,4185
Operating surplus/ mixed income, net, mill. FIM		0,651641	0,481245	0,329657	0,299415	0,309059	0,290094	0,361953	0,312089	0,515416	0,391164	0,390753	0,390216
Value added, gross at producer's price, mill. FIM		0,989564	0,97963	0,976617	0,965683	0,976575	0,978385	0,980059	0,98267	0,98144	0,970038	0,970354	0,970769
Number of employees		2,002133	2,68257	3,755248	3,389939	3,908288	3,858008	3,345614	4,217921	1,573541	2,306375	2,30633	2,30627
Working hours, 1000 hours		3,731369	4,75686	6,432293	5,810842	6,591943	6,59006	5,775182	7,122571	2,801817	4,048894	4,045062	4,040045
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		25,27462	69,22036	103,5755	284,2497	75,31026	85,14782	62,63993	55,18212	113,2468	168,5305	223,5601	220,4433
Methane (CH_4) emissions, tons		0,00773	0,026995	0,194238	0,218903	0,047562	0,053863	0,034568	0,036878	0,021234	0,072368	0,072604	0,072914
Nitrous oxide (N_2O) emissions, tons		0,002883	0,008091	0,029716	0,061946	0,014648	0,024258	0,009812	0,01783	0,026822	0,042505	0,042507	0,04251
CO_2 equivalents, tons (Global warming potential GWP)		26,3308	72,2955	116,8666	308,0499	80,84995	93,79881	66,40746	61,48387	122,0075	183,2268	238,262	235,1526
Sulphur dioxide (SO_2) emissions, tons		0,017755	0,105498	0,259419	0,725952	0,155011	0,224987	0,116751	0,123074	0,62215	0,429219	0,453785	0,451564
Nitrogen oxides (NOx) emissions, tons		0,246041	0,39925	0,942702	0,978905	0,397713	0,387301	0,324596	0,274328	0,986571	0,727861	0,752436	0,726226
SO2 equivalents, tons (Acidification potential AP)		0,189984	0,384973	0,91931	1,411186	0,433411	0,496098	0,343968	0,315104	1,31275	0,938722	0,98049	0,959922

(continues)

Appendix 7 (continues)
Industry-by-industry multiplier matrix 1995 and total factor multipliers including imports (relative to million FIM output)

		Industry											
Industry		13	14	15	16	17	18	19	20	21	22	23	24
1	Forestry	0,1417	0,1421	0,1412	0,0552	0,0656	0,0167	0,0293	0,0285	0,0266	0,0703	0,0840	0,1246
2	Sawmilling, planing and impregnation of wood	0,0309	0,0315	0,0301	0,0144	0,0145	0,0050	0,0078	0,0315	0,0329	0,0839	0,1372	0,2072
3	Manufacture of plywood and veneer sheets	0,0008	0,0009	0,0008	0,0013	0,0006	0,0003	0,0004	0,0318	0,0201	0,0181	0,0259	0,0272
4	Manufacture of particle board and fibreboard	0,0003	0,0003	0,0002	0,0009	0,0003	0,0002	0,0002	0,0413	0,0765	0,1450	0,0563	0,0156
5	Manufacture of wooden houses	0,0002	0,0003	0,0002	0,0001	0,0001	0,0001	0,0001	0,0004	0,0003	0,0005	0,0018	0,0737
6	Manufacture of builders' joinery and carpentry	0,0016	0,0021	0,0009	0,0023	0,0015	0,0011	0,0011	0,0019	0,0040	0,0044	0,0698	0,1900
7	Manufacture of wooden containers	0,0036	0,0036	0,0036	0,0047	0,0029	0,0006	0,0014	0,0019	0,0035	0,0031	0,0017	0,0032
8	Manufacture of other wood products	0,0001	0,0001	0,0001	0,0005	0,0001	0,0000	0,0000	0,0034	0,0012	0,0048	0,0043	0,0005
9	Manufacture of chemical pulp	0,2199	0,2199	0,2198	0,0845	0,1002	0,0251	0,0450	0,0079	0,0089	0,0112	0,0099	0,0103
10	Manufacture of mechanical pulp and newsprint	0,0059	0,0059	0,0057	0,0029	0,0040	0,0909	0,0246	0,0011	0,0012	0,0013	0,0013	0,0010
11	Manufacture of uncoated magazine paper	0,0016	0,0016	0,0015	0,0017	0,0081	0,0024	0,0790	0,0013	0,0015	0,0015	0,0015	0,0012
12	Manufacture of coated magazine paper	0,0028	0,0028	0,0026	0,0032	0,0053	0,0024	0,0145	0,0023	0,0026	0,0026	0,0025	0,0019
13	Manufacture of fine paper	1,0142	0,0142	0,0140	0,0253	0,0539	0,0121	0,0647	0,0024	0,0028	0,0029	0,0027	0,0021
14	Manufacture of kraft paper and other paper	0,0168	1,0168	0,0167	0,0746	0,2643	0,0035	0,0142	0,0050	0,0072	0,0118	0,0077	0,0052
15	Manufacture of paperboard	0,0115	0,0115	1,0114	0,2837	0,0359	0,0027	0,0082	0,0065	0,0084	0,0119	0,0080	0,0034
16	Manufacture of corrugated board and paperboard containers	0,0148	0,0148	0,0148	1,0337	0,0228	0,0028	0,0068	0,0111	0,0124	0,0148	0,0141	0,0039
17	Manufacture of paper and paperboard products excluding 16	0,0010	0,0010	0,0009	0,0043	1,0196	0,0010	0,0018	0,0014	0,0023	0,0012	0,0011	0,0054
18	Publishing and printing of newspapers	0,0038	0,0039	0,0030	0,0040	0,0053	1,0077	0,0069	0,0037	0,0037	0,0042	0,0045	0,0031
19	Publishing of books, magazines and other printed matter	0,0052	0,0053	0,0047	0,0081	0,0111	0,0151	1,0139	0,0050	0,0053	0,0058	0,0059	0,0056
20	Manufacture of chairs and seats, use of wood	0,0003	0,0004	0,0002	0,0003	0,0003	0,0003	0,0003	1,0574	0,0531	0,0324	0,0052	0,0147
21	Manufacture of office and shop furniture, use of wood	0,0002	0,0002	0,0001	0,0002	0,0002	0,0002	0,0002	0,0153	1,0546	0,0334	0,0025	0,0041
22	Manufacture of kitchen furniture, use of wood	0,0002	0,0002	0,0001	0,0002	0,0002	0,0002	0,0002	0,0082	0,0296	1,0160	0,0059	0,0116
23	Manufacture of other furniture, use of wood	0,0003	0,0003	0,0002	0,0002	0,0003	0,0003	0,0003	0,0108	0,0352	0,0160	1,0055	0,0153
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	1,0000
25	Renovation of buildings, use of wood	0,0077	0,0112	0,0035	0,0047	0,0076	0,0060	0,0059	0,0043	0,0045	0,0052	0,0056	0,0032
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0018	0,0018	0,0017	0,0012	0,0013	0,0008	0,0010	0,0010	0,0011	0,0011	0,0010	0,0007
28	Agriculture, hunting & fishing	0,0145	0,0143	0,0146	0,0110	0,0168	0,0068	0,0076	0,0056	0,0046	0,0051	0,0065	0,0043
29	Mining and quarrying	0,0791	0,0792	0,0793	0,0418	0,0421	0,0183	0,0262	0,0244	0,0332	0,0327	0,0258	0,0152
30	Manufacture of food products, beverages and tobacco	0,0294	0,0291	0,0299	0,0254	0,0303	0,0168	0,0182	0,0121	0,0110	0,0126	0,0169	0,0111
31	Manufacture of textiles, wearing apparel and leather products	0,0032	0,0032	0,0030	0,0052	0,0129	0,0031	0,0034	0,1168	0,0093	0,0127	0,0049	0,0047
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0258	0,0256	0,0267	0,0198	0,0199	0,0113	0,0138	0,0156	0,0200	0,0214	0,0177	0,0115
34	Manufacture of chemicals and chemical products	0,1255	0,1257	0,1254	0,1108	0,1114	0,0415	0,0788	0,0923	0,0903	0,0908	0,0875	0,0350
35	Manufacture of rubber and plastic products	0,0110	0,0112	0,0111	0,0368	0,0430	0,0073	0,0097	0,0361	0,0330	0,0272	0,0149	0,0124
36	Manufacture of other non-metallic mineral products	0,0059	0,0066	0,0053	0,0046	0,0055	0,0048	0,0048	0,0066	0,0073	0,0082	0,0135	0,0147
37	Manufacture of basic metals and metal products	0,0385	0,0392	0,0385	0,0505	0,0418	0,0219	0,0279	0,1030	0,2334	0,1758	0,0970	0,0419
38	Manufacture of machinery and equipment	0,0507	0,0479	0,0570	0,0373	0,0420	0,0239	0,0260	0,0296	0,0401	0,0366	0,0337	0,0195
39	Manufacture of electrical machinery and apparatus	0,0220	0,0220	0,0213	0,0215	0,0217	0,0247	0,0232	0,0251	0,0452	0,0316	0,0302	0,0174
40	Manufacture of motor vehicles	0,0055	0,0052	0,0063	0,0054	0,0058	0,0057	0,0054	0,0058	0,0084	0,0076	0,0059	0,0038
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0008	0,0008	0,0008	0,0009	0,0011	0,0010	0,0010	0,0053	0,0099	0,0075	0,0033	0,0012
42	Electricity, gas and steam supply, excluding 27	0,1626	0,1628	0,1611	0,0872	0,0973	0,0426	0,0586	0,0510	0,0550	0,0644	0,0592	0,0354
43	Collection, purification and distribution of water	0,0019	0,0020	0,0016	0,0019	0,0025	0,0029	0,0027	0,0022	0,0021	0,0025	0,0027	0,0013
44	Construction, excluding wood construction	0,0264	0,0327	0,0195	0,0195	0,0258	0,0292	0,0269	0,0155	0,0162	0,0194	0,0202	0,0129
45	Wholesale and retail trade	0,0295	0,0302	0,0286	0,0396	0,0313	0,0336	0,0332	0,0221	0,0250	0,0289	0,0274	0,1921
46	Hotels and restaurants	0,0145	0,0136	0,0163	0,0162	0,0207	0,0184	0,0166	0,0113	0,0118	0,0138	0,0144	0,0085
47	Land transport; transport via pipelines	0,0833	0,0751	0,1130	0,0849	0,0837	0,0270	0,0339	0,0517	0,0589	0,0729	0,0670	0,0563
48	Water transport	0,0027	0,0025	0,0035	0,0025	0,0027	0,0018	0,0018	0,0015	0,0017	0,0021	0,0021	0,0028
49	Other transport; post and telecommunications	0,0429	0,0400	0,0520	0,0525	0,0521	0,1143	0,0960	0,0365	0,0386	0,0468	0,0465	0,0328
50	Financial intermediation and insurance	0,0074	0,0074	0,0069	0,0074	0,0096	0,0094	0,0088	0,0065	0,0067	0,0077	0,0081	0,0058
51	Real estate, renting and business activities; R&D	0,1229	0,1287	0,0865	0,1165	0,1643	0,1812	0,1702	0,1254	0,1263	0,1431	0,1538	0,0772
52	Community, social and other service activities	0,0273	0,0268	0,0265	0,0291	0,0383	0,2202	0,1769	0,0262	0,0267	0,0305	0,0325	0,0189
Total intermediate product requirement		2,4204	2,4245	2,4129	2,4406	2,5489	2,0655	2,1997	2,1133	2,3140	2,4053	2,2575	2,3716
Operating surplus/ mixed income, net, mill. FIM		0,390098	0,389543	0,390619	0,306128	0,320998	0,216563	0,243906	0,319816	0,236976	0,28236	0,303508	0,263397
Value added, gross at producer's price, mill. FIM		0,971226	0,971637	0,969573	0,974002	0,972022	0,975479	0,975074	0,981479	0,979181	0,976324	0,978505	0,958623
Number of employees		2,297549	2,298048	2,327126	2,729622	2,715064	3,834873	3,51273	4,120858	4,471342	4,386581	4,449906	4,270442
Working hours, 1000 hours		4,0193	4,023461	4,081192	4,650703	4,694749	5,917237	5,765917	6,791809	7,414604	7,270356	7,457643	8,247922
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		210,9208	183,162	258,8387	147,6535	145,4938	50,19761	76,7932	71,85376	80,51081	99,75483	80,68272	112,3263
Methane (CH_4) emissions, tons		0,072847	0,072348	0,073982	0,056663	0,078829	0,034032	0,039014	0,050569	0,060515	0,074053	0,056192	0,045331
Nitrous oxide (N_2O) emissions, tons		0,04244	0,042342	0,042802	0,034826	0,039133	0,015919	0,024714	0,02609	0,025499	0,026737	0,026187	0,012682
CO_2 equivalents, tons (Global warming potential GWP)		225,6069	197,8073	273,661	159,6394	159,2805	55,84717	85,2737	81,00365	89,6863	109,5986	89,98076	117,2097
Sulphur dioxide (SO_2) emissions, tons		0,444676	0,519569	0,616658	0,336547	0,32261	0,111031	0,170981	0,184152	0,21978	0,25801	0,202306	0,133154
Nitrogen oxides (NOx) emissions, tons		0,679819	0,746021	0,906356	0,516915	0,516644	0,19734	0,261156	0,285106	0,293098	0,380676	0,32425	1,132061
SO2 equivalents, tons (Acidification potential AP)		0,920549	1,041784	1,251107	0,698388	0,684261	0,249169	0,35379	0,383726	0,424948	0,524483	0,429281	0,925597

(continues)

Appendix 7 (continues)
Industry-by-industry multiplier matrix 1995 and total factor multipliers including imports (relative to million FIM output)

		Industry											
Industry		25	26	27	28	29	30	31	32	33	34	35	36
1	Forestry	0,0951	0,1136	0,0069	0,0071	0,0056	0,0097	0,0063	0,0061	0,0056	0,0175	0,0124	0,0096
2	Sawmilling, planing and impregnation of wood	0,1708	0,1723	0,0076	0,0063	0,0046	0,0058	0,0037	0,0043	0,0045	0,0072	0,0066	0,0088
3	Manufacture of plywood and veneer sheets	0,0101	0,0095	0,0005	0,0004	0,0005	0,0004	0,0004	0,0007	0,0005	0,0005	0,0009	0,0007
4	Manufacture of particle board and fibreboard	0,0205	0,0164	0,0001	0,0003	0,0004	0,0003	0,0003	0,0007	0,0003	0,0003	0,0008	0,0004
5	Manufacture of wooden houses	0,0035	0,2201	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001
6	Manufacture of builders' joinery and carpentry	0,1669	0,0989	0,0007	0,0014	0,0021	0,0016	0,0011	0,0011	0,0018	0,0013	0,0012	0,0016
7	Manufacture of wooden containers	0,0013	0,0019	0,0006	0,0008	0,0016	0,0014	0,0017	0,0008	0,0012	0,0027	0,0024	0,0099
8	Manufacture of other wood products	0,0005	0,0004	0,0000	0,0000	0,0001	0,0001	0,0001	0,0001	0,0000	0,0001	0,0001	0,0002
9	Manufacture of chemical pulp	0,0075	0,0085	0,0054	0,0093	0,0069	0,0131	0,0106	0,0084	0,0073	0,0437	0,0229	0,0102
10	Manufacture of mechanical pulp and newsprint	0,0010	0,0011	0,0016	0,0015	0,0018	0,0019	0,0015	0,0018	0,0018	0,0016	0,0016	0,0014
11	Manufacture of uncoated magazine paper	0,0012	0,0013	0,0022	0,0019	0,0021	0,0022	0,0017	0,0022	0,0022	0,0020	0,0020	0,0017
12	Manufacture of coated magazine paper	0,0018	0,0020	0,0038	0,0033	0,0036	0,0118	0,0032	0,0046	0,0038	0,0048	0,0092	0,0056
13	Manufacture of fine paper	0,0025	0,0024	0,0032	0,0034	0,0034	0,0101	0,0032	0,0043	0,0035	0,0042	0,0078	0,0050
14	Manufacture of kraft paper and other paper	0,0069	0,0060	0,0027	0,0060	0,0029	0,0107	0,0031	0,0036	0,0030	0,0040	0,0074	0,0048
15	Manufacture of paperboard	0,0036	0,0033	0,0030	0,0028	0,0035	0,0060	0,0048	0,0039	0,0034	0,0051	0,0092	0,0063
16	Manufacture of corrugated board and paperboard containers	0,0037	0,0034	0,0016	0,0042	0,0049	0,0136	0,0109	0,0030	0,0038	0,0072	0,0095	0,0087
17	Manufacture of paper and paperboard products excluding 16	0,0148	0,0107	0,0004	0,0016	0,0008	0,0027	0,0010	0,0013	0,0009	0,0010	0,0022	0,0019
18	Publishing and printing of newspapers	0,0026	0,0032	0,0030	0,0055	0,0070	0,0063	0,0058	0,0058	0,0065	0,0042	0,0046	0,0043
19	Publishing of books, magazines and other printed matter	0,0049	0,0057	0,0038	0,0126	0,0079	0,0104	0,0082	0,0097	0,0079	0,0058	0,0068	0,0058
20	Manufacture of chairs and seats, use of wood	0,0192	0,0142	0,0002	0,0007	0,0005	0,0005	0,0004	0,0019	0,0004	0,0003	0,0004	0,0004
21	Manufacture of office and shop furniture, use of wood	0,0086	0,0015	0,0001	0,0004	0,0003	0,0003	0,0003	0,0021	0,0002	0,0002	0,0003	0,0003
22	Manufacture of kitchen furniture, use of wood	0,0088	0,0176	0,0001	0,0005	0,0003	0,0004	0,0002	0,0005	0,0003	0,0002	0,0002	0,0003
23	Manufacture of other furniture, use of wood	0,0155	0,0098	0,0002	0,0006	0,0004	0,0005	0,0003	0,0025	0,0004	0,0003	0,0003	0,0004
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	1,0025	0,0033	0,0031	0,0073	0,0108	0,0081	0,0053	0,0048	0,0094	0,0064	0,0061	0,0073
26	Do-it-yourself construction and renovation, use of wood	0,0000	1,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0006	0,0007	1,0090	0,0021	0,0023	0,0022	0,0017	0,0058	0,0037	0,0038	0,0025	0,0022
28	Agriculture, hunting & fishing	0,0038	0,0043	0,0058	1,1448	0,0064	0,4922	0,0215	0,0069	0,0068	0,0130	0,0194	0,0062
29	Mining and quarrying	0,0129	0,0149	0,1459	0,0390	1,0595	0,0362	0,0259	0,0190	0,6579	0,0874	0,0410	0,0977
30	Manufacture of food products, beverages and tobacco	0,0096	0,0109	0,0131	0,1413	0,0166	1,3883	0,0359	0,0126	0,0175	0,0331	0,0241	0,0154
31	Manufacture of textiles, wearing apparel and leather products	0,0048	0,0048	0,0034	0,0216	0,0058	0,0130	1,3210	0,0069	0,0057	0,0057	0,0221	0,0154
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	1,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0098	0,0113	0,0475	0,0319	0,0407	0,0275	0,0195	0,0154	1,1817	0,0616	0,0291	0,0336
34	Manufacture of chemicals and chemical products	0,0311	0,0302	0,0281	0,1236	0,0531	0,0985	0,1886	0,0973	0,0758	1,4557	0,4170	0,0782
35	Manufacture of rubber and plastic products	0,0111	0,0121	0,0143	0,0299	0,0120	0,0390	0,0403	0,2268	0,0150	0,0253	1,0820	0,0282
36	Manufacture of other non-metallic mineral products	0,0100	0,0174	0,0046	0,0070	0,0088	0,0114	0,0090	0,0050	0,0075	0,0103	0,0101	1,1486
37	Manufacture of basic metals and metal products	0,0348	0,0404	0,0577	0,0436	0,0526	0,0569	0,0336	0,0345	0,0527	0,0478	0,0599	0,1132
38	Manufacture of machinery and equipment	0,0157	0,0204	0,0497	0,0788	0,1147	0,0591	0,0228	0,0217	0,0845	0,0407	0,0379	0,0734
39	Manufacture of electrical machinery and apparatus	0,0146	0,0181	0,0382	0,0471	0,0322	0,0364	0,0208	0,0916	0,0308	0,0213	0,0279	0,0237
40	Manufacture of motor vehicles	0,0032	0,0038	0,0046	0,0064	0,0103	0,0075	0,0043	0,0052	0,0084	0,0055	0,0080	0,0082
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0011	0,0013	0,0009	0,0023	0,0013	0,0019	0,0099	0,0117	0,0013	0,0013	0,0015	0,0027
42	Electricity, gas and steam supply, excluding 27	0,0297	0,0340	0,3958	0,0607	0,0654	0,0657	0,0492	0,0391	0,1034	0,1089	0,0731	0,0620
43	Collection, purification and distribution of water	0,0010	0,0013	0,0020	0,0015	0,0032	0,0031	0,0029	0,0028	0,0034	0,0028	0,0027	0,0028
44	Construction, excluding wood construction	0,0104	0,0132	0,0225	0,0274	0,0310	0,0285	0,0183	0,0175	0,0293	0,0222	0,0210	0,0244
45	Wholesale and retail trade	0,1689	0,1908	0,0198	0,1344	0,0414	0,0794	0,0285	0,0615	0,0674	0,0360	0,0329	0,0304
46	Hotels and restaurants	0,0069	0,0086	0,0108	0,0085	0,0147	0,0145	0,0142	0,0109	0,0162	0,0147	0,0201	0,0136
47	Land transport; transport via pipelines	0,0499	0,0571	0,0484	0,0373	0,1731	0,0987	0,0512	0,0385	0,1274	0,0786	0,0612	0,1070
48	Water transport	0,0023	0,0027	0,0016	0,0019	0,0024	0,0023	0,0016	0,0536	0,0095	0,0024	0,0024	0,0020
49	Other transport; post and telecommunications	0,0269	0,0332	0,0213	0,0486	0,0356	0,0570	0,0416	0,0350	0,0457	0,0437	0,0446	0,0483
50	Financial intermediation and insurance	0,0048	0,0059	0,0057	0,0127	0,0122	0,0124	0,0089	0,0778	0,0115	0,0079	0,0090	0,0081
51	Real estate, renting and business activities; R&D	0,0635	0,0797	0,1009	0,0909	0,2342	0,1730	0,1852	0,1795	0,2156	0,1436	0,1569	0,1444
52	Community, social and other service activities	0,0156	0,0193	0,0238	0,0434	0,0383	0,0469	0,0351	0,0260	0,0407	0,0343	0,0391	0,0328
Total intermediate product requirement		2,1172	2,3634	2,1265	2,2649	2,1395	2,9696	2,2656	2,1770	2,8883	2,4280	2,3605	2,2179
Operating surplus/ mixed income, net, mill. FIM		0,242451	0,253848	0,276425	0,73241	0,314802	0,494231	0,230696	0,275629	0,273079	0,351038	0,298037	0,239752
Value added, gross at producer's price, mill. FIM		0,967165	0,957426	0,942695	1,003293	0,960155	1,09823	0,978715	0,976987	0,936267	0,961526	0,970349	0,969828
Number of employees		4,541754	4,358238	2,013747	10,43412	3,038235	6,759709	4,913267	3,189983	2,839123	2,593751	3,362075	3,495543
Working hours, 1000 hours		9,039848	8,425908	3,386208	21,23896	5,401167	12,97822	8,109129	5,242083	4,995538	4,451656	5,679494	5,914024
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		58,48956	58,40892	2826,775	171,2957	152,7859	149,4756	85,38922	128,8825	419,3277	205,3446	115,0618	196,5251
Methane (CH_4) emissions, tons		0,031393	0,034626	0,379315	4,482538	0,045413	1,938309	0,096409	0,037462	0,08284	0,087227	0,095294	0,051916
Nitrous oxide (N_2O) emissions, tons		0,011152	0,011598	0,798195	0,781	0,023151	0,350416	0,057371	0,03859	0,044227	0,318189	0,104951	0,028207
CO_2 equivalents, tons (Global warming potential GWP)		62,60604	62,73138	3082,181	507,5388	160,9165	298,8092	105,1989	141,632	434,7777	305,815	149,5977	206,3595
Sulphur dioxide (SO_2) emissions, tons		0,103471	0,109196	5,194408	0,309255	0,384361	0,322402	0,239957	0,366836	0,937103	1,042104	0,474409	0,3582
Nitrogen oxides (NOx) emissions, tons		0,413498	0,370534	3,987225	0,804866	0,590047	0,619433	0,384018	1,033722	1,109748	0,627634	0,373381	0,898524
SO2 equivalents, tons (Acidification potential AP)		0,392919	0,36857	7,985465	0,872661	0,797394	0,756004	0,508769	1,090441	1,713927	1,481448	0,735775	0,987167

(continues)

Appendix 7 (continues)
Industry-by-industry multiplier matrix 1995 and total factor multipliers including imports (relative to million FIM output)

		Industry											
Industry		37	38	39	40	41	42	43	44	45	46	47	48
1	Forestry	0,0056	0,0048	0,0040	0,0050	0,0148	0,0079	0,0029	0,0067	0,0039	0,0054	0,0016	0,0042
2	Sawmilling, planing and impregnation of wood	0,0048	0,0045	0,0033	0,0044	0,0190	0,0087	0,0027	0,0082	0,0025	0,0041	0,0011	0,0025
3	Manufacture of plywood and veneer sheets	0,0005	0,0005	0,0004	0,0006	0,0049	0,0006	0,0002	0,0004	0,0003	0,0004	0,0001	0,0003
4	Manufacture of particle board and fibreboard	0,0004	0,0004	0,0003	0,0008	0,0088	0,0002	0,0001	0,0002	0,0003	0,0004	0,0001	0,0004
5	Manufacture of wooden houses	0,0001	0,0001	0,0001	0,0001	0,0002	0,0001	0,0000	0,0001	0,0000	0,0001	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0014	0,0017	0,0010	0,0018	0,0029	0,0008	0,0007	0,0010	0,0008	0,0021	0,0004	0,0008
7	Manufacture of wooden containers	0,0040	0,0040	0,0026	0,0021	0,0022	0,0007	0,0004	0,0019	0,0004	0,0005	0,0003	0,0005
8	Manufacture of other wood products	0,0001	0,0001	0,0001	0,0001	0,0014	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0065	0,0049	0,0048	0,0056	0,0083	0,0062	0,0034	0,0059	0,0052	0,0062	0,0021	0,0054
10	Manufacture of mechanical pulp and newsprint	0,0017	0,0016	0,0013	0,0017	0,0014	0,0018	0,0007	0,0011	0,0025	0,0019	0,0006	0,0018
11	Manufacture of uncoated magazine paper	0,0021	0,0019	0,0015	0,0019	0,0016	0,0025	0,0009	0,0013	0,0024	0,0020	0,0007	0,0022
12	Manufacture of coated magazine paper	0,0036	0,0032	0,0026	0,0033	0,0034	0,0044	0,0018	0,0026	0,0032	0,0053	0,0016	0,0055
13	Manufacture of fine paper	0,0034	0,0030	0,0026	0,0031	0,0034	0,0037	0,0016	0,0025	0,0038	0,0049	0,0015	0,0054
14	Manufacture of kraft paper and other paper	0,0030	0,0026	0,0025	0,0026	0,0041	0,0031	0,0013	0,0022	0,0031	0,0044	0,0012	0,0044
15	Manufacture of paperboard	0,0038	0,0030	0,0037	0,0030	0,0067	0,0034	0,0014	0,0026	0,0025	0,0031	0,0009	0,0019
16	Manufacture of corrugated board and paperboard containers	0,0057	0,0035	0,0077	0,0034	0,0150	0,0019	0,0009	0,0032	0,0015	0,0041	0,0008	0,0016
17	Manufacture of paper and paperboard products excluding 16	0,0011	0,0009	0,0011	0,0009	0,0013	0,0005	0,0004	0,0010	0,0032	0,0014	0,0005	0,0022
18	Publishing and printing of newspapers	0,0057	0,0059	0,0056	0,0065	0,0049	0,0034	0,0022	0,0036	0,0088	0,0084	0,0024	0,0086
19	Publishing of books, magazines and other printed matter	0,0077	0,0075	0,0070	0,0078	0,0068	0,0043	0,0030	0,0060	0,0193	0,0106	0,0044	0,0183
20	Manufacture of chairs and seats, use of wood	0,0004	0,0005	0,0004	0,0021	0,0093	0,0002	0,0002	0,0003	0,0006	0,0005	0,0003	0,0011
21	Manufacture of office and shop furniture, use of wood	0,0006	0,0004	0,0004	0,0013	0,0085	0,0002	0,0002	0,0003	0,0003	0,0003	0,0002	0,0006
22	Manufacture of kitchen furniture, use of wood	0,0003	0,0004	0,0002	0,0018	0,0030	0,0002	0,0001	0,0002	0,0004	0,0004	0,0002	0,0009
23	Manufacture of other furniture, use of wood	0,0007	0,0006	0,0004	0,0023	0,0038	0,0002	0,0002	0,0004	0,0006	0,0005	0,0003	0,0011
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0065	0,0072	0,0053	0,0080	0,0052	0,0036	0,0035	0,0037	0,0038	0,0116	0,0016	0,0039
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0026	0,0015	0,0010	0,0016	0,0015	0,0103	0,0025	0,0013	0,0011	0,0011	0,0006	0,0008
28	Agriculture, hunting & fishing	0,0060	0,0064	0,0057	0,0058	0,0066	0,0067	0,0036	0,0050	0,0095	0,1339	0,0022	0,0117
29	Mining and quarrying	0,1292	0,0319	0,0197	0,0356	0,0479	0,1669	0,0149	0,0641	0,0155	0,0165	0,0286	0,0420
30	Manufacture of food products, beverages and tobacco	0,0155	0,0164	0,0144	0,0144	0,0162	0,0150	0,0085	0,0119	0,0243	0,3541	0,0054	0,0305
31	Manufacture of textiles, wearing apparel and leather products	0,0058	0,0063	0,0058	0,0073	0,0256	0,0039	0,0034	0,0136	0,0060	0,0079	0,0027	0,0057
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0543	0,0181	0,0127	0,0209	0,0286	0,0544	0,0090	0,0252	0,0154	0,0125	0,0450	0,0641
34	Manufacture of chemicals and chemical products	0,0579	0,0357	0,0446	0,0514	0,0954	0,0322	0,0377	0,0737	0,0299	0,0366	0,0143	0,0211
35	Manufacture of rubber and plastic products	0,0121	0,0211	0,0210	0,0288	0,0387	0,0164	0,0389	0,0417	0,0286	0,0159	0,0137	0,0093
36	Manufacture of other non-metallic mineral products	0,0102	0,0079	0,0064	0,0193	0,0192	0,0052	0,0069	0,1111	0,0057	0,0067	0,0024	0,0082
37	Manufacture of basic metals and metal products	1,6957	0,2791	0,1292	0,2957	0,2796	0,0660	0,0233	0,2524	0,0252	0,0286	0,0250	0,0303
38	Manufacture of machinery and equipment	0,0743	1,3515	0,0305	0,2059	0,0357	0,0568	0,0545	0,0742	0,0119	0,0231	0,0536	0,0167
39	Manufacture of electrical machinery and apparatus	0,0377	0,1122	1,8696	0,0879	0,0557	0,0437	0,0142	0,0684	0,0411	0,0306	0,0212	0,0851
40	Manufacture of motor vehicles	0,0192	0,0466	0,0058	1,1564	0,0085	0,0053	0,0034	0,0103	0,0041	0,0045	0,0259	0,0122
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0070	0,0029	0,0019	0,0047	1,0745	0,0010	0,0007	0,0045	0,0020	0,0014	0,0009	0,0036
42	Electricity, gas and steam supply, excluding 27	0,0724	0,0427	0,0301	0,0471	0,0481	1,4528	0,0700	0,0403	0,0322	0,0340	0,0175	0,0240
43	Collection, purification and distribution of water	0,0028	0,0033	0,0030	0,0036	0,0027	0,0023	1,0016	0,0017	0,0028	0,0035	0,0008	0,0020
44	Construction, excluding wood construction	0,0218	0,0229	0,0173	0,0244	0,0180	0,0257	0,0116	1,0380	0,0173	0,0301	0,0080	0,0432
45	Wholesale and retail trade	0,0483	0,0402	0,0379	0,0406	0,0541	0,0226	0,0131	0,1132	1,0843	0,0873	0,0603	0,1048
46	Hotels and restaurants	0,0168	0,0199	0,0176	0,0156	0,0154	0,0124	0,0099	0,0099	0,0124	1,0074	0,0051	0,0136
47	Land transport; transport via pipelines	0,0840	0,0457	0,0330	0,0437	0,0572	0,0553	0,0159	0,0661	0,0552	0,0336	1,0342	0,0244
48	Water transport	0,0025	0,0022	0,0019	0,0019	0,0021	0,0018	0,0010	0,0025	0,0022	0,0014	0,0014	1,1106
49	Other transport; post and telecommunications	0,0453	0,0430	0,0368	0,0391	0,0412	0,0244	0,0198	0,0330	0,0648	0,0326	0,0313	0,2603
50	Financial intermediation and insurance	0,0100	0,0105	0,0096	0,0107	0,0087	0,0065	0,0042	0,0123	0,0145	0,0163	0,0146	0,0257
51	Real estate, renting and business activities; R&D	0,1921	0,2119	0,1992	0,2370	0,1673	0,1154	0,0758	0,1139	0,1498	0,2758	0,0562	0,1539
52	Community, social and other service activities	0,0378	0,0436	0,0423	0,0408	0,0343	0,0272	0,0206	0,0358	0,0423	0,0714	0,0149	0,0240
Total intermediate product requirement		2,7310	2,4870	2,6557	2,5104	2,3236	2,2885	1,4939	2,2793	1,7670	2,3454	1,5088	2,2014
Operating surplus/ mixed income, net, mill. FIM		0,314794	0,269726	0,3551	0,221519	0,308186	0,276166	0,315284	0,237101	0,25878	0,289221	0,362901	0,098282
Value added, gross at producer's price, mill. FIM		0,972367	0,977204	0,974567	0,977072	0,976818	0,934453	0,987577	0,959346	0,974922	0,972453	0,912818	0,97679
Number of employees		3,138709	3,390273	3,01108	3,63532	4,063469	2,082607	2,034483	4,143878	4,248642	5,704107	3,383327	3,394725
Working hours, 1000 hours		5,356944	5,778107	5,088632	5,991069	6,727098	3,522526	3,256906	7,933615	7,667634	10,21146	6,609764	6,297233
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		139,3292	61,79745	43,08347	72,25566	84,96652	994,4688	65,58481	79,83591	47,37667	62,14134	147,5055	95,45862
Methane (CH_4) emissions, tons		0,168749	0,053613	0,036972	0,05322	0,060477	0,099575	0,022389	0,047103	0,044379	0,531016	0,030814	0,05717
Nitrous oxide (N_2O) emissions, tons		0,023095	0,01545	0,015497	0,018495	0,028708	0,054393	0,015055	0,024985	0,015396	0,098566	0,016683	0,033225
CO_2 equivalents, tons (Global warming potential GWP)		150,0323	67,71278	48,66388	79,10658	95,13594	1013,422	70,72194	88,57044	53,08133	103,848	153,3243	106,9588
Sulphur dioxide (SO_2) emissions, tons		0,445997	0,153706	0,107252	0,190649	0,225419	1,850339	0,141539	0,189659	0,10683	0,12736	0,108571	0,296229
Nitrogen oxides (NOx) emissions, tons		0,40706	0,212788	0,153839	0,23351	0,303441	1,968796	0,167977	0,402587	0,189707	0,22794	1,61209	0,967418
SO2 equivalents, tons (Acidification potential AP)		0,730939	0,302657	0,214939	0,354106	0,437827	3,228496	0,259123	0,47147	0,239625	0,286918	1,237034	0,973421

(continues)

Appendix 7 (continues)
Industry-by-industry multiplier matrix 1995 and total factor multipliers including imports (relative to million FIM output)

		Industry			
Industry		49	50	51	52
1	Forestry	0,0030	0,0031	0,0056	0,0031
2	Sawmilling, planing and impregnation of wood	0,0026	0,0022	0,0055	0,0017
3	Manufacture of plywood and veneer sheets	0,0002	0,0002	0,0005	0,0002
4	Manufacture of particle board and fibreboard	0,0002	0,0003	0,0006	0,0002
5	Manufacture of wooden houses	0,0000	0,0000	0,0001	0,0000
6	Manufacture of builders' joinery and carpentry	0,0008	0,0011	0,0037	0,0006
7	Manufacture of wooden containers	0,0005	0,0002	0,0004	0,0003
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0033	0,0030	0,0046	0,0042
10	Manufacture of mechanical pulp and newsprint	0,0011	0,0012	0,0018	0,0021
11	Manufacture of uncoated magazine paper	0,0014	0,0013	0,0022	0,0029
12	Manufacture of coated magazine paper	0,0023	0,0027	0,0041	0,0026
13	Manufacture of fine paper	0,0024	0,0027	0,0042	0,0038
14	Manufacture of kraft paper and other paper	0,0019	0,0021	0,0029	0,0023
15	Manufacture of paperboard	0,0017	0,0018	0,0020	0,0018
16	Manufacture of corrugated board and paperboard containers	0,0013	0,0007	0,0011	0,0011
17	Manufacture of paper and paperboard products excluding 16	0,0009	0,0008	0,0015	0,0015
18	Publishing and printing of newspapers	0,0051	0,0055	0,0081	0,0110
19	Publishing of books, magazines and other printed matter	0,0097	0,0084	0,0161	0,0309
20	Manufacture of chairs and seats, use of wood	0,0004	0,0005	0,0009	0,0004
21	Manufacture of office and shop furniture, use of wood	0,0003	0,0003	0,0005	0,0002
22	Manufacture of kitchen furniture, use of wood	0,0003	0,0004	0,0006	0,0003
23	Manufacture of other furniture, use of wood	0,0004	0,0005	0,0008	0,0004
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0041	0,0061	0,0214	0,0030
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0008	0,0009	0,0019	0,0010
28	Agriculture, hunting & fishing	0,0093	0,0033	0,0040	0,0105
29	Mining and quarrying	0,0253	0,0088	0,0171	0,0106
30	Manufacture of food products, beverages and tobacco	0,0243	0,0086	0,0101	0,0262
31	Manufacture of textiles, wearing apparel and leather products	0,0061	0,0019	0,0037	0,0047
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0262	0,0074	0,0134	0,0092
34	Manufacture of chemicals and chemical products	0,0224	0,0091	0,0180	0,0249
35	Manufacture of rubber and plastic products	0,0146	0,0038	0,0074	0,0089
36	Manufacture of other non-metallic mineral products	0,0184	0,0035	0,0079	0,0036
37	Manufacture of basic metals and metal products	0,0530	0,0143	0,0269	0,0165
38	Manufacture of machinery and equipment	0,0210	0,0071	0,0142	0,0148
39	Manufacture of electrical machinery and apparatus	0,0509	0,0302	0,0456	0,0309
40	Manufacture of motor vehicles	0,0178	0,0023	0,0032	0,0101
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0017	0,0052	0,0022	0,0020
42	Electricity, gas and steam supply, excluding 27	0,0235	0,0255	0,0551	0,0291
43	Collection, purification and distribution of water	0,0015	0,0031	0,0127	0,0016
44	Construction, excluding wood construction	0,1579	0,0187	0,0543	0,0114
45	Wholesale and retail trade	0,0636	0,0333	0,0639	0,0627
46	Hotels and restaurants	0,0391	0,0105	0,0084	0,0132
47	Land transport; transport via pipelines	0,0300	0,0102	0,0149	0,0165
48	Water transport	0,0025	0,0011	0,0012	0,0015
49	Other transport; post and telecommunications	1,1363	0,0405	0,0438	0,0354
50	Financial intermediation and insurance	0,0071	1,0613	0,0186	0,0105
51	Real estate, renting and business activities; R&D	0,1131	0,1576	1,1814	0,0740
52	Community, social and other service activities	0,0213	0,0308	0,0585	1,0915
Total intermediate product requirement		1,9320	1,5443	1,7774	1,5957
Operating surplus/ mixed income, net, mill. FIM		0,23772	0,298679	0,331878	0,099687
Value added, gross at producer's price, mill. FIM		0,970292	0,935227	0,972556	0,950096
Number of employees		3,264975	2,561252	2,323055	4,973516
Working hours, 1000 hours		5,617935	4,226899	4,090795	7,728073
Carbon dioxide (CO_2) emissions (fossile fuels & processes), tons		70,4889	27,25422	58,9517	36,50912
Methane (CH_4) emissions, tons		0,05872	0,01684	0,023463	0,046206
Nitrous oxide (N_2O) emissions, tons		0,018261	0,005855	0,010036	0,014238
CO_2 equivalents, tons (Global warming potential GWP)		77,38288	29,42276	62,55558	41,89327
Sulphur dioxide (SO_2) emissions, tons		0,088571	0,052822	0,108876	0,077296
Nitrogen oxides (NOx) emissions, tons		0,516806	0,08436	0,156965	0,109985
SO2 equivalents, tons (Acidification potential AP)		0,450335	0,111874	0,218752	0,154285

Appendix 8
Contribution of industries to domestic operating surplus multipliers (mill. FIM operating surplus/ mill. FIM output)

		Industry											
Industry		1	2	3	4	5	6	7	8	9	10	11	12
1	Forestry	0,6344	0,3116	0,1434	0,0451	0,1203	0,0749	0,1102	0,0561	0,1536	0,0658	0,0658	0,0658
2	Sawmilling, planing and impregnation of wood	0,0000	0,0878	0,0010	0,0099	0,0175	0,0152	0,0297	0,0132	0,0049	0,0023	0,0023	0,0023
3	Manufacture of plywood and veneer sheets	0,0000	0,0000	0,0613	0,0003	0,0005	0,0013	0,0017	0,0019	0,0001	0,0000	0,0000	0,0000
4	Manufacture of particle board and fibreboard	0,0000	0,0000	0,0000	0,0494	0,0002	0,0006	0,0004	0,0003	0,0000	0,0000	0,0000	0,0000
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000	0,0341	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0000	0,0000	0,0001	0,0001	0,0072	0,0658	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001
7	Manufacture of wooden containers	0,0000	0,0000	0,0003	0,0007	0,0001	0,0001	0,1138	0,0004	0,0000	0,0003	0,0003	0,0003
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0013	0,1345	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0001	0,0005	0,0015	0,0045	0,0012	0,0014	0,0014	0,0011	0,2406	0,0489	0,0489	0,0489
10	Manufacture of mechanical pulp and newsprint	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,1033	0,0005	0,0005
11	Manufacture of uncoated magazine paper	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,1029	0,0001
12	Manufacture of coated magazine paper	0,0000	0,0001	0,0001	0,0002	0,0002	0,0002	0,0001	0,0001	0,0001	0,0002	0,0002	0,1030
13	Manufacture of fine paper	0,0000	0,0001	0,0001	0,0003	0,0002	0,0002	0,0001	0,0001	0,0001	0,0013	0,0013	0,0013
14	Manufacture of kraft paper and other paper	0,0000	0,0001	0,0009	0,0031	0,0002	0,0002	0,0002	0,0002	0,0003	0,0015	0,0015	0,0015
15	Manufacture of paperboard	0,0000	0,0001	0,0007	0,0028	0,0002	0,0003	0,0002	0,0002	0,0001	0,0009	0,0009	0,0009
16	Manufacture of corrugated board and paperboard containers	0,0000	0,0002	0,0003	0,0008	0,0003	0,0004	0,0001	0,0001	0,0001	0,0011	0,0011	0,0011
17	Manufacture of paper and paperboard products excluding 16	0,0000	0,0000	0,0000	0,0001	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
18	Publishing and printing of newspapers	0,0000	0,0002	0,0002	0,0002	0,0003	0,0002	0,0002	0,0002	0,0001	0,0002	0,0002	0,0002
19	Publishing of books, magazines and other printed matter	0,0001	0,0002	0,0002	0,0003	0,0003	0,0003	0,0002	0,0003	0,0001	0,0003	0,0003	0,0003
20	Manufacture of chairs and seats, use of wood	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0001	0,0001	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000
23	Manufacture of other furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0000	0,0002	0,0003	0,0003	0,0004	0,0003	0,0002	0,0002	0,0001	0,0003	0,0004	0,0004
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0000	0,0001	0,0001	0,0002	0,0001	0,0001	0,0001	0,0001	0,0001	0,0002	0,0002	0,0002
28	Agriculture, hunting & fishing	0,0003	0,0008	0,0012	0,0017	0,0011	0,0012	0,0008	0,0008	0,0007	0,0023	0,0023	0,0023
29	Mining and quarrying	0,0001	0,0004	0,0007	0,0012	0,0005	0,0005	0,0004	0,0003	0,0006	0,0021	0,0021	0,0021
30	Manufacture of food products, beverages and tobacco	0,0001	0,0002	0,0004	0,0005	0,0003	0,0004	0,0002	0,0003	0,0002	0,0008	0,0008	0,0008
31	Manufacture of textiles, wearing apparel and leather products	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001	0,0000	0,0012	0,0000	0,0000	0,0000	0,0000
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0001	0,0002	0,0002	0,0003	0,0001	0,0001	0,0001	0,0001	0,0001	0,0002	0,0002	0,0002
34	Manufacture of chemicals and chemical products	0,0003	0,0007	0,0072	0,0149	0,0020	0,0048	0,0011	0,0030	0,0059	0,0070	0,0070	0,0070
35	Manufacture of rubber and plastic products	0,0001	0,0003	0,0005	0,0005	0,0006	0,0009	0,0003	0,0009	0,0002	0,0005	0,0005	0,0005
36	Manufacture of other non-metallic mineral products	0,0001	0,0001	0,0003	0,0003	0,0021	0,0018	0,0001	0,0001	0,0002	0,0002	0,0002	0,0002
37	Manufacture of basic metals and metal products	0,0002	0,0011	0,0013	0,0026	0,0037	0,0053	0,0035	0,0021	0,0008	0,0017	0,0017	0,0017
38	Manufacture of machinery and equipment	0,0001	0,0011	0,0013	0,0027	0,0021	0,0018	0,0012	0,0010	0,0010	0,0021	0,0022	0,0023
39	Manufacture of electrical machinery and apparatus	0,0003	0,0006	0,0006	0,0009	0,0010	0,0007	0,0006	0,0006	0,0004	0,0007	0,0008	0,0008
40	Manufacture of motor vehicles	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0000	0,0000	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,0000	0,0001	0,0001
42	Electricity, gas and steam supply, excluding 27	0,0002	0,0050	0,0074	0,0142	0,0046	0,0047	0,0045	0,0035	0,0069	0,0156	0,0156	0,0156
43	Collection, purification and distribution of water	0,0000	0,0002	0,0003	0,0004	0,0004	0,0004	0,0003	0,0004	0,0001	0,0003	0,0003	0,0003
44	Construction, excluding wood construction	0,0006	0,0011	0,0012	0,0014	0,0015	0,0013	0,0010	0,0009	0,0005	0,0014	0,0015	0,0015
45	Wholesale and retail trade	0,0042	0,0038	0,0029	0,0031	0,0036	0,0029	0,0030	0,0024	0,0021	0,0027	0,0027	0,0027
46	Hotels and restaurants	0,0002	0,0004	0,0005	0,0005	0,0005	0,0004	0,0004	0,0003	0,0002	0,0004	0,0004	0,0005
47	Land transport; transport via pipelines	0,0012	0,0252	0,0208	0,0284	0,0222	0,0190	0,0220	0,0167	0,0102	0,0252	0,0235	0,0214
48	Water transport	0,0000	-0,0001	-0,0001	-0,0001	-0,0001	-0,0001	-0,0001	-0,0001	0,0000	-0,0001	-0,0001	-0,0001
49	Other transport; post and telecommunications	0,0008	0,0037	0,0039	0,0052	0,0048	0,0041	0,0039	0,0035	0,0022	0,0042	0,0041	0,0039
50	Financial intermediation and insurance	0,0004	0,0009	0,0009	0,0011	0,0012	0,0011	0,0009	0,0010	0,0005	0,0009	0,0010	0,0010
51	Real estate, renting and business activities; R&D	0,0012	0,0110	0,0135	0,0172	0,0218	0,0191	0,0134	0,0189	0,0072	0,0140	0,0147	0,0156
52	Community, social and other service activities	0,0000	0,0003	0,0005	0,0006	0,0006	0,0005	0,0004	0,0004	0,0002	0,0004	0,0005	0,0005
Domestic operational surplus multiplier		0,6454	0,4585	0,2763	0,2167	0,2589	0,2336	0,3186	0,2679	0,4408	0,3097	0,3090	0,3081

(continues)

Appendix 8 (continues)
Contribution of industries to domestic operating surplus multipliers (mill. FIM operating surplus/ mill. FIM output)

		Industry											
Industry		13	14	15	16	17	18	19	20	21	22	23	24
1	Forestry	0,0658	0,0660	0,0656	0,0182	0,0221	0,0072	0,0127	0,0135	0,0120	0,0370	0,0446	0,0679
2	Sawmilling, planing and impregnation of wood	0,0023	0,0024	0,0023	0,0008	0,0008	0,0003	0,0005	0,0023	0,0023	0,0062	0,0105	0,0160
3	Manufacture of plywood and veneer sheets	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0016	0,0010	0,0010	0,0013	0,0013
4	Manufacture of particle board and fibreboard	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0016	0,0029	0,0056	0,0022	0,0005
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0025
6	Manufacture of builders' joinery and carpentry	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0002	0,0002	0,0041	0,0115
7	Manufacture of wooden containers	0,0003	0,0003	0,0003	0,0004	0,0002	0,0000	0,0001	0,0001	0,0003	0,0003	0,0001	0,0003
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0004	0,0001	0,0006	0,0005	0,0001
9	Manufacture of chemical pulp	0,0489	0,0489	0,0489	0,0131	0,0172	0,0051	0,0092	0,0009	0,0011	0,0014	0,0014	0,0018
10	Manufacture of mechanical pulp and newsprint	0,0005	0,0005	0,0005	0,0002	0,0003	0,0089	0,0024	0,0001	0,0001	0,0001	0,0001	0,0001
11	Manufacture of uncoated magazine paper	0,0001	0,0001	0,0001	0,0001	0,0008	0,0002	0,0080	0,0001	0,0001	0,0001	0,0001	0,0001
12	Manufacture of coated magazine paper	0,0002	0,0002	0,0002	0,0002	0,0004	0,0002	0,0014	0,0001	0,0002	0,0002	0,0002	0,0001
13	Manufacture of fine paper	0,1040	0,0013	0,0013	0,0020	0,0044	0,0011	0,0060	0,0002	0,0002	0,0002	0,0002	0,0001
14	Manufacture of kraft paper and other paper	0,0015	0,1042	0,0015	0,0053	0,0189	0,0003	0,0012	0,0003	0,0004	0,0006	0,0005	0,0003
15	Manufacture of paperboard	0,0009	0,0009	0,1036	0,0202	0,0025	0,0002	0,0006	0,0004	0,0005	0,0006	0,0005	0,0002
16	Manufacture of corrugated board and paperboard containers	0,0011	0,0011	0,0011	0,0848	0,0014	0,0002	0,0005	0,0007	0,0008	0,0010	0,0010	0,0002
17	Manufacture of paper and paperboard products excluding 16	0,0000	0,0000	0,0000	0,0003	0,0740	0,0000	0,0001	0,0001	0,0001	0,0001	0,0000	0,0001
18	Publishing and printing of newspapers	0,0002	0,0002	0,0002	0,0002	0,0003	0,0803	0,0005	0,0002	0,0002	0,0003	0,0003	0,0002
19	Publishing of books, magazines and other printed matter	0,0003	0,0003	0,0003	0,0005	0,0007	0,0010	0,0804	0,0003	0,0003	0,0003	0,0004	0,0003
20	Manufacture of chairs and seats, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1751	0,0086	0,0052	0,0008	0,0022
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0008	0,0667	0,0017	0,0001	0,0002
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0006	0,0022	0,0782	0,0004	0,0009
23	Manufacture of other furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0009	0,0028	0,0013	0,1054	0,0014
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0464
25	Renovation of buildings, use of wood	0,0004	0,0006	0,0001	0,0002	0,0003	0,0003	0,0003	0,0002	0,0002	0,0002	0,0003	0,0002
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0002	0,0002	0,0002	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001
28	Agriculture, hunting & fishing	0,0023	0,0023	0,0023	0,0019	0,0023	0,0018	0,0018	0,0008	0,0009	0,0010	0,0015	0,0012
29	Mining and quarrying	0,0021	0,0021	0,0021	0,0007	0,0008	0,0004	0,0006	0,0003	0,0004	0,0005	0,0005	0,0003
30	Manufacture of food products, beverages and tobacco	0,0008	0,0008	0,0009	0,0006	0,0008	0,0006	0,0006	0,0003	0,0003	0,0003	0,0005	0,0004
31	Manufacture of textiles, wearing apparel and leather products	0,0000	0,0001	0,0000	0,0001	0,0003	0,0001	0,0001	0,0018	0,0001	0,0002	0,0001	0,0001
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0002	0,0002	0,0002	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001
34	Manufacture of chemicals and chemical products	0,0070	0,0070	0,0070	0,0048	0,0048	0,0020	0,0038	0,0040	0,0045	0,0046	0,0049	0,0018
35	Manufacture of rubber and plastic products	0,0005	0,0005	0,0005	0,0018	0,0021	0,0004	0,0005	0,0016	0,0015	0,0012	0,0007	0,0006
36	Manufacture of other non-metallic mineral products	0,0002	0,0003	0,0002	0,0002	0,0002	0,0002	0,0002	0,0002	0,0002	0,0003	0,0004	0,0006
37	Manufacture of basic metals and metal products	0,0017	0,0018	0,0017	0,0014	0,0014	0,0010	0,0013	0,0048	0,0112	0,0085	0,0046	0,0018
38	Manufacture of machinery and equipment	0,0023	0,0021	0,0027	0,0013	0,0016	0,0011	0,0011	0,0010	0,0014	0,0013	0,0013	0,0008
39	Manufacture of electrical machinery and apparatus	0,0008	0,0008	0,0007	0,0007	0,0008	0,0011	0,0010	0,0010	0,0019	0,0013	0,0013	0,0007
40	Manufacture of motor vehicles	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0002	0,0002	0,0001	0,0001
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001	0,0001	0,0004	0,0009	0,0007	0,0003	0,0001
42	Electricity, gas and steam supply, excluding 27	0,0157	0,0157	0,0155	0,0063	0,0074	0,0037	0,0051	0,0039	0,0041	0,0050	0,0049	0,0029
43	Collection, purification and distribution of water	0,0003	0,0003	0,0003	0,0003	0,0004	0,0006	0,0005	0,0004	0,0004	0,0004	0,0005	0,0002
44	Construction, excluding wood construction	0,0015	0,0020	0,0010	0,0009	0,0013	0,0018	0,0016	0,0008	0,0008	0,0010	0,0011	0,0007
45	Wholesale and retail trade	0,0028	0,0028	0,0026	0,0041	0,0028	0,0036	0,0035	0,0019	0,0022	0,0028	0,0028	0,0247
46	Hotels and restaurants	0,0005	0,0004	0,0005	0,0005	0,0007	0,0007	0,0006	0,0003	0,0003	0,0004	0,0005	0,0003
47	Land transport; transport via pipelines	0,0191	0,0167	0,0276	0,0182	0,0188	0,0060	0,0073	0,0109	0,0124	0,0165	0,0159	0,0137
48	Water transport	-0,0001	-0,0001	-0,0001	-0,0001	-0,0001	-0,0001	0,0000	0,0000	0,0000	-0,0001	-0,0001	-0,0001
49	Other transport; post and telecommunications	0,0037	0,0034	0,0046	0,0044	0,0044	0,0123	0,0101	0,0030	0,0031	0,0040	0,0042	0,0029
50	Financial intermediation and insurance	0,0010	0,0010	0,0009	0,0010	0,0014	0,0015	0,0014	0,0009	0,0009	0,0011	0,0012	0,0008
51	Real estate, renting and business activities; R&D	0,0175	0,0186	0,0105	0,0158	0,0241	0,0300	0,0274	0,0177	0,0177	0,0216	0,0252	0,0117
52	Community, social and other service activities	0,0005	0,0005	0,0005	0,0005	0,0007	0,0050	0,0040	0,0005	0,0005	0,0006	0,0007	0,0004
Domestic operational surplus multiplier		0,3078	0,3072	0,3087	0,2127	0,2221	0,1797	0,1968	0,2569	0,1694	0,2162	0,2483	0,2218

(continues)

Appendix 8 (continues)
Contribution of industries to domestic operating surplus multipliers (mill. FIM operating surplus/ mill. FIM output)

		Industry											
Industry		25	26	27	28	29	30	31	32	33	34	35	36
1	Forestry	0,0516	0,0628	0,0032	0,0025	0,0023	0,0033	0,0015	0,0018	0,0008	0,0048	0,0033	0,0037
2	Sawmilling, planing and impregnation of wood	0,0132	0,0133	0,0005	0,0003	0,0003	0,0003	0,0002	0,0002	0,0001	0,0003	0,0003	0,0006
3	Manufacture of plywood and veneer sheets	0,0005	0,0005	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
4	Manufacture of particle board and fibreboard	0,0007	0,0006	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
5	Manufacture of wooden houses	0,0001	0,0074	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0101	0,0060	0,0000	0,0001	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001
7	Manufacture of wooden containers	0,0001	0,0002	0,0000	0,0000	0,0001	0,0001	0,0001	0,0000	0,0000	0,0002	0,0001	0,0009
8	Manufacture of other wood products	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0011	0,0014	0,0009	0,0014	0,0012	0,0020	0,0009	0,0009	0,0004	0,0056	0,0024	0,0014
10	Manufacture of mechanical pulp and newsprint	0,0001	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001
11	Manufacture of uncoated magazine paper	0,0001	0,0001	0,0002	0,0002	0,0002	0,0002	0,0001	0,0002	0,0001	0,0001	0,0001	0,0001
12	Manufacture of coated magazine paper	0,0001	0,0002	0,0003	0,0003	0,0003	0,0011	0,0002	0,0003	0,0001	0,0003	0,0008	0,0004
13	Manufacture of fine paper	0,0001	0,0002	0,0003	0,0002	0,0003	0,0008	0,0002	0,0003	0,0001	0,0003	0,0005	0,0004
14	Manufacture of kraft paper and other paper	0,0002	0,0003	0,0002	0,0005	0,0002	0,0008	0,0002	0,0002	0,0001	0,0002	0,0004	0,0003
15	Manufacture of paperboard	0,0002	0,0002	0,0002	0,0002	0,0003	0,0004	0,0003	0,0002	0,0001	0,0003	0,0006	0,0004
16	Manufacture of corrugated board and paperboard containers	0,0002	0,0002	0,0001	0,0002	0,0003	0,0009	0,0006	0,0001	0,0000	0,0004	0,0005	0,0005
17	Manufacture of paper and paperboard products excluding 16	0,0002	0,0001	0,0000	0,0001	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0001	0,0001
18	Publishing and printing of newspapers	0,0002	0,0002	0,0002	0,0003	0,0005	0,0004	0,0003	0,0004	0,0001	0,0002	0,0002	0,0002
19	Publishing of books, magazines and other printed matter	0,0003	0,0004	0,0002	0,0008	0,0005	0,0006	0,0004	0,0005	0,0002	0,0003	0,0003	0,0003
20	Manufacture of chairs and seats, use of wood	0,0029	0,0021	0,0000	0,0001	0,0001	0,0001	0,0000	0,0003	0,0000	0,0000	0,0000	0,0000
21	Manufacture of office and shop furniture, use of wood	0,0004	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0007	0,0013	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
23	Manufacture of other furniture, use of wood	0,0014	0,0009	0,0000	0,0000	0,0000	0,0000	0,0000	0,0002	0,0000	0,0000	0,0000	0,0000
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0642	0,0002	0,0001	0,0004	0,0006	0,0004	0,0002	0,0002	0,0001	0,0002	0,0002	0,0003
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0489	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0000	0,0001	0,1318	0,0002	0,0002	0,0002	0,0001	0,0006	0,0002	0,0003	0,0002	0,0002
28	Agriculture, hunting & fishing	0,0010	0,0012	0,0018	0,5845	0,0018	0,2151	0,0019	0,0009	0,0007	0,0029	0,0017	0,0013
29	Mining and quarrying	0,0002	0,0003	0,0052	0,0012	0,1362	0,0008	0,0003	0,0002	0,0003	0,0023	0,0005	0,0051
30	Manufacture of food products, beverages and tobacco	0,0003	0,0004	0,0005	0,0066	0,0006	0,0740	0,0004	0,0003	0,0002	0,0010	0,0005	0,0004
31	Manufacture of textiles, wearing apparel and leather products	0,0001	0,0001	0,0001	0,0004	0,0001	0,0002	0,0717	0,0001	0,0000	0,0001	0,0001	0,0004
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1142	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0001	0,0001	0,0002	0,0003	0,0004	0,0002	0,0001	0,0001	0,0189	0,0005	0,0001	0,0003
34	Manufacture of chemicals and chemical products	0,0015	0,0015	0,0014	0,0092	0,0038	0,0046	0,0044	0,0020	0,0008	0,1578	0,0141	0,0032
35	Manufacture of rubber and plastic products	0,0006	0,0006	0,0009	0,0016	0,0006	0,0019	0,0020	0,0115	0,0004	0,0012	0,1031	0,0012
36	Manufacture of other non-metallic mineral products	0,0004	0,0007	0,0002	0,0003	0,0004	0,0005	0,0003	0,0002	0,0001	0,0004	0,0003	0,0798
37	Manufacture of basic metals and metal products	0,0015	0,0018	0,0034	0,0015	0,0022	0,0022	0,0009	0,0011	0,0011	0,0018	0,0019	0,0044
38	Manufacture of machinery and equipment	0,0006	0,0009	0,0019	0,0022	0,0057	0,0020	0,0007	0,0007	0,0006	0,0014	0,0011	0,0030
39	Manufacture of electrical machinery and apparatus	0,0006	0,0008	0,0015	0,0018	0,0014	0,0013	0,0007	0,0038	0,0004	0,0006	0,0008	0,0008
40	Manufacture of motor vehicles	0,0001	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0005	0,0012	0,0000	0,0001	0,0001	0,0002
42	Electricity, gas and steam supply, excluding 27	0,0024	0,0028	0,0402	0,0051	0,0059	0,0052	0,0029	0,0025	0,0059	0,0081	0,0044	0,0049
43	Collection, purification and distribution of water	0,0002	0,0002	0,0004	0,0002	0,0007	0,0006	0,0005	0,0005	0,0003	0,0004	0,0004	0,0005
44	Construction, excluding wood construction	0,0006	0,0007	0,0013	0,0016	0,0020	0,0016	0,0008	0,0008	0,0006	0,0010	0,0009	0,0013
45	Wholesale and retail trade	0,0217	0,0245	0,0016	0,0165	0,0047	0,0084	0,0022	0,0069	0,0051	0,0030	0,0025	0,0028
46	Hotels and restaurants	0,0002	0,0003	0,0003	0,0002	0,0005	0,0004	0,0004	0,0003	0,0002	0,0004	0,0006	0,0004
47	Land transport; transport via pipelines	0,0121	0,0141	0,0082	0,0071	0,0472	0,0240	0,0091	0,0075	0,0048	0,0143	0,0105	0,0252
48	Water transport	-0,0001	-0,0001	0,0000	-0,0001	-0,0001	-0,0001	0,0000	-0,0013	-0,0003	-0,0001	0,0000	-0,0001
49	Other transport; post and telecommunications	0,0024	0,0030	0,0016	0,0043	0,0031	0,0050	0,0030	0,0020	0,0019	0,0031	0,0031	0,0042
50	Financial intermediation and insurance	0,0007	0,0009	0,0007	0,0020	0,0020	0,0018	0,0011	0,0134	0,0006	0,0009	0,0011	0,0011
51	Real estate, renting and business activities; R&D	0,0093	0,0123	0,0126	0,0113	0,0428	0,0263	0,0261	0,0260	0,0115	0,0164	0,0193	0,0200
52	Community, social and other service activities	0,0003	0,0004	0,0004	0,0009	0,0008	0,0009	0,0006	0,0004	0,0004	0,0006	0,0007	0,0006
Domestic operational surplus multiplier		0,2055	0,2148	0,2228	0,6671	0,2710	0,3893	0,1362	0,2022	0,0572	0,2320	0,1783	0,1717

(continues)

Appendix 8 (continues)
Contribution of industries to domestic operating surplus multipliers (mill. FIM operating surplus/ mill. FIM output)

		Industry											
Industry		37	38	39	40	41	42	43	44	45	46	47	48
1	Forestry	0,0017	0,0015	0,0009	0,0015	0,0063	0,0036	0,0011	0,0024	0,0015	0,0021	0,0005	0,0014
2	Sawmilling, planing and impregnation of wood	0,0002	0,0002	0,0001	0,0002	0,0013	0,0006	0,0002	0,0005	0,0002	0,0003	0,0001	0,0001
3	Manufacture of plywood and veneer sheets	0,0000	0,0000	0,0000	0,0000	0,0002	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
4	Manufacture of particle board and fibreboard	0,0000	0,0000	0,0000	0,0000	0,0003	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0000	0,0001	0,0000	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000
7	Manufacture of wooden containers	0,0003	0,0003	0,0002	0,0001	0,0001	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000	0,0002	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0008	0,0006	0,0004	0,0006	0,0010	0,0010	0,0005	0,0007	0,0008	0,0010	0,0003	0,0008
10	Manufacture of mechanical pulp and newsprint	0,0001	0,0001	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0002	0,0002	0,0000	0,0001
11	Manufacture of uncoated magazine paper	0,0001	0,0001	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0002	0,0002	0,0001	0,0002
12	Manufacture of coated magazine paper	0,0002	0,0002	0,0001	0,0002	0,0002	0,0004	0,0001	0,0002	0,0003	0,0005	0,0001	0,0005
13	Manufacture of fine paper	0,0002	0,0002	0,0001	0,0002	0,0002	0,0003	0,0001	0,0002	0,0003	0,0004	0,0001	0,0004
14	Manufacture of kraft paper and other paper	0,0002	0,0001	0,0001	0,0001	0,0002	0,0002	0,0001	0,0001	0,0002	0,0003	0,0001	0,0003
15	Manufacture of paperboard	0,0002	0,0002	0,0002	0,0002	0,0004	0,0003	0,0001	0,0001	0,0002	0,0002	0,0001	0,0001
16	Manufacture of corrugated board and paperboard containers	0,0003	0,0002	0,0003	0,0001	0,0010	0,0001	0,0000	0,0002	0,0001	0,0002	0,0000	0,0001
17	Manufacture of paper and paperboard products excluding 16	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0001	0,0001	0,0000	0,0001
18	Publishing and printing of newspapers	0,0003	0,0003	0,0002	0,0004	0,0003	0,0002	0,0001	0,0002	0,0007	0,0006	0,0002	0,0005
19	Publishing of books, magazines and other printed matter	0,0004	0,0004	0,0003	0,0004	0,0004	0,0002	0,0002	0,0003	0,0014	0,0007	0,0003	0,0012
20	Manufacture of chairs and seats, use of wood	0,0000	0,0001	0,0000	0,0003	0,0014	0,0000	0,0000	0,0000	0,0001	0,0001	0,0000	0,0001
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0004	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0001	0,0002	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001
23	Manufacture of other furniture, use of wood	0,0001	0,0000	0,0000	0,0002	0,0003	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0002	0,0003	0,0002	0,0003	0,0002	0,0001	0,0002	0,0001	0,0002	0,0007	0,0001	0,0002
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0002	0,0001	0,0001	0,0001	0,0001	0,0012	0,0003	0,0001	0,0001	0,0001	0,0001	0,0001
28	Agriculture, hunting & fishing	0,0012	0,0014	0,0010	0,0011	0,0012	0,0020	0,0009	0,0010	0,0032	0,0540	0,0005	0,0035
29	Mining and quarrying	0,0017	0,0003	0,0002	0,0004	0,0004	0,0060	0,0004	0,0039	0,0003	0,0004	0,0001	0,0002
30	Manufacture of food products, beverages and tobacco	0,0004	0,0004	0,0003	0,0004	0,0004	0,0005	0,0003	0,0003	0,0010	0,0174	0,0002	0,0011
31	Manufacture of textiles, wearing apparel and leather products	0,0001	0,0001	0,0001	0,0001	0,0004	0,0001	0,0001	0,0003	0,0001	0,0002	0,0000	0,0001
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0005	0,0001	0,0001	0,0001	0,0002	0,0003	0,0001	0,0002	0,0002	0,0001	0,0006	0,0004
34	Manufacture of chemicals and chemical products	0,0025	0,0010	0,0010	0,0017	0,0037	0,0016	0,0020	0,0039	0,0012	0,0017	0,0004	0,0007
35	Manufacture of rubber and plastic products	0,0004	0,0007	0,0008	0,0011	0,0018	0,0010	0,0028	0,0024	0,0017	0,0008	0,0005	0,0004
36	Manufacture of other non-metallic mineral products	0,0003	0,0002	0,0001	0,0008	0,0006	0,0002	0,0003	0,0064	0,0003	0,0003	0,0001	0,0003
37	Manufacture of basic metals and metal products	0,1346	0,0112	0,0031	0,0112	0,0089	0,0038	0,0008	0,0152	0,0009	0,0012	0,0009	0,0009
38	Manufacture of machinery and equipment	0,0018	0,0985	0,0008	0,0060	0,0010	0,0021	0,0014	0,0024	0,0004	0,0008	0,0028	0,0004
39	Manufacture of electrical machinery and apparatus	0,0012	0,0040	0,1579	0,0028	0,0020	0,0017	0,0005	0,0029	0,0018	0,0014	0,0008	0,0032
40	Manufacture of motor vehicles	0,0004	0,0006	0,0001	0,0402	0,0002	0,0001	0,0000	0,0002	0,0001	0,0001	0,0006	0,0003
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0007	0,0002	0,0001	0,0003	0,1355	0,0001	0,0001	0,0004	0,0002	0,0001	0,0001	0,0003
42	Electricity, gas and steam supply, excluding 27	0,0052	0,0027	0,0015	0,0030	0,0030	0,1556	0,0068	0,0028	0,0028	0,0028	0,0013	0,0014
43	Collection, purification and distribution of water	0,0004	0,0005	0,0004	0,0006	0,0004	0,0004	0,2504	0,0002	0,0006	0,0007	0,0001	0,0003
44	Construction, excluding wood construction	0,0009	0,0011	0,0006	0,0012	0,0008	0,0015	0,0007	0,0765	0,0011	0,0019	0,0004	0,0020
45	Wholesale and retail trade	0,0043	0,0035	0,0028	0,0035	0,0055	0,0018	0,0013	0,0137	0,1546	0,0105	0,0078	0,0115
46	Hotels and restaurants	0,0005	0,0006	0,0004	0,0004	0,0004	0,0004	0,0003	0,0003	0,0004	0,0693	0,0001	0,0003
47	Land transport; transport via pipelines	0,0146	0,0079	0,0046	0,0069	0,0103	0,0094	0,0031	0,0147	0,0144	0,0074	0,3054	0,0033
48	Water transport	-0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0001	-0,0001	0,0000	0,0000	-0,0439
49	Other transport; post and telecommunications	0,0033	0,0031	0,0022	0,0026	0,0031	0,0018	0,0017	0,0025	0,0068	0,0029	0,0031	0,0200
50	Financial intermediation and insurance	0,0012	0,0013	0,0010	0,0014	0,0011	0,0008	0,0006	0,0018	0,0024	0,0029	0,0026	0,0040
51	Real estate, renting and business activities; R&D	0,0248	0,0282	0,0223	0,0333	0,0230	0,0145	0,0116	0,0118	0,0270	0,0530	0,0081	0,0228
52	Community, social and other service activities	0,0006	0,0007	0,0006	0,0007	0,0006	0,0005	0,0004	0,0007	0,0010	0,0016	0,0003	0,0004
Domestic operational surplus multiplier		0,2074	0,1735	0,2055	0,1252	0,2195	0,2148	0,2900	0,1701	0,2291	0,2393	0,3391	0,0402

(continues)

Appendix 8 (continues)
Contribution of industries to domestic operating surplus multipliers (mill. FIM operating surplus/ mill. FIM output)

		Industry			
Industry		49	50	51	52
1	Forestry	0,0011	0,0014	0,0026	0,0012
2	Sawmilling, planing and impregnation of wood	0,0001	0,0001	0,0004	0,0001
3	Manufacture of plywood and veneer sheets	0,0000	0,0000	0,0000	0,0000
4	Manufacture of particle board and fibreboard	0,0000	0,0000	0,0000	0,0000
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0000	0,0001	0,0002	0,0000
7	Manufacture of wooden containers	0,0000	0,0000	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0005	0,0006	0,0008	0,0007
10	Manufacture of mechanical pulp and newsprint	0,0001	0,0001	0,0002	0,0002
11	Manufacture of uncoated magazine paper	0,0001	0,0001	0,0002	0,0003
12	Manufacture of coated magazine paper	0,0002	0,0003	0,0004	0,0002
13	Manufacture of fine paper	0,0002	0,0002	0,0004	0,0003
14	Manufacture of kraft paper and other paper	0,0001	0,0002	0,0002	0,0002
15	Manufacture of paperboard	0,0001	0,0002	0,0002	0,0001
16	Manufacture of corrugated board and paperboard containers	0,0001	0,0000	0,0001	0,0001
17	Manufacture of paper and paperboard products excluding 16	0,0000	0,0000	0,0001	0,0001
18	Publishing and printing of newspapers	0,0003	0,0004	0,0006	0,0008
19	Publishing of books, magazines and other printed matter	0,0006	0,0006	0,0012	0,0023
20	Manufacture of chairs and seats, use of wood	0,0001	0,0001	0,0001	0,0001
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0000
23	Manufacture of other furniture, use of wood	0,0000	0,0000	0,0001	0,0000
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0002	0,0004	0,0013	0,0001
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0001	0,0001	0,0002	0,0001
28	Agriculture, hunting & fishing	0,0022	0,0010	0,0012	0,0038
29	Mining and quarrying	0,0007	0,0002	0,0005	0,0002
30	Manufacture of food products, beverages and tobacco	0,0007	0,0003	0,0004	0,0011
31	Manufacture of textiles, wearing apparel and leather products	0,0001	0,0000	0,0001	0,0001
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0003	0,0001	0,0001	0,0001
34	Manufacture of chemicals and chemical products	0,0009	0,0004	0,0008	0,0010
35	Manufacture of rubber and plastic products	0,0008	0,0002	0,0004	0,0005
36	Manufacture of other non-metallic mineral products	0,0010	0,0002	0,0004	0,0001
37	Manufacture of basic metals and metal products	0,0026	0,0007	0,0013	0,0006
38	Manufacture of machinery and equipment	0,0007	0,0003	0,0006	0,0005
39	Manufacture of electrical machinery and apparatus	0,0025	0,0014	0,0020	0,0012
40	Manufacture of motor vehicles	0,0005	0,0001	0,0001	0,0001
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0001	0,0006	0,0002	0,0001
42	Electricity, gas and steam supply, excluding 27	0,0018	0,0024	0,0053	0,0026
43	Collection, purification and distribution of water	0,0003	0,0007	0,0031	0,0003
44	Construction, excluding wood construction	0,0110	0,0012	0,0038	0,0007
45	Wholesale and retail trade	0,0074	0,0041	0,0080	0,0078
46	Hotels and restaurants	0,0011	0,0004	0,0003	0,0005
47	Land transport; transport via pipelines	0,0064	0,0022	0,0029	0,0036
48	Water transport	-0,0001	0,0000	0,0000	0,0000
49	Other transport; post and telecommunications	0,1323	0,0041	0,0044	0,0035
50	Financial intermediation and insurance	0,0011	0,2253	0,0032	0,0017
51	Real estate, renting and business activities; R&D	0,0175	0,0307	0,2533	0,0112
52	Community, social and other service activities	0,0004	0,0007	0,0014	0,0276
Domestic operational surplus multiplier		0,1963	0,2823	0,3029	0,0759

Appendix 9
Contribution of industries to domestic value added multipliers (mill. FIM value added/ mill. FIM output)

		Industry											
Industry		1	2	3	4	5	6	7	8	9	10	11	12
1	Forestry	0,9273	0,4554	0,2096	0,0660	0,1758	0,1095	0,1611	0,0821	0,2245	0,0961	0,0962	0,0962
2	Sawmilling, planing and impregnation of wood	0,0001	0,2751	0,0033	0,0312	0,0547	0,0476	0,0930	0,0415	0,0153	0,0073	0,0073	0,0073
3	Manufacture of plywood and veneer sheets	0,0000	0,0003	0,4076	0,0020	0,0034	0,0088	0,0114	0,0124	0,0004	0,0003	0,0003	0,0003
4	Manufacture of particle board and fibreboard	0,0000	0,0000	0,0001	0,2884	0,0013	0,0036	0,0021	0,0019	0,0000	0,0000	0,0000	0,0000
5	Manufacture of wooden houses	0,0000	0,0002	0,0001	0,0001	0,2917	0,0004	0,0005	0,0003	0,0001	0,0001	0,0001	0,0001
6	Manufacture of builders' joinery and carpentry	0,0000	0,0003	0,0003	0,0005	0,0434	0,3979	0,0008	0,0005	0,0002	0,0004	0,0004	0,0005
7	Manufacture of wooden containers	0,0000	0,0002	0,0010	0,0023	0,0005	0,0005	0,3992	0,0013	0,0001	0,0012	0,0012	0,0012
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0001	0,0002	0,0004	0,0050	0,5135	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0002	0,0009	0,0029	0,0084	0,0022	0,0027	0,0026	0,0020	0,4536	0,0922	0,0922	0,0922
10	Manufacture of mechanical pulp and newsprint	0,0000	0,0002	0,0002	0,0004	0,0003	0,0003	0,0002	0,0002	0,0001	0,2877	0,0015	0,0015
11	Manufacture of uncoated magazine paper	0,0000	0,0002	0,0002	0,0004	0,0003	0,0004	0,0003	0,0003	0,0002	0,0003	0,2865	0,0003
12	Manufacture of coated magazine paper	0,0000	0,0003	0,0004	0,0007	0,0005	0,0006	0,0004	0,0004	0,0003	0,0005	0,0006	0,2867
13	Manufacture of fine paper	0,0001	0,0003	0,0004	0,0008	0,0005	0,0005	0,0004	0,0004	0,0002	0,0035	0,0035	0,0035
14	Manufacture of kraft paper and other paper	0,0001	0,0003	0,0024	0,0086	0,0005	0,0007	0,0004	0,0006	0,0007	0,0041	0,0041	0,0041
15	Manufacture of paperboard	0,0001	0,0004	0,0019	0,0078	0,0006	0,0008	0,0004	0,0006	0,0002	0,0024	0,0024	0,0024
16	Manufacture of corrugated board and paperboard containers	0,0000	0,0010	0,0012	0,0034	0,0013	0,0017	0,0005	0,0004	0,0003	0,0047	0,0047	0,0047
17	Manufacture of paper and paperboard products excluding 16	0,0000	0,0001	0,0001	0,0003	0,0001	0,0006	0,0001	0,0001	0,0000	0,0002	0,0002	0,0002
18	Publishing and printing of newspapers	0,0002	0,0009	0,0010	0,0012	0,0015	0,0013	0,0010	0,0012	0,0005	0,0010	0,0011	0,0011
19	Publishing of books, magazines and other printed matter	0,0005	0,0011	0,0013	0,0016	0,0017	0,0016	0,0012	0,0013	0,0007	0,0013	0,0014	0,0014
20	Manufacture of chairs and seats, use of wood	0,0000	0,0001	0,0001	0,0001	0,0003	0,0001	0,0003	0,0001	0,0000	0,0001	0,0001	0,0001
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0001	0,0002	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0006	0,0003	0,0002	0,0003	0,0001	0,0000	0,0000	0,0000	0,0000
23	Manufacture of other furniture, use of wood	0,0000	0,0001	0,0001	0,0001	0,0003	0,0001	0,0003	0,0001	0,0000	0,0001	0,0001	0,0001
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0001	0,0013	0,0019	0,0023	0,0025	0,0022	0,0014	0,0015	0,0004	0,0023	0,0024	0,0027
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0000	0,0002	0,0003	0,0006	0,0003	0,0003	0,0002	0,0002	0,0003	0,0006	0,0006	0,0006
28	Agriculture, hunting & fishing	0,0003	0,0007	0,0011	0,0014	0,0009	0,0011	0,0007	0,0007	0,0006	0,0020	0,0020	0,0020
29	Mining and quarrying	0,0002	0,0012	0,0021	0,0037	0,0016	0,0017	0,0011	0,0010	0,0019	0,0064	0,0064	0,0064
30	Manufacture of food products, beverages and tobacco	0,0004	0,0011	0,0018	0,0025	0,0016	0,0018	0,0011	0,0012	0,0010	0,0038	0,0038	0,0039
31	Manufacture of textiles, wearing apparel and leather products	0,0004	0,0003	0,0003	0,0003	0,0006	0,0005	0,0003	0,0076	0,0002	0,0003	0,0003	0,0003
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0009	0,0012	0,0011	0,0023	0,0010	0,0010	0,0010	0,0008	0,0009	0,0014	0,0014	0,0014
34	Manufacture of chemicals and chemical products	0,0008	0,0018	0,0184	0,0380	0,0050	0,0121	0,0028	0,0076	0,0151	0,0178	0,0178	0,0178
35	Manufacture of rubber and plastic products	0,0003	0,0010	0,0018	0,0020	0,0025	0,0034	0,0011	0,0033	0,0007	0,0019	0,0019	0,0019
36	Manufacture of other non-metallic mineral products	0,0004	0,0009	0,0015	0,0015	0,0123	0,0107	0,0009	0,0008	0,0010	0,0014	0,0014	0,0014
37	Manufacture of basic metals and metal products	0,0006	0,0032	0,0038	0,0077	0,0111	0,0160	0,0104	0,0063	0,0024	0,0051	0,0051	0,0052
38	Manufacture of machinery and equipment	0,0002	0,0046	0,0053	0,0114	0,0089	0,0077	0,0049	0,0042	0,0041	0,0087	0,0091	0,0097
39	Manufacture of electrical machinery and apparatus	0,0007	0,0015	0,0016	0,0022	0,0025	0,0017	0,0015	0,0015	0,0010	0,0019	0,0019	0,0020
40	Manufacture of motor vehicles	0,0001	0,0008	0,0008	0,0012	0,0012	0,0012	0,0010	0,0008	0,0004	0,0009	0,0009	0,0009
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0001	0,0001	0,0001	0,0002	0,0004	0,0004	0,0003	0,0002	0,0001	0,0002	0,0002	0,0002
42	Electricity, gas and steam supply, excluding 27	0,0008	0,0180	0,0266	0,0512	0,0166	0,0168	0,0161	0,0126	0,0248	0,0561	0,0561	0,0562
43	Collection, purification and distribution of water	0,0001	0,0007	0,0008	0,0011	0,0014	0,0012	0,0008	0,0011	0,0004	0,0008	0,0009	0,0009
44	Construction, excluding wood construction	0,0035	0,0060	0,0067	0,0080	0,0083	0,0071	0,0056	0,0052	0,0028	0,0077	0,0080	0,0084
45	Wholesale and retail trade	0,0174	0,0156	0,0119	0,0129	0,0150	0,0122	0,0124	0,0100	0,0089	0,0113	0,0113	0,0114
46	Hotels and restaurants	0,0011	0,0021	0,0026	0,0030	0,0028	0,0025	0,0021	0,0019	0,0014	0,0023	0,0024	0,0025
47	Land transport; transport via pipelines	0,0027	0,0580	0,0479	0,0654	0,0512	0,0437	0,0507	0,0384	0,0235	0,0581	0,0543	0,0493
48	Water transport	0,0002	0,0013	0,0008	0,0011	0,0008	0,0007	0,0007	0,0005	0,0004	0,0009	0,0009	0,0008
49	Other transport; post and telecommunications	0,0036	0,0167	0,0176	0,0236	0,0215	0,0183	0,0177	0,0156	0,0101	0,0190	0,0184	0,0175
50	Financial intermediation and insurance	0,0011	0,0027	0,0029	0,0035	0,0038	0,0033	0,0027	0,0029	0,0016	0,0029	0,0030	0,0031
51	Real estate, renting and business activities; R&D	0,0033	0,0291	0,0358	0,0455	0,0577	0,0507	0,0354	0,0501	0,0191	0,0371	0,0390	0,0414
52	Community, social and other service activities	0,0012	0,0089	0,0121	0,0151	0,0160	0,0141	0,0103	0,0116	0,0059	0,0115	0,0121	0,0129
Domestic value added multiplier		0,9694	0,9162	0,8420	0,7328	0,8289	0,8124	0,8646	0,8491	0,8266	0,7660	0,7655	0,7648

(continues)

Appendix 9 (continues)
Contribution of industries to domestic value added multipliers (mill. FIM value added/ mill. FIM output)

		Industry											
Industry		13	14	15	16	17	18	19	20	21	22	23	24
1	Forestry	0,0962	0,0965	0,0958	0,0266	0,0323	0,0105	0,0185	0,0197	0,0176	0,0541	0,0652	0,0992
2	Sawmilling, planing and impregnation of wood	0,0073	0,0075	0,0072	0,0025	0,0026	0,0011	0,0017	0,0071	0,0071	0,0194	0,0328	0,0501
3	Manufacture of plywood and veneer sheets	0,0003	0,0003	0,0002	0,0004	0,0001	0,0001	0,0001	0,0105	0,0068	0,0064	0,0087	0,0084
4	Manufacture of particle board and fibreboard	0,0000	0,0001	0,0000	0,0002	0,0000	0,0000	0,0000	0,0092	0,0170	0,0326	0,0126	0,0032
5	Manufacture of wooden houses	0,0001	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0001	0,0001	0,0001	0,0005	0,0212
6	Manufacture of builders' joinery and carpentry	0,0005	0,0007	0,0002	0,0007	0,0004	0,0003	0,0003	0,0005	0,0011	0,0014	0,0247	0,0697
7	Manufacture of wooden containers	0,0012	0,0012	0,0012	0,0015	0,0008	0,0002	0,0004	0,0005	0,0011	0,0009	0,0005	0,0011
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0002	0,0000	0,0000	0,0000	0,0015	0,0005	0,0022	0,0017	0,0002
9	Manufacture of chemical pulp	0,0922	0,0922	0,0922	0,0246	0,0325	0,0096	0,0174	0,0017	0,0021	0,0027	0,0027	0,0034
10	Manufacture of mechanical pulp and newsprint	0,0015	0,0015	0,0015	0,0006	0,0009	0,0249	0,0067	0,0002	0,0002	0,0003	0,0003	0,0002
11	Manufacture of uncoated magazine paper	0,0003	0,0003	0,0003	0,0003	0,0021	0,0006	0,0224	0,0003	0,0003	0,0003	0,0003	0,0003
12	Manufacture of coated magazine paper	0,0006	0,0006	0,0005	0,0006	0,0012	0,0005	0,0040	0,0004	0,0005	0,0005	0,0005	0,0004
13	Manufacture of fine paper	0,2897	0,0035	0,0035	0,0055	0,0123	0,0030	0,0167	0,0004	0,0005	0,0005	0,0005	0,0004
14	Manufacture of kraft paper and other paper	0,0041	0,2903	0,0041	0,0146	0,0526	0,0008	0,0035	0,0007	0,0011	0,0018	0,0013	0,0008
15	Manufacture of paperboard	0,0024	0,0024	0,2886	0,0564	0,0069	0,0006	0,0017	0,0010	0,0013	0,0018	0,0013	0,0006
16	Manufacture of corrugated board and paperboard containers	0,0047	0,0047	0,0047	0,3734	0,0063	0,0008	0,0020	0,0032	0,0037	0,0045	0,0045	0,0011
17	Manufacture of paper and paperboard products excluding 16	0,0002	0,0002	0,0002	0,0011	0,3050	0,0002	0,0004	0,0003	0,0005	0,0002	0,0002	0,0004
18	Publishing and printing of newspapers	0,0012	0,0012	0,0009	0,0012	0,0018	0,4418	0,0026	0,0011	0,0011	0,0014	0,0016	0,0011
19	Publishing of books, magazines and other printed matter	0,0015	0,0015	0,0013	0,0024	0,0035	0,0049	0,4104	0,0013	0,0015	0,0017	0,0018	0,0018
20	Manufacture of chairs and seats, use of wood	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,5151	0,0253	0,0153	0,0022	0,0064
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0001	0,0000	0,0000	0,0001	0,0000	0,0000	0,0052	0,4500	0,0116	0,0008	0,0014
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0001	0,0000	0,0000	0,0000	0,0001	0,0001	0,0029	0,0104	0,3756	0,0021	0,0042
23	Manufacture of other furniture, use of wood	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001	0,0001	0,0037	0,0112	0,0051	0,4157	0,0054
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,3201
25	Renovation of buildings, use of wood	0,0027	0,0043	0,0009	0,0013	0,0024	0,0021	0,0020	0,0013	0,0013	0,0016	0,0019	0,0010
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0006	0,0006	0,0005	0,0003	0,0003	0,0003	0,0003	0,0002	0,0003	0,0003	0,0003	0,0002
28	Agriculture, hunting & fishing	0,0020	0,0020	0,0020	0,0016	0,0020	0,0016	0,0016	0,0007	0,0007	0,0009	0,0014	0,0010
29	Mining and quarrying	0,0064	0,0064	0,0063	0,0023	0,0024	0,0013	0,0018	0,0011	0,0014	0,0015	0,0014	0,0009
30	Manufacture of food products, beverages and tobacco	0,0039	0,0039	0,0039	0,0029	0,0036	0,0026	0,0027	0,0012	0,0013	0,0016	0,0024	0,0018
31	Manufacture of textiles, wearing apparel and leather products	0,0003	0,0003	0,0003	0,0006	0,0018	0,0004	0,0004	0,0115	0,0009	0,0013	0,0005	0,0006
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0013	0,0013	0,0014	0,0009	0,0009	0,0007	0,0007	0,0007	0,0010	0,0011	0,0010	0,0007
34	Manufacture of chemicals and chemical products	0,0178	0,0178	0,0178	0,0123	0,0122	0,0050	0,0096	0,0101	0,0114	0,0118	0,0124	0,0046
35	Manufacture of rubber and plastic products	0,0019	0,0020	0,0019	0,0069	0,0081	0,0014	0,0018	0,0063	0,0059	0,0048	0,0026	0,0025
36	Manufacture of other non-metallic mineral products	0,0014	0,0017	0,0012	0,0009	0,0012	0,0013	0,0012	0,0012	0,0012	0,0015	0,0024	0,0032
37	Manufacture of basic metals and metal products	0,0052	0,0054	0,0051	0,0043	0,0042	0,0029	0,0038	0,0143	0,0337	0,0253	0,0137	0,0054
38	Manufacture of machinery and equipment	0,0096	0,0089	0,0112	0,0056	0,0068	0,0047	0,0048	0,0044	0,0059	0,0055	0,0055	0,0035
39	Manufacture of electrical machinery and apparatus	0,0020	0,0021	0,0019	0,0019	0,0019	0,0027	0,0024	0,0025	0,0048	0,0032	0,0033	0,0018
40	Manufacture of motor vehicles	0,0009	0,0008	0,0010	0,0008	0,0009	0,0010	0,0010	0,0011	0,0016	0,0015	0,0011	0,0007
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0002	0,0002	0,0002	0,0002	0,0002	0,0002	0,0002	0,0014	0,0030	0,0023	0,0010	0,0003
42	Electricity, gas and steam supply, excluding 27	0,0564	0,0565	0,0559	0,0226	0,0268	0,0135	0,0184	0,0139	0,0148	0,0181	0,0178	0,0105
43	Collection, purification and distribution of water	0,0010	0,0010	0,0008	0,0009	0,0013	0,0018	0,0016	0,0011	0,0011	0,0014	0,0016	0,0007
44	Construction, excluding wood construction	0,0085	0,0110	0,0056	0,0053	0,0073	0,0101	0,0090	0,0042	0,0044	0,0056	0,0063	0,0040
45	Wholesale and retail trade	0,0114	0,0118	0,0109	0,0169	0,0115	0,0151	0,0146	0,0080	0,0090	0,0114	0,0114	0,1023
46	Hotels and restaurants	0,0025	0,0024	0,0029	0,0027	0,0037	0,0038	0,0033	0,0018	0,0018	0,0023	0,0026	0,0014
47	Land transport; transport via pipelines	0,0440	0,0386	0,0637	0,0420	0,0433	0,0139	0,0168	0,0252	0,0286	0,0380	0,0366	0,0316
48	Water transport	0,0008	0,0007	0,0010	0,0006	0,0007	0,0005	0,0005	0,0003	0,0004	0,0005	0,0006	0,0009
49	Other transport; post and telecommunications	0,0165	0,0152	0,0207	0,0197	0,0198	0,0552	0,0454	0,0133	0,0141	0,0181	0,0190	0,0132
50	Financial intermediation and insurance	0,0032	0,0032	0,0028	0,0030	0,0042	0,0046	0,0042	0,0026	0,0027	0,0034	0,0038	0,0026
51	Real estate, renting and business activities; R&D	0,0464	0,0493	0,0279	0,0419	0,0639	0,0794	0,0726	0,0468	0,0470	0,0572	0,0667	0,0311
52	Community, social and other service activities	0,0133	0,0130	0,0129	0,0135	0,0191	0,1296	0,1033	0,0121	0,0122	0,0150	0,0173	0,0095
Domestic value added multiplier		0,7646	0,7653	0,7636	0,7251	0,7124	0,8561	0,8334	0,7738	0,7713	0,7757	0,8171	0,8370

(continues)

Appendix 9 (continues)
Contribution of industries to domestic value added multipliers (mill. FIM value added/ mill. FIM output)

Industry		Industry 25	26	27	28	29	30	31	32	33	34	35	36
1	Forestry	0,0754	0,0917	0,0046	0,0036	0,0033	0,0049	0,0022	0,0027	0,0011	0,0070	0,0048	0,0054
2	Sawmilling, planing and impregnation of wood	0,0412	0,0416	0,0017	0,0011	0,0009	0,0010	0,0005	0,0007	0,0003	0,0011	0,0010	0,0017
3	Manufacture of plywood and veneer sheets	0,0033	0,0031	0,0002	0,0001	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0003	0,0002
4	Manufacture of particle board and fibreboard	0,0041	0,0033	0,0000	0,0001	0,0001	0,0001	0,0000	0,0001	0,0000	0,0000	0,0002	0,0001
5	Manufacture of wooden houses	0,0010	0,0633	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0613	0,0360	0,0001	0,0004	0,0007	0,0004	0,0002	0,0003	0,0001	0,0003	0,0003	0,0005
7	Manufacture of wooden containers	0,0004	0,0006	0,0001	0,0001	0,0005	0,0003	0,0004	0,0001	0,0000	0,0007	0,0005	0,0033
8	Manufacture of other wood products	0,0002	0,0002	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001
9	Manufacture of chemical pulp	0,0021	0,0026	0,0017	0,0026	0,0022	0,0038	0,0017	0,0017	0,0007	0,0105	0,0045	0,0027
10	Manufacture of mechanical pulp and newsprint	0,0002	0,0002	0,0004	0,0003	0,0004	0,0004	0,0003	0,0004	0,0002	0,0003	0,0003	0,0003
11	Manufacture of uncoated magazine paper	0,0003	0,0003	0,0005	0,0004	0,0005	0,0005	0,0003	0,0005	0,0002	0,0004	0,0004	0,0003
12	Manufacture of coated magazine paper	0,0004	0,0004	0,0009	0,0007	0,0009	0,0030	0,0005	0,0009	0,0004	0,0009	0,0021	0,0012
13	Manufacture of fine paper	0,0004	0,0004	0,0007	0,0007	0,0008	0,0023	0,0005	0,0008	0,0003	0,0007	0,0014	0,0010
14	Manufacture of kraft paper and other paper	0,0007	0,0007	0,0006	0,0013	0,0006	0,0024	0,0004	0,0006	0,0002	0,0006	0,0012	0,0009
15	Manufacture of paperboard	0,0005	0,0005	0,0006	0,0005	0,0007	0,0010	0,0007	0,0006	0,0002	0,0008	0,0015	0,0012
16	Manufacture of corrugated board and paperboard containers	0,0010	0,0009	0,0003	0,0010	0,0015	0,0039	0,0027	0,0005	0,0002	0,0017	0,0024	0,0024
17	Manufacture of paper and paperboard products excluding 16	0,0006	0,0005	0,0001	0,0003	0,0001	0,0005	0,0002	0,0002	0,0001	0,0001	0,0005	0,0004
18	Publishing and printing of newspapers	0,0009	0,0011	0,0008	0,0019	0,0027	0,0021	0,0018	0,0020	0,0008	0,0011	0,0013	0,0013
19	Publishing of books, magazines and other printed matter	0,0016	0,0018	0,0010	0,0043	0,0026	0,0032	0,0021	0,0028	0,0009	0,0014	0,0017	0,0016
20	Manufacture of chairs and seats, use of wood	0,0085	0,0061	0,0001	0,0003	0,0002	0,0002	0,0001	0,0008	0,0001	0,0001	0,0001	0,0001
21	Manufacture of office and shop furniture, use of wood	0,0028	0,0005	0,0000	0,0001	0,0001	0,0001	0,0001	0,0007	0,0000	0,0000	0,0001	0,0001
22	Manufacture of kitchen furniture, use of wood	0,0032	0,0063	0,0000	0,0001	0,0001	0,0001	0,0000	0,0001	0,0000	0,0000	0,0001	0,0001
23	Manufacture of other furniture, use of wood	0,0054	0,0035	0,0000	0,0002	0,0001	0,0001	0,0001	0,0008	0,0000	0,0001	0,0001	0,0001
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,4437	0,0011	0,0007	0,0026	0,0042	0,0027	0,0014	0,0013	0,0010	0,0017	0,0016	0,0024
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,3377	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0002	0,0002	0,4738	0,0008	0,0009	0,0007	0,0004	0,0023	0,0009	0,0012	0,0006	0,0007
28	Agriculture, hunting & fishing	0,0009	0,0010	0,0015	0,5118	0,0016	0,1883	0,0017	0,0008	0,0007	0,0025	0,0015	0,0012
29	Mining and quarrying	0,0007	0,0009	0,0160	0,0037	0,4180	0,0025	0,0009	0,0007	0,0009	0,0070	0,0015	0,0158
30	Manufacture of food products, beverages and tobacco	0,0015	0,0018	0,0021	0,0303	0,0027	0,3408	0,0018	0,0014	0,0011	0,0044	0,0025	0,0020
31	Manufacture of textiles, wearing apparel and leather products	0,0006	0,0006	0,0004	0,0026	0,0008	0,0014	0,4646	0,0004	0,0003	0,0006	0,0008	0,0023
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,4375	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0006	0,0007	0,0018	0,0019	0,0027	0,0015	0,0007	0,0006	0,1383	0,0033	0,0010	0,0020
34	Manufacture of chemicals and chemical products	0,0039	0,0038	0,0037	0,0233	0,0097	0,0116	0,0113	0,0052	0,0020	0,4009	0,0358	0,0082
35	Manufacture of rubber and plastic products	0,0021	0,0024	0,0034	0,0062	0,0022	0,0075	0,0077	0,0446	0,0016	0,0045	0,4008	0,0048
36	Manufacture of other non-metallic mineral products	0,0022	0,0039	0,0011	0,0017	0,0026	0,0029	0,0018	0,0009	0,0005	0,0021	0,0020	0,4656
37	Manufacture of basic metals and metal products	0,0044	0,0052	0,0100	0,0045	0,0066	0,0065	0,0026	0,0032	0,0032	0,0055	0,0056	0,0131
38	Manufacture of machinery and equipment	0,0027	0,0037	0,0078	0,0094	0,0241	0,0084	0,0028	0,0031	0,0027	0,0057	0,0046	0,0127
39	Manufacture of electrical machinery and apparatus	0,0015	0,0019	0,0038	0,0045	0,0034	0,0034	0,0018	0,0095	0,0011	0,0016	0,0019	0,0021
40	Manufacture of motor vehicles	0,0006	0,0007	0,0006	0,0009	0,0018	0,0012	0,0006	0,0009	0,0004	0,0007	0,0010	0,0013
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0003	0,0003	0,0002	0,0005	0,0003	0,0004	0,0016	0,0038	0,0001	0,0002	0,0003	0,0008
42	Electricity, gas and steam supply, excluding 27	0,0085	0,0101	0,1446	0,0184	0,0214	0,0188	0,0105	0,0091	0,0211	0,0291	0,0158	0,0176
43	Collection, purification and distribution of water	0,0006	0,0007	0,0011	0,0007	0,0020	0,0018	0,0014	0,0015	0,0008	0,0013	0,0012	0,0015
44	Construction, excluding wood construction	0,0031	0,0041	0,0071	0,0091	0,0109	0,0088	0,0045	0,0044	0,0031	0,0054	0,0050	0,0074
45	Wholesale and retail trade	0,0899	0,1017	0,0067	0,0686	0,0195	0,0347	0,0091	0,0285	0,0210	0,0124	0,0104	0,0118
46	Hotels and restaurants	0,0011	0,0015	0,0018	0,0012	0,0028	0,0024	0,0021	0,0015	0,0013	0,0021	0,0033	0,0022
47	Land transport; transport via pipelines	0,0279	0,0325	0,0188	0,0163	0,1087	0,0553	0,0211	0,0173	0,0111	0,0330	0,0243	0,0581
48	Water transport	0,0007	0,0009	0,0003	0,0005	0,0007	0,0006	0,0003	0,0126	0,0028	0,0005	0,0005	0,0005
49	Other transport; post and telecommunications	0,0106	0,0135	0,0070	0,0194	0,0140	0,0225	0,0136	0,0091	0,0086	0,0139	0,0141	0,0189
50	Financial intermediation and insurance	0,0021	0,0027	0,0021	0,0061	0,0062	0,0056	0,0035	0,0412	0,0019	0,0028	0,0034	0,0034
51	Real estate, renting and business activities; R&D	0,0246	0,0325	0,0335	0,0301	0,1135	0,0696	0,0692	0,0687	0,0303	0,0434	0,0511	0,0529
52	Community, social and other service activities	0,0077	0,0099	0,0111	0,0234	0,0211	0,0240	0,0152	0,0106	0,0091	0,0143	0,0171	0,0158
Domestic value added multiplier		0,8580	0,8417	0,7755	0,8186	0,8217	0,8544	0,6673	0,7381	0,2718	0,6284	0,6323	0,7499

(continues)

Appendix 9 (continues)
Contribution of industries to domestic value added multipliers (mill. FIM value added/ mill. FIM output)

		Industry											
Industry		37	38	39	40	41	42	43	44	45	46	47	48
1	Forestry	0,0025	0,0022	0,0014	0,0021	0,0092	0,0053	0,0017	0,0036	0,0022	0,0031	0,0008	0,0020
2	Sawmilling, planing and impregnation of wood	0,0008	0,0007	0,0004	0,0006	0,0041	0,0020	0,0006	0,0015	0,0005	0,0008	0,0002	0,0004
3	Manufacture of plywood and veneer sheets	0,0001	0,0001	0,0001	0,0001	0,0016	0,0002	0,0001	0,0001	0,0001	0,0001	0,0000	0,0001
4	Manufacture of particle board and fibreboard	0,0001	0,0000	0,0000	0,0001	0,0019	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0001
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0003	0,0004	0,0002	0,0004	0,0008	0,0002	0,0002	0,0002	0,0002	0,0007	0,0001	0,0002
7	Manufacture of wooden containers	0,0011	0,0011	0,0005	0,0004	0,0005	0,0001	0,0001	0,0004	0,0001	0,0001	0,0001	0,0001
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000	0,0006	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0015	0,0011	0,0008	0,0012	0,0018	0,0019	0,0009	0,0014	0,0016	0,0019	0,0005	0,0015
10	Manufacture of mechanical pulp and newsprint	0,0003	0,0003	0,0002	0,0003	0,0003	0,0004	0,0002	0,0002	0,0006	0,0005	0,0001	0,0004
11	Manufacture of uncoated magazine paper	0,0004	0,0004	0,0002	0,0004	0,0003	0,0006	0,0002	0,0003	0,0006	0,0005	0,0002	0,0005
12	Manufacture of coated magazine paper	0,0006	0,0006	0,0004	0,0006	0,0006	0,0010	0,0004	0,0005	0,0008	0,0013	0,0003	0,0013
13	Manufacture of fine paper	0,0006	0,0005	0,0004	0,0005	0,0006	0,0008	0,0003	0,0004	0,0009	0,0011	0,0003	0,0011
14	Manufacture of kraft paper and other paper	0,0005	0,0004	0,0003	0,0004	0,0007	0,0007	0,0003	0,0003	0,0006	0,0010	0,0002	0,0008
15	Manufacture of paperboard	0,0006	0,0005	0,0005	0,0005	0,0011	0,0007	0,0003	0,0004	0,0005	0,0006	0,0001	0,0003
16	Manufacture of corrugated board and paperboard containers	0,0013	0,0007	0,0015	0,0006	0,0044	0,0003	0,0002	0,0007	0,0003	0,0011	0,0001	0,0003
17	Manufacture of paper and paperboard products excluding 16	0,0002	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0001	0,0005	0,0002	0,0001	0,0003
18	Publishing and printing of newspapers	0,0016	0,0017	0,0014	0,0020	0,0015	0,0009	0,0008	0,0010	0,0036	0,0033	0,0008	0,0029
19	Publishing of books, magazines and other printed matter	0,0020	0,0019	0,0015	0,0020	0,0018	0,0011	0,0009	0,0016	0,0072	0,0037	0,0015	0,0059
20	Manufacture of chairs and seats, use of wood	0,0001	0,0001	0,0001	0,0007	0,0041	0,0001	0,0001	0,0001	0,0002	0,0002	0,0001	0,0004
21	Manufacture of office and shop furniture, use of wood	0,0002	0,0001	0,0001	0,0003	0,0028	0,0000	0,0000	0,0001	0,0001	0,0001	0,0000	0,0002
22	Manufacture of kitchen furniture, use of wood	0,0001	0,0001	0,0000	0,0004	0,0010	0,0000	0,0000	0,0000	0,0001	0,0001	0,0001	0,0002
23	Manufacture of other furniture, use of wood	0,0002	0,0001	0,0001	0,0006	0,0012	0,0001	0,0000	0,0001	0,0002	0,0001	0,0001	0,0003
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0016	0,0020	0,0012	0,0024	0,0014	0,0008	0,0012	0,0008	0,0013	0,0046	0,0004	0,0010
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0008	0,0004	0,0002	0,0004	0,0004	0,0043	0,0010	0,0004	0,0004	0,0004	0,0002	0,0002
28	Agriculture, hunting & fishing	0,0011	0,0012	0,0009	0,0010	0,0010	0,0018	0,0008	0,0009	0,0028	0,0472	0,0005	0,0030
29	Mining and quarrying	0,0052	0,0011	0,0006	0,0012	0,0012	0,0183	0,0011	0,0119	0,0008	0,0012	0,0004	0,0007
30	Manufacture of food products, beverages and tobacco	0,0019	0,0021	0,0015	0,0017	0,0018	0,0024	0,0013	0,0016	0,0048	0,0799	0,0008	0,0052
31	Manufacture of textiles, wearing apparel and leather products	0,0006	0,0007	0,0006	0,0007	0,0026	0,0004	0,0004	0,0018	0,0009	0,0011	0,0003	0,0006
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0036	0,0008	0,0004	0,0009	0,0011	0,0021	0,0005	0,0015	0,0011	0,0007	0,0046	0,0032
34	Manufacture of chemicals and chemical products	0,0064	0,0026	0,0026	0,0044	0,0094	0,0042	0,0050	0,0098	0,0030	0,0042	0,0011	0,0017
35	Manufacture of rubber and plastic products	0,0017	0,0028	0,0031	0,0043	0,0069	0,0039	0,0111	0,0093	0,0065	0,0030	0,0021	0,0014
36	Manufacture of other non-metallic mineral products	0,0016	0,0014	0,0006	0,0044	0,0034	0,0012	0,0020	0,0375	0,0016	0,0018	0,0005	0,0017
37	Manufacture of basic metals and metal products	0,4034	0,0336	0,0093	0,0337	0,0268	0,0115	0,0025	0,0456	0,0026	0,0037	0,0027	0,0028
38	Manufacture of machinery and equipment	0,0076	0,4139	0,0033	0,0252	0,0043	0,0089	0,0059	0,0103	0,0018	0,0034	0,0118	0,0016
39	Manufacture of electrical machinery and apparatus	0,0030	0,0100	0,3969	0,0070	0,0051	0,0044	0,0013	0,0073	0,0046	0,0035	0,0021	0,0081
40	Manufacture of motor vehicles	0,0041	0,0055	0,0007	0,3715	0,0014	0,0007	0,0004	0,0020	0,0008	0,0009	0,0059	0,0025
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0021	0,0006	0,0003	0,0011	0,4353	0,0002	0,0002	0,0014	0,0005	0,0003	0,0002	0,0009
42	Electricity, gas and steam supply, excluding 27	0,0185	0,0098	0,0053	0,0108	0,0109	0,5592	0,0244	0,0101	0,0102	0,0100	0,0048	0,0051
43	Collection, purification and distribution of water	0,0013	0,0016	0,0012	0,0018	0,0013	0,0012	0,7703	0,0007	0,0018	0,0023	0,0004	0,0010
44	Construction, excluding wood construction	0,0052	0,0059	0,0035	0,0064	0,0045	0,0081	0,0037	0,4230	0,0058	0,0108	0,0023	0,0110
45	Wholesale and retail trade	0,0179	0,0144	0,0115	0,0146	0,0227	0,0076	0,0053	0,0567	0,6410	0,0435	0,0325	0,0477
46	Hotels and restaurants	0,0025	0,0031	0,0023	0,0022	0,0024	0,0021	0,0019	0,0014	0,0024	0,3806	0,0008	0,0015
47	Land transport; transport via pipelines	0,0336	0,0183	0,0106	0,0159	0,0238	0,0216	0,0072	0,0339	0,0333	0,0170	0,7039	0,0077
48	Water transport	0,0005	0,0005	0,0003	0,0004	0,0005	0,0004	0,0002	0,0007	0,0007	0,0004	0,0004	0,4183
49	Other transport; post and telecommunications	0,0147	0,0139	0,0097	0,0118	0,0140	0,0080	0,0078	0,0115	0,0305	0,0132	0,0142	0,0899
50	Financial intermediation and insurance	0,0037	0,0041	0,0031	0,0042	0,0034	0,0025	0,0019	0,0057	0,0075	0,0088	0,0078	0,0123
51	Real estate, renting and business activities; R&D	0,0658	0,0746	0,0590	0,0881	0,0608	0,0383	0,0308	0,0311	0,0714	0,1405	0,0213	0,0603
52	Community, social and other service activities	0,0159	0,0194	0,0158	0,0175	0,0154	0,0127	0,0112	0,0174	0,0250	0,0415	0,0076	0,0101
Domestic value added multiplier		0,6391	0,6575	0,5548	0,6482	0,7028	0,7432	0,9068	0,7473	0,8843	0,8452	0,8354	0,7188

(continues)

Appendix 9 (continues)
Contribution of industries to domestic value added multipliers (mill. FIM value added/ mill. FIM output)

		Industry			
Industry		49	50	51	52
1	Forestry	0,0016	0,0020	0,0037	0,0017
2	Sawmilling, planing and impregnation of wood	0,0005	0,0005	0,0012	0,0003
3	Manufacture of plywood and veneer sheets	0,0001	0,0001	0,0001	0,0000
4	Manufacture of particle board and fibreboard	0,0000	0,0001	0,0001	0,0000
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0002	0,0004	0,0013	0,0002
7	Manufacture of wooden containers	0,0001	0,0000	0,0001	0,0001
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0009	0,0011	0,0015	0,0013
10	Manufacture of mechanical pulp and newsprint	0,0002	0,0003	0,0004	0,0005
11	Manufacture of uncoated magazine paper	0,0003	0,0004	0,0006	0,0008
12	Manufacture of coated magazine paper	0,0005	0,0007	0,0011	0,0006
13	Manufacture of fine paper	0,0005	0,0007	0,0010	0,0009
14	Manufacture of kraft paper and other paper	0,0004	0,0005	0,0007	0,0005
15	Manufacture of paperboard	0,0003	0,0004	0,0004	0,0004
16	Manufacture of corrugated board and paperboard containers	0,0002	0,0002	0,0002	0,0002
17	Manufacture of paper and paperboard products excluding 16	0,0001	0,0001	0,0002	0,0003
18	Publishing and printing of newspapers	0,0018	0,0023	0,0033	0,0046
19	Publishing of books, magazines and other printed matter	0,0032	0,0031	0,0060	0,0118
20	Manufacture of chairs and seats, use of wood	0,0002	0,0002	0,0004	0,0002
21	Manufacture of office and shop furniture, use of wood	0,0001	0,0001	0,0001	0,0001
22	Manufacture of kitchen furniture, use of wood	0,0001	0,0001	0,0002	0,0001
23	Manufacture of other furniture, use of wood	0,0001	0,0001	0,0003	0,0001
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0013	0,0025	0,0090	0,0010
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0003	0,0004	0,0008	0,0004
28	Agriculture, hunting & fishing	0,0019	0,0009	0,0011	0,0033
29	Mining and quarrying	0,0020	0,0006	0,0014	0,0006
30	Manufacture of food products, beverages and tobacco	0,0033	0,0015	0,0018	0,0053
31	Manufacture of textiles, wearing apparel and leather products	0,0008	0,0003	0,0005	0,0007
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0018	0,0005	0,0008	0,0006
34	Manufacture of chemicals and chemical products	0,0024	0,0011	0,0021	0,0024
35	Manufacture of rubber and plastic products	0,0032	0,0008	0,0015	0,0018
36	Manufacture of other non-metallic mineral products	0,0057	0,0010	0,0024	0,0008
37	Manufacture of basic metals and metal products	0,0079	0,0020	0,0040	0,0018
38	Manufacture of machinery and equipment	0,0028	0,0012	0,0023	0,0022
39	Manufacture of electrical machinery and apparatus	0,0064	0,0035	0,0050	0,0031
40	Manufacture of motor vehicles	0,0044	0,0005	0,0006	0,0014
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0005	0,0019	0,0006	0,0004
42	Electricity, gas and steam supply, excluding 27	0,0064	0,0088	0,0192	0,0094
43	Collection, purification and distribution of water	0,0008	0,0022	0,0094	0,0010
44	Construction, excluding wood construction	0,0610	0,0068	0,0209	0,0037
45	Wholesale and retail trade	0,0309	0,0172	0,0331	0,0325
46	Hotels and restaurants	0,0059	0,0022	0,0018	0,0029
47	Land transport; transport via pipelines	0,0148	0,0050	0,0068	0,0082
48	Water transport	0,0007	0,0003	0,0003	0,0004
49	Other transport; post and telecommunications	0,5952	0,0184	0,0200	0,0157
50	Financial intermediation and insurance	0,0033	0,6921	0,0098	0,0052
51	Real estate, renting and business activities; R&D	0,0462	0,0814	0,6709	0,0296
52	Community, social and other service activities	0,0100	0,0186	0,0355	0,7160
Domestic value added multiplier		0,8313	0,8849	0,8847	0,8749

Appendix 10
Contribution of industries to domestic employees multipliers (number of employees/ mill. FIM output)

		Industry											
Industry		1	2	3	4	5	6	7	8	9	10	11	12
1	Forestry	1,7488	0,8589	0,3952	0,1244	0,3315	0,2064	0,3038	0,1548	0,4233	0,1813	0,1813	0,1814
2	Sawmilling, planing and impregnation of wood	0,0003	0,9817	0,0116	0,1112	0,1952	0,1698	0,3318	0,1480	0,0547	0,0261	0,0261	0,0262
3	Manufacture of plywood and veneer sheets	0,0000	0,0015	2,2441	0,0113	0,0185	0,0485	0,0629	0,0685	0,0022	0,0014	0,0014	0,0014
4	Manufacture of particle board and fibreboard	0,0000	0,0001	0,0006	1,4212	0,0064	0,0176	0,0103	0,0096	0,0001	0,0002	0,0002	0,0002
5	Manufacture of wooden houses	0,0000	0,0009	0,0008	0,0009	1,7814	0,0027	0,0028	0,0015	0,0007	0,0004	0,0004	0,0004
6	Manufacture of builders' joinery and carpentry	0,0001	0,0014	0,0018	0,0028	0,2263	2,0729	0,0041	0,0026	0,0009	0,0021	0,0022	0,0024
7	Manufacture of wooden containers	0,0000	0,0006	0,0040	0,0094	0,0021	0,0019	1,5974	0,0053	0,0003	0,0047	0,0047	0,0047
8	Manufacture of other wood products	0,0000	0,0001	0,0001	0,0006	0,0009	0,0019	0,0260	2,7015	0,0002	0,0002	0,0002	0,0002
9	Manufacture of chemical pulp	0,0001	0,0006	0,0018	0,0053	0,0014	0,0017	0,0016	0,0013	0,2847	0,0579	0,0579	0,0579
10	Manufacture of mechanical pulp and newsprint	0,0001	0,0003	0,0004	0,0007	0,0005	0,0005	0,0004	0,0004	0,0002	0,5339	0,0028	0,0028
11	Manufacture of uncoated magazine paper	0,0001	0,0004	0,0005	0,0007	0,0006	0,0007	0,0005	0,0005	0,0003	0,0006	0,5317	0,0006
12	Manufacture of coated magazine paper	0,0001	0,0005	0,0008	0,0012	0,0010	0,0011	0,0008	0,0008	0,0005	0,0010	0,0010	0,5322
13	Manufacture of fine paper	0,0001	0,0005	0,0008	0,0014	0,0009	0,0010	0,0007	0,0007	0,0004	0,0065	0,0065	0,0065
14	Manufacture of kraft paper and other paper	0,0002	0,0005	0,0044	0,0160	0,0009	0,0013	0,0008	0,0011	0,0014	0,0077	0,0077	0,0077
15	Manufacture of paperboard	0,0002	0,0007	0,0036	0,0144	0,0011	0,0015	0,0008	0,0011	0,0004	0,0044	0,0044	0,0044
16	Manufacture of corrugated board and paperboard containers	0,0001	0,0027	0,0032	0,0095	0,0035	0,0048	0,0015	0,0012	0,0008	0,0133	0,0133	0,0133
17	Manufacture of paper and paperboard products excluding 16	0,0001	0,0002	0,0003	0,0007	0,0004	0,0015	0,0002	0,0002	0,0001	0,0005	0,0005	0,0005
18	Publishing and printing of newspapers	0,0010	0,0038	0,0043	0,0053	0,0063	0,0055	0,0041	0,0052	0,0022	0,0044	0,0045	0,0047
19	Publishing of books, magazines and other printed matter	0,0021	0,0045	0,0050	0,0064	0,0067	0,0063	0,0046	0,0052	0,0026	0,0053	0,0055	0,0057
20	Manufacture of chairs and seats, use of wood	0,0002	0,0003	0,0004	0,0006	0,0012	0,0006	0,0014	0,0004	0,0002	0,0004	0,0004	0,0005
21	Manufacture of office and shop furniture, use of wood	0,0001	0,0002	0,0002	0,0004	0,0010	0,0005	0,0008	0,0002	0,0001	0,0002	0,0002	0,0002
22	Manufacture of kitchen furniture, use of wood	0,0001	0,0002	0,0002	0,0038	0,0020	0,0015	0,0020	0,0008	0,0001	0,0003	0,0003	0,0003
23	Manufacture of other furniture, use of wood	0,0002	0,0003	0,0004	0,0008	0,0018	0,0007	0,0022	0,0004	0,0002	0,0004	0,0004	0,0004
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0005	0,0074	0,0108	0,0132	0,0146	0,0128	0,0084	0,0088	0,0024	0,0133	0,0142	0,0155
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0000	0,0003	0,0005	0,0009	0,0004	0,0004	0,0003	0,0003	0,0004	0,0008	0,0009	0,0009
28	Agriculture, hunting & fishing	0,0044	0,0113	0,0178	0,0243	0,0155	0,0176	0,0113	0,0118	0,0101	0,0331	0,0334	0,0337
29	Mining and quarrying	0,0005	0,0037	0,0063	0,0113	0,0049	0,0051	0,0034	0,0029	0,0057	0,0195	0,0195	0,0195
30	Manufacture of food products, beverages and tobacco	0,0017	0,0042	0,0068	0,0093	0,0059	0,0067	0,0043	0,0044	0,0038	0,0142	0,0143	0,0144
31	Manufacture of textiles, wearing apparel and leather products	0,0026	0,0022	0,0019	0,0021	0,0036	0,0032	0,0021	0,0487	0,0014	0,0019	0,0020	0,0020
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0020	0,0026	0,0025	0,0053	0,0024	0,0022	0,0022	0,0018	0,0021	0,0032	0,0031	0,0031
34	Manufacture of chemicals and chemical products	0,0019	0,0041	0,0418	0,0864	0,0114	0,0275	0,0063	0,0173	0,0343	0,0406	0,0406	0,0405
35	Manufacture of rubber and plastic products	0,0013	0,0039	0,0069	0,0078	0,0097	0,0132	0,0043	0,0130	0,0028	0,0074	0,0075	0,0075
36	Manufacture of other non-metallic mineral products	0,0015	0,0034	0,0058	0,0060	0,0484	0,0420	0,0034	0,0033	0,0040	0,0055	0,0056	0,0057
37	Manufacture of basic metals and metal products	0,0020	0,0104	0,0124	0,0248	0,0360	0,0518	0,0335	0,0204	0,0079	0,0164	0,0166	0,0169
38	Manufacture of machinery and equipment	0,0008	0,0169	0,0195	0,0419	0,0328	0,0283	0,0181	0,0155	0,0151	0,0322	0,0337	0,0357
39	Manufacture of electrical machinery and apparatus	0,0020	0,0044	0,0048	0,0066	0,0075	0,0053	0,0045	0,0047	0,0030	0,0056	0,0058	0,0059
40	Manufacture of motor vehicles	0,0004	0,0036	0,0035	0,0052	0,0052	0,0054	0,0044	0,0036	0,0019	0,0041	0,0041	0,0039
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0004	0,0007	0,0008	0,0011	0,0021	0,0019	0,0016	0,0011	0,0005	0,0008	0,0008	0,0008
42	Electricity, gas and steam supply, excluding 27	0,0012	0,0276	0,0409	0,0786	0,0254	0,0257	0,0247	0,0194	0,0381	0,0861	0,0862	0,0863
43	Collection, purification and distribution of water	0,0001	0,0012	0,0014	0,0019	0,0024	0,0021	0,0014	0,0019	0,0007	0,0015	0,0015	0,0016
44	Construction, excluding wood construction	0,0186	0,0324	0,0359	0,0426	0,0444	0,0379	0,0297	0,0277	0,0152	0,0413	0,0429	0,0450
45	Wholesale and retail trade	0,0853	0,0763	0,0584	0,0632	0,0735	0,0598	0,0606	0,0489	0,0436	0,0552	0,0554	0,0557
46	Hotels and restaurants	0,0086	0,0164	0,0200	0,0230	0,0219	0,0190	0,0160	0,0145	0,0105	0,0176	0,0185	0,0196
47	Land transport; transport via pipelines	0,0100	0,2184	0,1802	0,2461	0,1927	0,1647	0,1909	0,1445	0,0885	0,2186	0,2043	0,1856
48	Water transport	0,0008	0,0047	0,0030	0,0040	0,0027	0,0023	0,0027	0,0019	0,0016	0,0033	0,0031	0,0029
49	Other transport; post and telecommunications	0,0109	0,0503	0,0530	0,0709	0,0647	0,0551	0,0531	0,0469	0,0304	0,0573	0,0553	0,0527
50	Financial intermediation and insurance	0,0029	0,0070	0,0075	0,0090	0,0098	0,0085	0,0069	0,0076	0,0041	0,0074	0,0076	0,0079
51	Real estate, renting and business activities; R&D	0,0058	0,0510	0,0627	0,0798	0,1012	0,0888	0,0621	0,0878	0,0335	0,0651	0,0683	0,0725
52	Community, social and other service activities	0,0068	0,0512	0,0695	0,0868	0,0919	0,0812	0,0595	0,0667	0,0342	0,0664	0,0697	0,0740
Domestic employees multiplier		1,9269	2,4766	3,3595	2,7013	3,4226	3,3194	2,9773	3,7368	1,1721	1,6714	1,6685	1,6646

(continues)

Appendix 10 (continues)
Contribution of industries to domestic employees multipliers (number of employees/ mill. FIM output)

		Industry											
Industry		13	14	15	16	17	18	19	20	21	22	23	24
1	Forestry	0,1815	0,1820	0,1808	0,0501	0,0610	0,0198	0,0349	0,0371	0,0332	0,1021	0,1230	0,1872
2	Sawmilling, planing and impregnation of wood	0,0262	0,0268	0,0256	0,0089	0,0092	0,0038	0,0060	0,0253	0,0252	0,0693	0,1170	0,1788
3	Manufacture of plywood and veneer sheets	0,0015	0,0015	0,0013	0,0021	0,0008	0,0005	0,0006	0,0579	0,0372	0,0353	0,0480	0,0461
4	Manufacture of particle board and fibreboard	0,0002	0,0003	0,0001	0,0009	0,0002	0,0002	0,0002	0,0452	0,0837	0,1608	0,0623	0,0156
5	Manufacture of wooden houses	0,0004	0,0004	0,0004	0,0002	0,0002	0,0001	0,0001	0,0006	0,0005	0,0008	0,0032	0,1293
6	Manufacture of builders' joinery and carpentry	0,0024	0,0035	0,0011	0,0037	0,0020	0,0017	0,0017	0,0029	0,0060	0,0073	0,1288	0,3629
7	Manufacture of wooden containers	0,0047	0,0047	0,0047	0,0058	0,0032	0,0006	0,0017	0,0021	0,0042	0,0036	0,0019	0,0045
8	Manufacture of other wood products	0,0002	0,0002	0,0002	0,0013	0,0001	0,0001	0,0001	0,0078	0,0028	0,0118	0,0091	0,0013
9	Manufacture of chemical pulp	0,0579	0,0579	0,0579	0,0155	0,0204	0,0060	0,0109	0,0011	0,0013	0,0017	0,0017	0,0021
10	Manufacture of mechanical pulp and newsprint	0,0028	0,0028	0,0028	0,0010	0,0016	0,0462	0,0124	0,0004	0,0004	0,0005	0,0005	0,0004
11	Manufacture of uncoated magazine paper	0,0006	0,0006	0,0006	0,0006	0,0039	0,0011	0,0415	0,0005	0,0006	0,0006	0,0006	0,0005
12	Manufacture of coated magazine paper	0,0011	0,0011	0,0010	0,0012	0,0023	0,0010	0,0073	0,0008	0,0009	0,0009	0,0010	0,0008
13	Manufacture of fine paper	0,5377	0,0066	0,0065	0,0102	0,0227	0,0056	0,0309	0,0008	0,0009	0,0010	0,0010	0,0008
14	Manufacture of kraft paper and other paper	0,0077	0,5388	0,0076	0,0272	0,0975	0,0014	0,0064	0,0014	0,0020	0,0033	0,0024	0,0015
15	Manufacture of paperboard	0,0044	0,0044	0,5355	0,1046	0,0128	0,0010	0,0032	0,0018	0,0024	0,0033	0,0025	0,0010
16	Manufacture of corrugated board and paperboard containers	0,0133	0,0133	0,0133	1,0485	0,0178	0,0021	0,0057	0,0089	0,0104	0,0128	0,0125	0,0030
17	Manufacture of paper and paperboard products excluding 16	0,0005	0,0005	0,0005	0,0029	0,8237	0,0005	0,0010	0,0008	0,0014	0,0007	0,0005	0,0009
18	Publishing and printing of newspapers	0,0051	0,0053	0,0038	0,0053	0,0077	1,8918	0,0112	0,0048	0,0048	0,0060	0,0068	0,0046
19	Publishing of books, magazines and other printed matter	0,0059	0,0059	0,0052	0,0095	0,0139	0,0196	1,6255	0,0053	0,0058	0,0067	0,0072	0,0071
20	Manufacture of chairs and seats, use of wood	0,0005	0,0006	0,0003	0,0004	0,0005	0,0005	0,0005	2,4156	0,1187	0,0720	0,0104	0,0301
21	Manufacture of office and shop furniture, use of wood	0,0002	0,0003	0,0002	0,0003	0,0003	0,0003	0,0003	0,0305	2,6172	0,0674	0,0049	0,0080
22	Manufacture of kitchen furniture, use of wood	0,0003	0,0004	0,0002	0,0003	0,0003	0,0004	0,0003	0,0180	0,0653	2,3634	0,0132	0,0263
23	Manufacture of other furniture, use of wood	0,0004	0,0006	0,0003	0,0003	0,0004	0,0005	0,0005	0,0231	0,0707	0,0323	2,6174	0,0338
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	1,8650
25	Renovation of buildings, use of wood	0,0159	0,0248	0,0052	0,0078	0,0137	0,0124	0,0119	0,0073	0,0075	0,0095	0,0110	0,0061
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0009	0,0009	0,0008	0,0004	0,0005	0,0004	0,0005	0,0004	0,0004	0,0004	0,0004	0,0003
28	Agriculture, hunting & fishing	0,0338	0,0335	0,0342	0,0272	0,0340	0,0261	0,0264	0,0119	0,0125	0,0152	0,0226	0,0174
29	Mining and quarrying	0,0195	0,0197	0,0193	0,0069	0,0075	0,0040	0,0056	0,0032	0,0041	0,0046	0,0043	0,0027
30	Manufacture of food products, beverages and tobacco	0,0144	0,0143	0,0146	0,0109	0,0133	0,0098	0,0101	0,0044	0,0048	0,0058	0,0087	0,0066
31	Manufacture of textiles, wearing apparel and leather products	0,0020	0,0021	0,0018	0,0039	0,0116	0,0027	0,0027	0,0734	0,0057	0,0081	0,0034	0,0037
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0030	0,0029	0,0032	0,0021	0,0021	0,0015	0,0017	0,0017	0,0022	0,0024	0,0022	0,0016
34	Manufacture of chemicals and chemical products	0,0405	0,0406	0,0405	0,0280	0,0278	0,0113	0,0218	0,0231	0,0259	0,0268	0,0282	0,0104
35	Manufacture of rubber and plastic products	0,0075	0,0077	0,0073	0,0271	0,0317	0,0054	0,0070	0,0245	0,0230	0,0189	0,0103	0,0097
36	Manufacture of other non-metallic mineral products	0,0057	0,0065	0,0048	0,0036	0,0045	0,0050	0,0047	0,0047	0,0048	0,0058	0,0096	0,0128
37	Manufacture of basic metals and metal products	0,0168	0,0174	0,0165	0,0140	0,0137	0,0094	0,0123	0,0464	0,1089	0,0820	0,0444	0,0176
38	Manufacture of machinery and equipment	0,0355	0,0328	0,0414	0,0208	0,0250	0,0171	0,0178	0,0161	0,0216	0,0203	0,0202	0,0127
39	Manufacture of electrical machinery and apparatus	0,0061	0,0062	0,0056	0,0056	0,0058	0,0081	0,0074	0,0074	0,0144	0,0097	0,0098	0,0055
40	Manufacture of motor vehicles	0,0038	0,0036	0,0044	0,0036	0,0041	0,0046	0,0043	0,0048	0,0073	0,0066	0,0050	0,0032
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0009	0,0009	0,0008	0,0010	0,0011	0,0012	0,0011	0,0071	0,0155	0,0117	0,0049	0,0017
42	Electricity, gas and steam supply, excluding 27	0,0865	0,0867	0,0858	0,0346	0,0411	0,0207	0,0283	0,0213	0,0227	0,0277	0,0273	0,0161
43	Collection, purification and distribution of water	0,0017	0,0018	0,0013	0,0016	0,0023	0,0032	0,0028	0,0020	0,0020	0,0024	0,0028	0,0012
44	Construction, excluding wood construction	0,0452	0,0591	0,0302	0,0281	0,0391	0,0540	0,0484	0,0226	0,0234	0,0302	0,0337	0,0212
45	Wholesale and retail trade	0,0558	0,0577	0,0535	0,0824	0,0562	0,0739	0,0714	0,0389	0,0442	0,0558	0,0559	0,5004
46	Hotels and restaurants	0,0196	0,0182	0,0225	0,0207	0,0287	0,0298	0,0258	0,0138	0,0142	0,0179	0,0201	0,0112
47	Land transport; transport via pipelines	0,1658	0,1452	0,2397	0,1582	0,1632	0,0523	0,0632	0,0948	0,1075	0,1430	0,1377	0,1190
48	Water transport	0,0027	0,0024	0,0037	0,0021	0,0023	0,0017	0,0017	0,0012	0,0013	0,0018	0,0020	0,0031
49	Other transport; post and telecommunications	0,0497	0,0457	0,0622	0,0593	0,0596	0,1662	0,1364	0,0400	0,0425	0,0545	0,0571	0,0397
50	Financial intermediation and insurance	0,0082	0,0082	0,0073	0,0078	0,0108	0,0120	0,0109	0,0068	0,0070	0,0087	0,0098	0,0067
51	Real estate, renting and business activities; R&D	0,0814	0,0865	0,0490	0,0735	0,1120	0,1393	0,1273	0,0820	0,0824	0,1002	0,1169	0,0544
52	Community, social and other service activities	0,0766	0,0748	0,0742	0,0776	0,1101	0,7462	0,5950	0,0694	0,0705	0,0864	0,0996	0,0549
Domestic employees multiplier		1,6552	1,6586	1,6796	2,0095	1,9246	3,4232	3,0495	3,3216	3,7718	3,7197	3,9240	3,8518

(continues)

Appendix 10 (continues)
Contribution of industries to domestic employees multipliers (number of employees/ mill. FIM output)

	Industry	Industry 25	26	27	28	29	30	31	32	33	34	35	36
1	Forestry	0,1422	0,1730	0,0087	0,0068	0,0062	0,0092	0,0041	0,0051	0,0021	0,0132	0,0091	0,0103
2	Sawmilling, planing and impregnation of wood	0,1472	0,1485	0,0061	0,0038	0,0034	0,0036	0,0017	0,0026	0,0011	0,0038	0,0036	0,0062
3	Manufacture of plywood and veneer sheets	0,0179	0,0170	0,0009	0,0005	0,0008	0,0006	0,0004	0,0011	0,0003	0,0006	0,0014	0,0010
4	Manufacture of particle board and fibreboard	0,0203	0,0165	0,0001	0,0003	0,0003	0,0003	0,0002	0,0006	0,0001	0,0002	0,0008	0,0003
5	Manufacture of wooden houses	0,0062	0,3865	0,0001	0,0001	0,0002	0,0001	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001
6	Manufacture of builders' joinery and carpentry	0,3191	0,1876	0,0007	0,0021	0,0036	0,0023	0,0012	0,0014	0,0008	0,0014	0,0014	0,0024
7	Manufacture of wooden containers	0,0016	0,0025	0,0004	0,0006	0,0018	0,0013	0,0016	0,0004	0,0001	0,0028	0,0021	0,0130
8	Manufacture of other wood products	0,0011	0,0010	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,0001	0,0001	0,0003
9	Manufacture of chemical pulp	0,0013	0,0016	0,0011	0,0016	0,0014	0,0024	0,0011	0,0011	0,0004	0,0066	0,0028	0,0017
10	Manufacture of mechanical pulp and newsprint	0,0004	0,0004	0,0007	0,0006	0,0008	0,0007	0,0005	0,0007	0,0003	0,0005	0,0006	0,0005
11	Manufacture of uncoated magazine paper	0,0005	0,0005	0,0010	0,0008	0,0010	0,0009	0,0006	0,0009	0,0004	0,0007	0,0007	0,0006
12	Manufacture of coated magazine paper	0,0008	0,0008	0,0017	0,0013	0,0016	0,0055	0,0010	0,0017	0,0007	0,0017	0,0039	0,0022
13	Manufacture of fine paper	0,0007	0,0008	0,0013	0,0013	0,0015	0,0043	0,0009	0,0014	0,0006	0,0013	0,0025	0,0018
14	Manufacture of kraft paper and other paper	0,0012	0,0013	0,0011	0,0025	0,0012	0,0044	0,0008	0,0011	0,0004	0,0012	0,0023	0,0017
15	Manufacture of paperboard	0,0010	0,0010	0,0012	0,0009	0,0014	0,0019	0,0013	0,0011	0,0005	0,0015	0,0028	0,0022
16	Manufacture of corrugated board and paperboard containers	0,0027	0,0025	0,0008	0,0027	0,0041	0,0110	0,0077	0,0013	0,0004	0,0047	0,0067	0,0067
17	Manufacture of paper and paperboard products excluding 16	0,0017	0,0013	0,0001	0,0007	0,0003	0,0014	0,0004	0,0005	0,0001	0,0004	0,0012	0,0010
18	Publishing and printing of newspapers	0,0038	0,0048	0,0035	0,0082	0,0115	0,0091	0,0076	0,0084	0,0033	0,0047	0,0055	0,0058
19	Publishing of books, magazines and other printed matter	0,0062	0,0072	0,0038	0,0168	0,0104	0,0126	0,0084	0,0110	0,0037	0,0055	0,0067	0,0064
20	Manufacture of chairs and seats, use of wood	0,0397	0,0285	0,0003	0,0012	0,0008	0,0009	0,0005	0,0038	0,0002	0,0004	0,0005	0,0006
21	Manufacture of office and shop furniture, use of wood	0,0162	0,0031	0,0002	0,0006	0,0004	0,0005	0,0003	0,0040	0,0001	0,0002	0,0004	0,0004
22	Manufacture of kitchen furniture, use of wood	0,0199	0,0398	0,0002	0,0009	0,0005	0,0006	0,0003	0,0008	0,0002	0,0002	0,0003	0,0004
23	Manufacture of other furniture, use of wood	0,0341	0,0217	0,0003	0,0012	0,0008	0,0008	0,0004	0,0049	0,0002	0,0004	0,0004	0,0006
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	2,5849	0,0065	0,0039	0,0153	0,0245	0,0158	0,0082	0,0078	0,0055	0,0099	0,0092	0,0140
26	Do-it-yourself construction and renovation, use of wood	0,0000	1,9674	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0003	0,0003	0,7272	0,0012	0,0014	0,0011	0,0007	0,0036	0,0014	0,0019	0,0010	0,0011
28	Agriculture, hunting & fishing	0,0147	0,0170	0,0259	8,5673	0,0268	3,1521	0,0280	0,0138	0,0109	0,0424	0,0245	0,0194
29	Mining and quarrying	0,0022	0,0027	0,0488	0,0114	1,2779	0,0078	0,0027	0,0023	0,0028	0,0215	0,0047	0,0482
30	Manufacture of food products, beverages and tobacco	0,0056	0,0065	0,0078	0,1123	0,0102	1,2621	0,0068	0,0053	0,0041	0,0163	0,0093	0,0074
31	Manufacture of textiles, wearing apparel and leather products	0,0035	0,0038	0,0023	0,0165	0,0051	0,0089	2,9666	0,0028	0,0017	0,0037	0,0050	0,0147
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	1,4343	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0013	0,0016	0,0041	0,0042	0,0060	0,0034	0,0017	0,0014	0,3133	0,0075	0,0022	0,0046
34	Manufacture of chemicals and chemical products	0,0089	0,0086	0,0083	0,0531	0,0220	0,0265	0,0256	0,0118	0,0045	0,9123	0,0816	0,0187
35	Manufacture of rubber and plastic products	0,0084	0,0093	0,0133	0,0240	0,0087	0,0293	0,0302	0,1739	0,0064	0,0177	1,5622	0,0185
36	Manufacture of other non-metallic mineral products	0,0087	0,0153	0,0042	0,0068	0,0103	0,0112	0,0070	0,0036	0,0018	0,0084	0,0078	1,8323
37	Manufacture of basic metals and metal products	0,0143	0,0170	0,0325	0,0147	0,0212	0,0209	0,0084	0,0103	0,0104	0,0179	0,0180	0,0424
38	Manufacture of machinery and equipment	0,0098	0,0137	0,0288	0,0348	0,0888	0,0308	0,0105	0,0114	0,0099	0,0210	0,0170	0,0469
39	Manufacture of electrical machinery and apparatus	0,0046	0,0058	0,0115	0,0135	0,0104	0,0101	0,0053	0,0284	0,0034	0,0049	0,0058	0,0063
40	Manufacture of motor vehicles	0,0027	0,0032	0,0029	0,0039	0,0079	0,0054	0,0028	0,0038	0,0017	0,0032	0,0046	0,0058
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0015	0,0017	0,0010	0,0028	0,0016	0,0021	0,0085	0,0198	0,0006	0,0010	0,0014	0,0040
42	Electricity, gas and steam supply, excluding 27	0,0130	0,0155	0,2220	0,0282	0,0328	0,0288	0,0162	0,0140	0,0323	0,0447	0,0243	0,0270
43	Collection, purification and distribution of water	0,0010	0,0013	0,0019	0,0012	0,0035	0,0031	0,0025	0,0025	0,0015	0,0022	0,0022	0,0027
44	Construction, excluding wood construction	0,0164	0,0220	0,0378	0,0488	0,0582	0,0469	0,0238	0,0235	0,0168	0,0291	0,0267	0,0394
45	Wholesale and retail trade	0,4398	0,4973	0,0326	0,3357	0,0956	0,1696	0,0447	0,1393	0,1027	0,0606	0,0510	0,0576
46	Hotels and restaurants	0,0087	0,0114	0,0140	0,0094	0,0214	0,0188	0,0164	0,0117	0,0100	0,0165	0,0252	0,0172
47	Land transport; transport via pipelines	0,1050	0,1223	0,0710	0,0614	0,4093	0,2083	0,0793	0,0650	0,0417	0,1244	0,0913	0,2189
48	Water transport	0,0026	0,0030	0,0012	0,0018	0,0023	0,0021	0,0011	0,0446	0,0098	0,0017	0,0017	0,0017
49	Other transport; post and telecommunications	0,0318	0,0406	0,0210	0,0583	0,0420	0,0676	0,0409	0,0274	0,0259	0,0418	0,0425	0,0570
50	Financial intermediation and insurance	0,0055	0,0069	0,0056	0,0158	0,0161	0,0145	0,0091	0,1065	0,0048	0,0072	0,0087	0,0087
51	Real estate, renting and business activities; R&D	0,0432	0,0570	0,0587	0,0527	0,1989	0,1220	0,1213	0,1205	0,0532	0,0761	0,0896	0,0927
52	Community, social and other service activities	0,0441	0,0569	0,0638	0,1347	0,1217	0,1381	0,0874	0,0609	0,0527	0,0823	0,0984	0,0908
Domestic employees multiplier		4,1685	3,9627	1,4862	9,6854	2,5790	5,4820	3,5969	2,4040	0,7460	1,6287	2,2717	2,7642

(continues)

Appendix 10 (continues)
Contribution of industries to domestic employees multipliers (number of employees/ mill. FIM output)

Industry		37	38	39	40	41	42	43	44	45	46	47	48
1	Forestry	0,0047	0,0041	0,0026	0,0040	0,0174	0,0100	0,0031	0,0067	0,0042	0,0058	0,0014	0,0038
2	Sawmilling, planing and impregnation of wood	0,0027	0,0025	0,0014	0,0023	0,0146	0,0070	0,0020	0,0054	0,0017	0,0029	0,0006	0,0013
3	Manufacture of plywood and veneer sheets	0,0006	0,0007	0,0004	0,0008	0,0086	0,0010	0,0004	0,0005	0,0004	0,0007	0,0002	0,0004
4	Manufacture of particle board and fibreboard	0,0003	0,0002	0,0001	0,0006	0,0092	0,0001	0,0001	0,0002	0,0002	0,0004	0,0001	0,0003
5	Manufacture of wooden houses	0,0001	0,0001	0,0000	0,0001	0,0002	0,0001	0,0000	0,0001	0,0001	0,0001	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0015	0,0022	0,0010	0,0023	0,0044	0,0008	0,0010	0,0012	0,0012	0,0036	0,0005	0,0010
7	Manufacture of wooden containers	0,0043	0,0043	0,0022	0,0016	0,0019	0,0005	0,0003	0,0018	0,0003	0,0005	0,0002	0,0003
8	Manufacture of other wood products	0,0003	0,0002	0,0001	0,0002	0,0030	0,0001	0,0000	0,0001	0,0001	0,0001	0,0000	0,0001
9	Manufacture of chemical pulp	0,0009	0,0007	0,0005	0,0007	0,0011	0,0012	0,0006	0,0009	0,0010	0,0012	0,0003	0,0009
10	Manufacture of mechanical pulp and newsprint	0,0006	0,0005	0,0004	0,0006	0,0005	0,0008	0,0003	0,0004	0,0012	0,0009	0,0002	0,0007
11	Manufacture of uncoated magazine paper	0,0007	0,0007	0,0004	0,0007	0,0006	0,0011	0,0004	0,0005	0,0012	0,0009	0,0003	0,0009
12	Manufacture of coated magazine paper	0,0012	0,0011	0,0007	0,0011	0,0012	0,0019	0,0008	0,0009	0,0015	0,0024	0,0006	0,0023
13	Manufacture of fine paper	0,0011	0,0010	0,0007	0,0010	0,0011	0,0015	0,0006	0,0008	0,0016	0,0021	0,0006	0,0021
14	Manufacture of kraft paper and other paper	0,0009	0,0008	0,0006	0,0008	0,0012	0,0012	0,0005	0,0006	0,0011	0,0018	0,0004	0,0016
15	Manufacture of paperboard	0,0011	0,0009	0,0008	0,0008	0,0021	0,0014	0,0005	0,0007	0,0010	0,0012	0,0003	0,0006
16	Manufacture of corrugated board and paperboard containers	0,0037	0,0019	0,0042	0,0017	0,0123	0,0009	0,0005	0,0019	0,0009	0,0030	0,0003	0,0007
17	Manufacture of paper and paperboard products excluding 16	0,0005	0,0003	0,0004	0,0003	0,0006	0,0002	0,0001	0,0004	0,0014	0,0006	0,0002	0,0008
18	Publishing and printing of newspapers	0,0068	0,0075	0,0059	0,0084	0,0063	0,0041	0,0032	0,0043	0,0154	0,0142	0,0036	0,0126
19	Publishing of books, magazines and other printed matter	0,0077	0,0076	0,0059	0,0079	0,0073	0,0043	0,0037	0,0065	0,0286	0,0145	0,0058	0,0233
20	Manufacture of chairs and seats, use of wood	0,0006	0,0007	0,0004	0,0035	0,0193	0,0003	0,0003	0,0004	0,0011	0,0010	0,0004	0,0020
21	Manufacture of office and shop furniture, use of wood	0,0009	0,0006	0,0006	0,0018	0,0165	0,0002	0,0003	0,0006	0,0006	0,0005	0,0002	0,0009
22	Manufacture of kitchen furniture, use of wood	0,0004	0,0005	0,0003	0,0027	0,0062	0,0002	0,0002	0,0003	0,0008	0,0007	0,0003	0,0015
23	Manufacture of other furniture, use of wood	0,0013	0,0009	0,0004	0,0038	0,0074	0,0003	0,0003	0,0007	0,0011	0,0009	0,0004	0,0020
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0095	0,0119	0,0068	0,0138	0,0081	0,0045	0,0072	0,0048	0,0078	0,0269	0,0024	0,0061
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0012	0,0006	0,0003	0,0007	0,0006	0,0066	0,0016	0,0006	0,0006	0,0006	0,0003	0,0003
28	Agriculture, hunting & fishing	0,0183	0,0202	0,0143	0,0167	0,0175	0,0296	0,0129	0,0153	0,0470	0,7909	0,0077	0,0510
29	Mining and quarrying	0,0160	0,0033	0,0017	0,0038	0,0035	0,0559	0,0035	0,0365	0,0025	0,0038	0,0011	0,0021
30	Manufacture of food products, beverages and tobacco	0,0069	0,0076	0,0054	0,0063	0,0066	0,0089	0,0048	0,0058	0,0177	0,2958	0,0029	0,0192
31	Manufacture of textiles, wearing apparel and leather products	0,0036	0,0042	0,0036	0,0047	0,0164	0,0026	0,0023	0,0116	0,0055	0,0072	0,0020	0,0041
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0081	0,0019	0,0010	0,0020	0,0025	0,0047	0,0011	0,0033	0,0026	0,0016	0,0104	0,0072
34	Manufacture of chemicals and chemical products	0,0145	0,0059	0,0059	0,0099	0,0214	0,0095	0,0115	0,0223	0,0069	0,0097	0,0026	0,0038
35	Manufacture of rubber and plastic products	0,0065	0,0110	0,0121	0,0167	0,0269	0,0152	0,0432	0,0361	0,0254	0,0118	0,0082	0,0056
36	Manufacture of other non-metallic mineral products	0,0062	0,0055	0,0025	0,0174	0,0133	0,0049	0,0079	0,1476	0,0064	0,0071	0,0021	0,0068
37	Manufacture of basic metals and metal products	1,3053	0,1087	0,0302	0,1089	0,0866	0,0372	0,0080	0,1476	0,0086	0,0119	0,0087	0,0090
38	Manufacture of machinery and equipment	0,0280	1,5246	0,0123	0,0929	0,0158	0,0330	0,0217	0,0379	0,0067	0,0126	0,0433	0,0059
39	Manufacture of electrical machinery and apparatus	0,0092	0,0302	1,1934	0,0210	0,0154	0,0132	0,0038	0,0219	0,0137	0,0106	0,0062	0,0243
40	Manufacture of motor vehicles	0,0181	0,0242	0,0032	1,6440	0,0063	0,0033	0,0018	0,0089	0,0037	0,0039	0,0260	0,0109
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0110	0,0032	0,0015	0,0058	2,2382	0,0011	0,0008	0,0072	0,0028	0,0018	0,0011	0,0044
42	Electricity, gas and steam supply, excluding 27	0,0285	0,0150	0,0081	0,0166	0,0168	0,8584	0,0375	0,0155	0,0156	0,0154	0,0074	0,0078
43	Collection, purification and distribution of water	0,0022	0,0028	0,0021	0,0031	0,0023	0,0022	1,3397	0,0012	0,0032	0,0039	0,0007	0,0017
44	Construction, excluding wood construction	0,0277	0,0316	0,0188	0,0344	0,0240	0,0432	0,0201	2,2633	0,0312	0,0575	0,0124	0,0591
45	Wholesale and retail trade	0,0874	0,0705	0,0564	0,0715	0,1112	0,0373	0,0257	0,2773	3,1357	0,2128	0,1591	0,2335
46	Hotels and restaurants	0,0193	0,0242	0,0176	0,0171	0,0187	0,0161	0,0146	0,0108	0,0186	2,9437	0,0061	0,0118
47	Land transport; transport via pipelines	0,1264	0,0688	0,0401	0,0600	0,0894	0,0812	0,0270	0,1275	0,1252	0,0640	2,6501	0,0289
48	Water transport	0,0019	0,0016	0,0011	0,0013	0,0016	0,0013	0,0009	0,0025	0,0024	0,0013	0,0015	1,4844
49	Other transport; post and telecommunications	0,0443	0,0417	0,0293	0,0355	0,0421	0,0240	0,0234	0,0345	0,0917	0,0396	0,0426	0,2706
50	Financial intermediation and insurance	0,0096	0,0106	0,0081	0,0109	0,0089	0,0064	0,0050	0,0147	0,0194	0,0226	0,0203	0,0319
51	Real estate, renting and business activities; R&D	0,1153	0,1308	0,1034	0,1545	0,1066	0,0672	0,0541	0,0546	0,1252	0,2463	0,0374	0,1056
52	Community, social and other service activities	0,0916	0,1119	0,0908	0,1009	0,0885	0,0730	0,0647	0,1001	0,1438	0,2388	0,0436	0,0583
Domestic employees multiplier		2,0593	2,3123	1,7000	2,5181	3,1323	1,4791	1,7640	3,4451	3,9363	5,1020	3,1236	2,5145

(continues)

Appendix 10 (continues)
Contribution of industries to domestic employees multipliers (number of employees/ mill. FIM output)

		Industry			
Industry		49	50	51	52
1	Forestry	0,0030	0,0039	0,0071	0,0032
2	Sawmilling, planing and impregnation of wood	0,0017	0,0017	0,0044	0,0012
3	Manufacture of plywood and veneer sheets	0,0003	0,0004	0,0008	0,0003
4	Manufacture of particle board and fibreboard	0,0002	0,0003	0,0006	0,0001
5	Manufacture of wooden houses	0,0001	0,0001	0,0002	0,0000
6	Manufacture of builders' joinery and carpentry	0,0011	0,0019	0,0067	0,0008
7	Manufacture of wooden containers	0,0004	0,0002	0,0003	0,0002
8	Manufacture of other wood products	0,0000	0,0001	0,0001	0,0000
9	Manufacture of chemical pulp	0,0006	0,0007	0,0010	0,0008
10	Manufacture of mechanical pulp and newsprint	0,0005	0,0006	0,0008	0,0010
11	Manufacture of uncoated magazine paper	0,0006	0,0007	0,0010	0,0014
12	Manufacture of coated magazine paper	0,0009	0,0013	0,0020	0,0012
13	Manufacture of fine paper	0,0009	0,0012	0,0019	0,0017
14	Manufacture of kraft paper and other paper	0,0007	0,0009	0,0012	0,0009
15	Manufacture of paperboard	0,0006	0,0008	0,0008	0,0007
16	Manufacture of corrugated board and paperboard containers	0,0007	0,0004	0,0006	0,0006
17	Manufacture of paper and paperboard products excluding 16	0,0003	0,0003	0,0006	0,0007
18	Publishing and printing of newspapers	0,0078	0,0098	0,0140	0,0197
19	Publishing of books, magazines and other printed matter	0,0129	0,0124	0,0236	0,0467
20	Manufacture of chairs and seats, use of wood	0,0007	0,0010	0,0018	0,0008
21	Manufacture of office and shop furniture, use of wood	0,0004	0,0005	0,0008	0,0004
22	Manufacture of kitchen furniture, use of wood	0,0005	0,0007	0,0012	0,0006
23	Manufacture of other furniture, use of wood	0,0007	0,0009	0,0017	0,0008
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0077	0,0145	0,0525	0,0059
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0004	0,0005	0,0012	0,0006
28	Agriculture, hunting & fishing	0,0326	0,0143	0,0177	0,0552
29	Mining and quarrying	0,0062	0,0020	0,0043	0,0018
30	Manufacture of food products, beverages and tobacco	0,0123	0,0054	0,0067	0,0194
31	Manufacture of textiles, wearing apparel and leather products	0,0049	0,0020	0,0034	0,0043
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0042	0,0011	0,0019	0,0013
34	Manufacture of chemicals and chemical products	0,0054	0,0025	0,0048	0,0056
35	Manufacture of rubber and plastic products	0,0123	0,0031	0,0060	0,0071
36	Manufacture of other non-metallic mineral products	0,0226	0,0039	0,0094	0,0032
37	Manufacture of basic metals and metal products	0,0255	0,0065	0,0131	0,0060
38	Manufacture of machinery and equipment	0,0102	0,0043	0,0085	0,0081
39	Manufacture of electrical machinery and apparatus	0,0191	0,0105	0,0149	0,0093
40	Manufacture of motor vehicles	0,0197	0,0022	0,0028	0,0061
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0023	0,0096	0,0030	0,0023
42	Electricity, gas and steam supply, excluding 27	0,0098	0,0135	0,0295	0,0144
43	Collection, purification and distribution of water	0,0014	0,0038	0,0163	0,0017
44	Construction, excluding wood construction	0,3264	0,0365	0,1119	0,0197
45	Wholesale and retail trade	0,1511	0,0841	0,1621	0,1590
46	Hotels and restaurants	0,0455	0,0168	0,0137	0,0221
47	Land transport; transport via pipelines	0,0557	0,0190	0,0255	0,0308
48	Water transport	0,0025	0,0011	0,0012	0,0015
49	Other transport; post and telecommunications	1,7905	0,0553	0,0601	0,0472
50	Financial intermediation and insurance	0,0084	1,7899	0,0254	0,0135
51	Real estate, renting and business activities; R&D	0,0811	0,1426	1,1763	0,0519
52	Community, social and other service activities	0,0577	0,1073	0,2043	4,1221
Domestic employees multiplier		2,7510	2,3933	2,0494	4,7038

Appendix 11
Contribution of industries to domestic working hours multipliers (1000 hours/ mill. FIM output)

		Industry											
Industry		1	2	3	4	5	6	7	8	9	10	11	12
1	Forestry	3,2772	1,6096	0,7407	0,2332	0,6213	0,3869	0,5693	0,2900	0,7933	0,3397	0,3398	0,3400
2	Sawmilling, planing and impregnation of wood	0,0004	1,6207	0,0192	0,1836	0,3222	0,2803	0,5478	0,2443	0,0903	0,0430	0,0431	0,0433
3	Manufacture of plywood and veneer sheets	0,0001	0,0024	3,7065	0,0186	0,0306	0,0802	0,1040	0,1132	0,0036	0,0023	0,0024	0,0024
4	Manufacture of particle board and fibreboard	0,0000	0,0002	0,0011	2,3383	0,0106	0,0290	0,0169	0,0157	0,0001	0,0003	0,0003	0,0003
5	Manufacture of wooden houses	0,0001	0,0015	0,0013	0,0014	2,8492	0,0044	0,0044	0,0025	0,0012	0,0006	0,0006	0,0006
6	Manufacture of builders' joinery and carpentry	0,0001	0,0023	0,0030	0,0047	0,3773	3,4553	0,0069	0,0043	0,0014	0,0035	0,0037	0,0040
7	Manufacture of wooden containers	0,0001	0,0010	0,0068	0,0157	0,0035	0,0032	2,6860	0,0090	0,0005	0,0079	0,0079	0,0079
8	Manufacture of other wood products	0,0000	0,0002	0,0002	0,0010	0,0015	0,0032	0,0431	4,4743	0,0003	0,0003	0,0003	0,0003
9	Manufacture of chemical pulp	0,0002	0,0010	0,0031	0,0089	0,0024	0,0028	0,0027	0,0021	0,4770	0,0969	0,0969	0,0969
10	Manufacture of mechanical pulp and newsprint	0,0001	0,0005	0,0006	0,0011	0,0008	0,0008	0,0006	0,0006	0,0004	0,8703	0,0046	0,0046
11	Manufacture of uncoated magazine paper	0,0001	0,0006	0,0007	0,0012	0,0010	0,0011	0,0008	0,0008	0,0005	0,0010	0,8668	0,0010
12	Manufacture of coated magazine paper	0,0001	0,0009	0,0012	0,0020	0,0016	0,0018	0,0012	0,0012	0,0008	0,0017	0,0017	0,8675
13	Manufacture of fine paper	0,0002	0,0009	0,0012	0,0023	0,0014	0,0017	0,0011	0,0011	0,0007	0,0106	0,0106	0,0106
14	Manufacture of kraft paper and other paper	0,0003	0,0008	0,0072	0,0261	0,0014	0,0020	0,0013	0,0018	0,0022	0,0125	0,0125	0,0125
15	Manufacture of paperboard	0,0003	0,0011	0,0059	0,0235	0,0019	0,0025	0,0013	0,0018	0,0007	0,0072	0,0072	0,0072
16	Manufacture of corrugated board and paperboard containers	0,0002	0,0044	0,0052	0,0154	0,0057	0,0077	0,0024	0,0019	0,0012	0,0215	0,0215	0,0215
17	Manufacture of paper and paperboard products excluding 16	0,0001	0,0003	0,0006	0,0012	0,0006	0,0025	0,0003	0,0004	0,0002	0,0008	0,0008	0,0008
18	Publishing and printing of newspapers	0,0014	0,0054	0,0061	0,0076	0,0090	0,0078	0,0059	0,0074	0,0032	0,0063	0,0065	0,0068
19	Publishing of books, magazines and other printed matter	0,0033	0,0073	0,0081	0,0103	0,0107	0,0101	0,0073	0,0084	0,0042	0,0085	0,0088	0,0091
20	Manufacture of chairs and seats, use of wood	0,0002	0,0005	0,0007	0,0009	0,0019	0,0010	0,0023	0,0007	0,0003	0,0007	0,0007	0,0007
21	Manufacture of office and shop furniture, use of wood	0,0001	0,0003	0,0003	0,0006	0,0016	0,0008	0,0013	0,0004	0,0001	0,0004	0,0004	0,0004
22	Manufacture of kitchen furniture, use of wood	0,0002	0,0004	0,0004	0,0061	0,0033	0,0023	0,0032	0,0013	0,0002	0,0004	0,0004	0,0005
23	Manufacture of other furniture, use of wood	0,0003	0,0006	0,0006	0,0013	0,0030	0,0011	0,0036	0,0007	0,0003	0,0006	0,0007	0,0007
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0010	0,0162	0,0235	0,0286	0,0318	0,0278	0,0184	0,0191	0,0052	0,0288	0,0309	0,0336
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0001	0,0005	0,0008	0,0014	0,0006	0,0007	0,0005	0,0005	0,0006	0,0013	0,0014	0,0014
28	Agriculture, hunting & fishing	0,0092	0,0236	0,0374	0,0509	0,0325	0,0369	0,0236	0,0247	0,0212	0,0693	0,0699	0,0706
29	Mining and quarrying	0,0008	0,0065	0,0110	0,0198	0,0085	0,0089	0,0059	0,0051	0,0099	0,0340	0,0340	0,0340
30	Manufacture of food products, beverages and tobacco	0,0027	0,0069	0,0111	0,0151	0,0096	0,0110	0,0069	0,0072	0,0062	0,0231	0,0233	0,0235
31	Manufacture of textiles, wearing apparel and leather products	0,0041	0,0035	0,0030	0,0034	0,0058	0,0051	0,0033	0,0781	0,0022	0,0031	0,0031	0,0032
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0033	0,0044	0,0042	0,0088	0,0039	0,0037	0,0036	0,0030	0,0034	0,0053	0,0052	0,0051
34	Manufacture of chemicals and chemical products	0,0031	0,0067	0,0687	0,1420	0,0188	0,0452	0,0104	0,0285	0,0565	0,0667	0,0667	0,0666
35	Manufacture of rubber and plastic products	0,0021	0,0064	0,0112	0,0126	0,0157	0,0214	0,0071	0,0211	0,0045	0,0121	0,0121	0,0122
36	Manufacture of other non-metallic mineral products	0,0025	0,0056	0,0095	0,0098	0,0789	0,0685	0,0055	0,0053	0,0065	0,0089	0,0091	0,0092
37	Manufacture of basic metals and metal products	0,0033	0,0171	0,0205	0,0410	0,0596	0,0856	0,0554	0,0338	0,0130	0,0271	0,0275	0,0279
38	Manufacture of machinery and equipment	0,0014	0,0285	0,0329	0,0707	0,0552	0,0477	0,0306	0,0262	0,0254	0,0543	0,0568	0,0602
39	Manufacture of electrical machinery and apparatus	0,0034	0,0074	0,0080	0,0110	0,0124	0,0087	0,0074	0,0077	0,0050	0,0093	0,0096	0,0099
40	Manufacture of motor vehicles	0,0006	0,0056	0,0054	0,0081	0,0082	0,0084	0,0069	0,0057	0,0030	0,0065	0,0064	0,0062
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0007	0,0012	0,0012	0,0017	0,0033	0,0030	0,0026	0,0018	0,0007	0,0013	0,0013	0,0013
42	Electricity, gas and steam supply, excluding 27	0,0019	0,0439	0,0650	0,1249	0,0404	0,0409	0,0392	0,0308	0,0605	0,1368	0,1369	0,1371
43	Collection, purification and distribution of water	0,0002	0,0018	0,0022	0,0029	0,0037	0,0033	0,0022	0,0030	0,0010	0,0023	0,0024	0,0025
44	Construction, excluding wood construction	0,0385	0,0669	0,0743	0,0882	0,0919	0,0785	0,0614	0,0573	0,0314	0,0854	0,0888	0,0931
45	Wholesale and retail trade	0,1558	0,1393	0,1066	0,1155	0,1343	0,1092	0,1107	0,0893	0,0796	0,1009	0,1012	0,1017
46	Hotels and restaurants	0,0148	0,0283	0,0346	0,0398	0,0378	0,0328	0,0276	0,0251	0,0182	0,0305	0,0320	0,0340
47	Land transport; transport via pipelines	0,0202	0,4406	0,3635	0,4963	0,3886	0,3322	0,3850	0,2915	0,1785	0,4409	0,4120	0,3743
48	Water transport	0,0016	0,0092	0,0059	0,0078	0,0053	0,0046	0,0052	0,0037	0,0031	0,0065	0,0062	0,0058
49	Other transport; post and telecommunications	0,0179	0,0824	0,0869	0,1162	0,1060	0,0903	0,0870	0,0768	0,0498	0,0938	0,0905	0,0863
50	Financial intermediation and insurance	0,0046	0,0113	0,0121	0,0146	0,0158	0,0137	0,0112	0,0123	0,0066	0,0120	0,0123	0,0127
51	Real estate, renting and business activities; R&D	0,0103	0,0906	0,1115	0,1418	0,1797	0,1578	0,1103	0,1560	0,0595	0,1156	0,1213	0,1289
52	Community, social and other service activities	0,0103	0,0774	0,1050	0,1311	0,1387	0,1227	0,0898	0,1007	0,0517	0,1002	0,1052	0,1118
Domestic working hours multiplier (1000h)		3,5997	4,3944	5,7367	4,6092	5,7496	5,6569	5,1319	6,2982	2,0860	2,9132	2,9043	2,8928

(continues)

Appendix 11 (continues)
Contribution of industries to domestic working hours multipliers (1000 hours/ mill. FIM output)

		Industry											
Industry		13	14	15	16	17	18	19	20	21	22	23	24
1	Forestry	0,3401	0,3410	0,3388	0,0939	0,1143	0,0372	0,0654	0,0696	0,0622	0,1913	0,2305	0,3507
2	Sawmilling, planing and impregnation of wood	0,0433	0,0442	0,0422	0,0147	0,0152	0,0063	0,0099	0,0418	0,0416	0,1143	0,1932	0,2952
3	Manufacture of plywood and veneer sheets	0,0024	0,0025	0,0022	0,0034	0,0013	0,0008	0,0010	0,0957	0,0615	0,0584	0,0792	0,0762
4	Manufacture of particle board and fibreboard	0,0004	0,0005	0,0002	0,0015	0,0004	0,0003	0,0003	0,0744	0,1377	0,2645	0,1025	0,0256
5	Manufacture of wooden houses	0,0006	0,0007	0,0006	0,0003	0,0003	0,0002	0,0002	0,0009	0,0007	0,0012	0,0050	0,2069
6	Manufacture of builders' joinery and carpentry	0,0040	0,0059	0,0019	0,0062	0,0034	0,0029	0,0028	0,0048	0,0100	0,0121	0,2147	0,6050
7	Manufacture of wooden containers	0,0079	0,0079	0,0079	0,0098	0,0054	0,0011	0,0029	0,0035	0,0071	0,0060	0,0032	0,0076
8	Manufacture of other wood products	0,0003	0,0004	0,0003	0,0021	0,0002	0,0001	0,0001	0,0130	0,0046	0,0195	0,0151	0,0021
9	Manufacture of chemical pulp	0,0969	0,0969	0,0969	0,0259	0,0342	0,0101	0,0182	0,0018	0,0022	0,0028	0,0028	0,0036
10	Manufacture of mechanical pulp and newsprint	0,0046	0,0046	0,0045	0,0017	0,0027	0,0753	0,0202	0,0006	0,0007	0,0008	0,0009	0,0007
11	Manufacture of uncoated magazine paper	0,0010	0,0010	0,0009	0,0010	0,0064	0,0018	0,0677	0,0008	0,0009	0,0009	0,0010	0,0008
12	Manufacture of coated magazine paper	0,0017	0,0017	0,0016	0,0019	0,0037	0,0017	0,0120	0,0013	0,0015	0,0015	0,0016	0,0012
13	Manufacture of fine paper	0,8765	0,0107	0,0106	0,0167	0,0371	0,0091	0,0504	0,0013	0,0015	0,0016	0,0017	0,0012
14	Manufacture of kraft paper and other paper	0,0125	0,8783	0,0125	0,0443	0,1590	0,0024	0,0105	0,0022	0,0032	0,0053	0,0039	0,0024
15	Manufacture of paperboard	0,0072	0,0072	0,8729	0,1705	0,0209	0,0017	0,0053	0,0030	0,0039	0,0054	0,0041	0,0017
16	Manufacture of corrugated board and paperboard containers	0,0215	0,0215	0,0215	1,6959	0,0287	0,0035	0,0092	0,0145	0,0168	0,0206	0,0203	0,0049
17	Manufacture of paper and paperboard products excluding 16	0,0008	0,0008	0,0008	0,0048	1,3655	0,0008	0,0017	0,0013	0,0023	0,0011	0,0009	0,0016
18	Publishing and printing of newspapers	0,0073	0,0075	0,0054	0,0076	0,0109	2,6981	0,0160	0,0068	0,0069	0,0085	0,0097	0,0066
19	Publishing of books, magazines and other printed matter	0,0095	0,0095	0,0083	0,0152	0,0223	0,0314	2,6078	0,0085	0,0093	0,0107	0,0116	0,0113
20	Manufacture of chairs and seats, use of wood	0,0007	0,0010	0,0005	0,0006	0,0008	0,0009	0,0008	3,8841	0,1908	0,1157	0,0167	0,0484
21	Manufacture of office and shop furniture, use of wood	0,0004	0,0005	0,0003	0,0004	0,0005	0,0004	0,0004	0,0495	4,2492	0,1094	0,0080	0,0131
22	Manufacture of kitchen furniture, use of wood	0,0005	0,0006	0,0003	0,0004	0,0005	0,0006	0,0005	0,0289	0,1046	3,7845	0,0211	0,0422
23	Manufacture of other furniture, use of wood	0,0007	0,0009	0,0005	0,0005	0,0007	0,0008	0,0008	0,0377	0,1154	0,0528	4,2734	0,0551
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	4,0520
25	Renovation of buildings, use of wood	0,0345	0,0539	0,0113	0,0169	0,0298	0,0269	0,0259	0,0160	0,0164	0,0207	0,0239	0,0133
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0014	0,0014	0,0013	0,0007	0,0008	0,0007	0,0007	0,0006	0,0006	0,0007	0,0007	0,0005
28	Agriculture, hunting & fishing	0,0709	0,0701	0,0717	0,0570	0,0713	0,0546	0,0553	0,0249	0,0263	0,0318	0,0474	0,0364
29	Mining and quarrying	0,0340	0,0344	0,0337	0,0120	0,0131	0,0070	0,0098	0,0057	0,0072	0,0081	0,0075	0,0047
30	Manufacture of food products, beverages and tobacco	0,0236	0,0234	0,0238	0,0178	0,0217	0,0160	0,0165	0,0072	0,0078	0,0094	0,0143	0,0108
31	Manufacture of textiles, wearing apparel and leather products	0,0033	0,0034	0,0029	0,0062	0,0187	0,0044	0,0044	0,1177	0,0091	0,0130	0,0055	0,0060
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0050	0,0049	0,0054	0,0034	0,0035	0,0025	0,0028	0,0028	0,0036	0,0040	0,0037	0,0026
34	Manufacture of chemicals and chemical products	0,0666	0,0667	0,0666	0,0460	0,0457	0,0186	0,0358	0,0380	0,0426	0,0440	0,0463	0,0171
35	Manufacture of rubber and plastic products	0,0122	0,0125	0,0119	0,0440	0,0515	0,0089	0,0114	0,0398	0,0375	0,0307	0,0167	0,0157
36	Manufacture of other non-metallic mineral products	0,0092	0,0106	0,0078	0,0059	0,0074	0,0081	0,0077	0,0076	0,0079	0,0094	0,0156	0,0208
37	Manufacture of basic metals and metal products	0,0278	0,0288	0,0272	0,0232	0,0227	0,0155	0,0203	0,0767	0,1800	0,1356	0,0735	0,0291
38	Manufacture of machinery and equipment	0,0598	0,0553	0,0697	0,0351	0,0422	0,0289	0,0300	0,0271	0,0364	0,0342	0,0340	0,0215
39	Manufacture of electrical machinery and apparatus	0,0102	0,0103	0,0094	0,0093	0,0097	0,0134	0,0122	0,0124	0,0240	0,0162	0,0163	0,0092
40	Manufacture of motor vehicles	0,0060	0,0056	0,0069	0,0057	0,0064	0,0072	0,0067	0,0076	0,0114	0,0103	0,0078	0,0050
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0014	0,0014	0,0012	0,0015	0,0018	0,0019	0,0018	0,0113	0,0249	0,0188	0,0079	0,0027
42	Electricity, gas and steam supply, excluding 27	0,1375	0,1377	0,1362	0,0550	0,0653	0,0328	0,0449	0,0339	0,0360	0,0441	0,0433	0,0256
43	Collection, purification and distribution of water	0,0027	0,0028	0,0021	0,0024	0,0035	0,0049	0,0043	0,0030	0,0030	0,0037	0,0044	0,0019
44	Construction, excluding wood construction	0,0935	0,1223	0,0624	0,0581	0,0809	0,1117	0,1001	0,0467	0,0484	0,0625	0,0698	0,0439
45	Wholesale and retail trade	0,1019	0,1054	0,0977	0,1506	0,1026	0,1350	0,1304	0,0711	0,0807	0,1019	0,1021	0,9140
46	Hotels and restaurants	0,0340	0,0315	0,0390	0,0358	0,0496	0,0515	0,0446	0,0238	0,0246	0,0309	0,0348	0,0193
47	Land transport; transport via pipelines	0,3344	0,2929	0,4835	0,3191	0,3291	0,1056	0,1274	0,1912	0,2169	0,2884	0,2776	0,2401
48	Water transport	0,0053	0,0048	0,0073	0,0042	0,0046	0,0034	0,0033	0,0024	0,0026	0,0036	0,0039	0,0062
49	Other transport; post and telecommunications	0,0814	0,0749	0,1019	0,0971	0,0976	0,2722	0,2234	0,0654	0,0695	0,0893	0,0934	0,0650
50	Financial intermediation and insurance	0,0133	0,0133	0,0118	0,0126	0,0175	0,0194	0,0175	0,0110	0,0112	0,0140	0,0159	0,0109
51	Real estate, renting and business activities; R&D	0,1445	0,1537	0,0870	0,1305	0,1989	0,2474	0,2261	0,1456	0,1464	0,1780	0,2076	0,0967
52	Community, social and other service activities	0,1157	0,1129	0,1121	0,1172	0,1662	1,1268	0,8985	0,1048	0,1064	0,1305	0,1504	0,0830
Domestic working hours multiplier (1000h)		2,8711	2,8804	2,9235	3,3867	3,2963	5,2124	4,9663	5,4397	6,2159	6,1229	6,5454	7,5179

(continues)

Appendix 11 (continues)
Contribution of industries to domestic working hours multipliers (1000 hours/ mill. FIM output)

		Industry											
Industry		25	26	27	28	29	30	31	32	33	34	35	36
1	Forestry	0,2665	0,3242	0,0164	0,0127	0,0117	0,0172	0,0077	0,0095	0,0039	0,0248	0,0170	0,0192
2	Sawmilling, planing and impregnation of wood	0,2430	0,2452	0,0101	0,0063	0,0056	0,0059	0,0029	0,0043	0,0019	0,0063	0,0059	0,0103
3	Manufacture of plywood and veneer sheets	0,0296	0,0281	0,0015	0,0009	0,0013	0,0010	0,0007	0,0017	0,0005	0,0010	0,0023	0,0017
4	Manufacture of particle board and fibreboard	0,0334	0,0271	0,0001	0,0004	0,0005	0,0004	0,0003	0,0009	0,0001	0,0003	0,0012	0,0005
5	Manufacture of wooden houses	0,0099	0,6182	0,0001	0,0001	0,0003	0,0002	0,0001	0,0001	0,0001	0,0001	0,0001	0,0002
6	Manufacture of builders' joinery and carpentry	0,5319	0,3128	0,0011	0,0036	0,0060	0,0038	0,0021	0,0024	0,0013	0,0024	0,0024	0,0040
7	Manufacture of wooden containers	0,0028	0,0042	0,0007	0,0009	0,0031	0,0022	0,0027	0,0007	0,0002	0,0047	0,0035	0,0219
8	Manufacture of other wood products	0,0018	0,0017	0,0001	0,0001	0,0002	0,0001	0,0001	0,0002	0,0000	0,0001	0,0001	0,0006
9	Manufacture of chemical pulp	0,0022	0,0027	0,0018	0,0027	0,0023	0,0040	0,0018	0,0018	0,0007	0,0110	0,0047	0,0028
10	Manufacture of mechanical pulp and newsprint	0,0007	0,0007	0,0011	0,0010	0,0014	0,0012	0,0008	0,0011	0,0005	0,0009	0,0009	0,0009
11	Manufacture of uncoated magazine paper	0,0008	0,0009	0,0016	0,0013	0,0016	0,0014	0,0009	0,0015	0,0006	0,0012	0,0011	0,0011
12	Manufacture of coated magazine paper	0,0012	0,0013	0,0027	0,0021	0,0027	0,0090	0,0016	0,0027	0,0011	0,0028	0,0064	0,0035
13	Manufacture of fine paper	0,0012	0,0013	0,0022	0,0021	0,0024	0,0070	0,0015	0,0023	0,0009	0,0021	0,0041	0,0030
14	Manufacture of kraft paper and other paper	0,0020	0,0021	0,0018	0,0040	0,0019	0,0071	0,0014	0,0018	0,0007	0,0019	0,0038	0,0027
15	Manufacture of paperboard	0,0016	0,0016	0,0019	0,0014	0,0022	0,0032	0,0021	0,0019	0,0007	0,0024	0,0046	0,0035
16	Manufacture of corrugated board and paperboard containers	0,0044	0,0040	0,0012	0,0044	0,0066	0,0178	0,0125	0,0021	0,0007	0,0076	0,0108	0,0109
17	Manufacture of paper and paperboard products excluding 16	0,0028	0,0022	0,0002	0,0012	0,0006	0,0024	0,0007	0,0009	0,0002	0,0006	0,0020	0,0017
18	Publishing and printing of newspapers	0,0054	0,0068	0,0051	0,0117	0,0164	0,0130	0,0108	0,0119	0,0047	0,0067	0,0078	0,0082
19	Publishing of books, magazines and other printed matter	0,0099	0,0116	0,0060	0,0270	0,0167	0,0202	0,0136	0,0176	0,0060	0,0088	0,0107	0,0102
20	Manufacture of chairs and seats, use of wood	0,0639	0,0458	0,0004	0,0019	0,0013	0,0014	0,0008	0,0062	0,0004	0,0006	0,0007	0,0009
21	Manufacture of office and shop furniture, use of wood	0,0263	0,0051	0,0003	0,0010	0,0007	0,0008	0,0005	0,0064	0,0002	0,0004	0,0006	0,0006
22	Manufacture of kitchen furniture, use of wood	0,0318	0,0637	0,0003	0,0014	0,0009	0,0009	0,0005	0,0012	0,0003	0,0004	0,0005	0,0006
23	Manufacture of other furniture, use of wood	0,0556	0,0355	0,0005	0,0019	0,0013	0,0014	0,0006	0,0081	0,0004	0,0006	0,0007	0,0010
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	5,6160	0,0141	0,0085	0,0333	0,0532	0,0342	0,0178	0,0170	0,0120	0,0215	0,0199	0,0303
26	Do-it-yourself construction and renovation, use of wood	0,0000	4,2746	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0004	0,0005	1,1552	0,0018	0,0022	0,0018	0,0010	0,0057	0,0022	0,0030	0,0015	0,0017
28	Agriculture, hunting & fishing	0,0308	0,0357	0,0542	17,9521	0,0561	6,6050	0,0586	0,0290	0,0229	0,0889	0,0513	0,0407
29	Mining and quarrying	0,0038	0,0046	0,0853	0,0198	2,2306	0,0136	0,0046	0,0040	0,0049	0,0376	0,0082	0,0841
30	Manufacture of food products, beverages and tobacco	0,0092	0,0106	0,0127	0,1836	0,0166	2,0626	0,0111	0,0086	0,0067	0,0266	0,0152	0,0121
31	Manufacture of textiles, wearing apparel and leather products	0,0057	0,0061	0,0036	0,0265	0,0081	0,0142	4,7576	0,0044	0,0027	0,0060	0,0080	0,0235
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	2,2094	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0022	0,0026	0,0068	0,0071	0,0101	0,0057	0,0028	0,0024	0,5221	0,0125	0,0037	0,0076
34	Manufacture of chemicals and chemical products	0,0146	0,0142	0,0137	0,0872	0,0362	0,0435	0,0421	0,0195	0,0074	1,4995	0,1341	0,0307
35	Manufacture of rubber and plastic products	0,0136	0,0152	0,0215	0,0391	0,0141	0,0477	0,0491	0,2827	0,0104	0,0288	2,5400	0,0301
36	Manufacture of other non-metallic mineral products	0,0141	0,0249	0,0069	0,0111	0,0168	0,0183	0,0114	0,0058	0,0030	0,0137	0,0128	2,9875
37	Manufacture of basic metals and metal products	0,0237	0,0281	0,0538	0,0243	0,0351	0,0346	0,0139	0,0170	0,0172	0,0296	0,0298	0,0700
38	Manufacture of machinery and equipment	0,0165	0,0231	0,0486	0,0586	0,1497	0,0520	0,0176	0,0193	0,0167	0,0354	0,0287	0,0790
39	Manufacture of electrical machinery and apparatus	0,0076	0,0096	0,0192	0,0225	0,0172	0,0168	0,0088	0,0473	0,0056	0,0081	0,0097	0,0104
40	Manufacture of motor vehicles	0,0042	0,0050	0,0045	0,0061	0,0125	0,0085	0,0044	0,0059	0,0026	0,0051	0,0073	0,0092
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0024	0,0028	0,0016	0,0045	0,0025	0,0034	0,0136	0,0316	0,0010	0,0017	0,0023	0,0064
42	Electricity, gas and steam supply, excluding 27	0,0207	0,0247	0,3526	0,0448	0,0521	0,0458	0,0257	0,0222	0,0514	0,0710	0,0386	0,0429
43	Collection, purification and distribution of water	0,0015	0,0020	0,0029	0,0018	0,0054	0,0048	0,0038	0,0039	0,0022	0,0034	0,0033	0,0041
44	Construction, excluding wood construction	0,0339	0,0455	0,0782	0,1009	0,1205	0,0971	0,0493	0,0486	0,0348	0,0603	0,0553	0,0816
45	Wholesale and retail trade	0,8033	0,9084	0,0595	0,6132	0,1746	0,3098	0,0817	0,2544	0,1876	0,1107	0,0931	0,1052
46	Hotels and restaurants	0,0151	0,0198	0,0243	0,0162	0,0370	0,0326	0,0284	0,0202	0,0173	0,0285	0,0437	0,0297
47	Land transport; transport via pipelines	0,2118	0,2466	0,1431	0,1237	0,8256	0,4200	0,1599	0,1311	0,0842	0,2509	0,1842	0,4415
48	Water transport	0,0052	0,0060	0,0023	0,0035	0,0046	0,0041	0,0022	0,0880	0,0193	0,0034	0,0033	0,0034
49	Other transport; post and telecommunications	0,0521	0,0665	0,0344	0,0955	0,0688	0,1108	0,0670	0,0448	0,0424	0,0685	0,0696	0,0933
50	Financial intermediation and insurance	0,0089	0,0112	0,0090	0,0255	0,0260	0,0234	0,0146	0,1717	0,0077	0,0116	0,0140	0,0140
51	Real estate, renting and business activities; R&D	0,0767	0,1012	0,1043	0,0936	0,3533	0,2167	0,2155	0,2140	0,0945	0,1353	0,1592	0,1647
52	Community, social and other service activities	0,0666	0,0858	0,0964	0,2033	0,1837	0,2086	0,1320	0,0919	0,0795	0,1242	0,1486	0,1371
Domestic working hours multiplier (1000h)		8,3897	7,7360	2,4602	19,8903	4,6004	10,5572	5,8613	3,8878	1,2847	2,7735	3,7775	4,6512

(continues)

Appendix 11 (continues)
Contribution of industries to domestic working hours multipliers (1000 hours/ mill. FIM output)

		Industry											
Industry		37	38	39	40	41	42	43	44	45	46	47	48
1	Forestry	0,0087	0,0077	0,0048	0,0075	0,0325	0,0187	0,0059	0,0126	0,0078	0,0109	0,0027	0,0071
2	Sawmilling, planing and impregnation of wood	0,0045	0,0042	0,0023	0,0038	0,0241	0,0115	0,0033	0,0090	0,0029	0,0048	0,0010	0,0022
3	Manufacture of plywood and veneer sheets	0,0011	0,0012	0,0006	0,0013	0,0142	0,0017	0,0006	0,0008	0,0007	0,0011	0,0003	0,0006
4	Manufacture of particle board and fibreboard	0,0004	0,0004	0,0002	0,0010	0,0152	0,0002	0,0002	0,0003	0,0004	0,0006	0,0001	0,0005
5	Manufacture of wooden houses	0,0001	0,0002	0,0001	0,0002	0,0004	0,0001	0,0001	0,0002	0,0001	0,0002	0,0001	0,0001
6	Manufacture of builders' joinery and carpentry	0,0026	0,0037	0,0016	0,0039	0,0073	0,0013	0,0017	0,0020	0,0020	0,0059	0,0008	0,0016
7	Manufacture of wooden containers	0,0073	0,0073	0,0037	0,0026	0,0032	0,0008	0,0004	0,0030	0,0005	0,0008	0,0004	0,0004
8	Manufacture of other wood products	0,0004	0,0003	0,0001	0,0003	0,0050	0,0001	0,0000	0,0002	0,0001	0,0001	0,0000	0,0001
9	Manufacture of chemical pulp	0,0015	0,0011	0,0009	0,0012	0,0019	0,0020	0,0010	0,0014	0,0017	0,0020	0,0006	0,0016
10	Manufacture of mechanical pulp and newsprint	0,0009	0,0009	0,0006	0,0009	0,0008	0,0013	0,0005	0,0006	0,0019	0,0014	0,0004	0,0011
11	Manufacture of uncoated magazine paper	0,0012	0,0011	0,0007	0,0011	0,0009	0,0018	0,0007	0,0008	0,0019	0,0015	0,0005	0,0014
12	Manufacture of coated magazine paper	0,0020	0,0018	0,0011	0,0018	0,0019	0,0031	0,0012	0,0015	0,0024	0,0039	0,0010	0,0038
13	Manufacture of fine paper	0,0018	0,0016	0,0011	0,0016	0,0018	0,0025	0,0010	0,0013	0,0027	0,0034	0,0010	0,0035
14	Manufacture of kraft paper and other paper	0,0015	0,0012	0,0009	0,0012	0,0020	0,0020	0,0008	0,0011	0,0019	0,0029	0,0007	0,0026
15	Manufacture of paperboard	0,0018	0,0014	0,0014	0,0014	0,0034	0,0022	0,0009	0,0012	0,0016	0,0019	0,0004	0,0009
16	Manufacture of corrugated board and paperboard containers	0,0059	0,0030	0,0069	0,0027	0,0198	0,0014	0,0008	0,0031	0,0015	0,0048	0,0006	0,0012
17	Manufacture of paper and paperboard products excluding 16	0,0008	0,0005	0,0006	0,0005	0,0011	0,0003	0,0002	0,0007	0,0023	0,0010	0,0003	0,0013
18	Publishing and printing of newspapers	0,0096	0,0106	0,0084	0,0120	0,0090	0,0058	0,0046	0,0061	0,0219	0,0203	0,0051	0,0180
19	Publishing of books, magazines and other printed matter	0,0124	0,0121	0,0095	0,0127	0,0117	0,0069	0,0059	0,0105	0,0458	0,0232	0,0093	0,0373
20	Manufacture of chairs and seats, use of wood	0,0010	0,0011	0,0006	0,0056	0,0311	0,0005	0,0005	0,0007	0,0018	0,0016	0,0007	0,0032
21	Manufacture of office and shop furniture, use of wood	0,0015	0,0009	0,0009	0,0029	0,0269	0,0004	0,0005	0,0010	0,0010	0,0008	0,0004	0,0015
22	Manufacture of kitchen furniture, use of wood	0,0006	0,0008	0,0004	0,0043	0,0099	0,0003	0,0003	0,0004	0,0013	0,0010	0,0005	0,0024
23	Manufacture of other furniture, use of wood	0,0021	0,0014	0,0007	0,0061	0,0120	0,0005	0,0004	0,0011	0,0018	0,0015	0,0007	0,0033
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0207	0,0259	0,0148	0,0300	0,0175	0,0097	0,0156	0,0105	0,0169	0,0585	0,0053	0,0132
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0019	0,0010	0,0005	0,0011	0,0009	0,0104	0,0025	0,0009	0,0010	0,0010	0,0005	0,0005
28	Agriculture, hunting & fishing	0,0383	0,0424	0,0300	0,0350	0,0367	0,0620	0,0270	0,0321	0,0985	1,6573	0,0161	0,1069
29	Mining and quarrying	0,0280	0,0057	0,0030	0,0066	0,0062	0,0975	0,0061	0,0637	0,0043	0,0066	0,0019	0,0037
30	Manufacture of food products, beverages and tobacco	0,0113	0,0125	0,0088	0,0104	0,0108	0,0146	0,0078	0,0095	0,0289	0,4834	0,0048	0,0314
31	Manufacture of textiles, wearing apparel and leather products	0,0058	0,0067	0,0058	0,0075	0,0264	0,0042	0,0037	0,0186	0,0087	0,0116	0,0033	0,0065
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0135	0,0031	0,0017	0,0034	0,0042	0,0078	0,0019	0,0056	0,0043	0,0027	0,0173	0,0121
34	Manufacture of chemicals and chemical products	0,0239	0,0096	0,0096	0,0163	0,0352	0,0157	0,0189	0,0366	0,0113	0,0159	0,0042	0,0063
35	Manufacture of rubber and plastic products	0,0105	0,0178	0,0197	0,0272	0,0437	0,0246	0,0702	0,0587	0,0412	0,0191	0,0134	0,0092
36	Manufacture of other non-metallic mineral products	0,0101	0,0089	0,0041	0,0284	0,0217	0,0079	0,0129	0,2406	0,0105	0,0116	0,0034	0,0110
37	Manufacture of basic metals and metal products	2,1584	0,1798	0,0500	0,1801	0,1433	0,0615	0,0133	0,2441	0,0141	0,0197	0,0143	0,0149
38	Manufacture of machinery and equipment	0,0472	2,5702	0,0207	0,1566	0,0267	0,0556	0,0365	0,0639	0,0114	0,0212	0,0730	0,0100
39	Manufacture of electrical machinery and apparatus	0,0152	0,0502	1,9835	0,0349	0,0255	0,0219	0,0063	0,0363	0,0228	0,0177	0,0103	0,0404
40	Manufacture of motor vehicles	0,0284	0,0379	0,0050	2,5815	0,0100	0,0051	0,0029	0,0139	0,0058	0,0061	0,0408	0,0171
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0176	0,0051	0,0024	0,0092	3,5830	0,0018	0,0014	0,0115	0,0044	0,0029	0,0018	0,0071
42	Electricity, gas and steam supply, excluding 27	0,0452	0,0239	0,0129	0,0263	0,0267	1,3636	0,0596	0,0246	0,0248	0,0245	0,0118	0,0125
43	Collection, purification and distribution of water	0,0034	0,0043	0,0033	0,0048	0,0036	0,0033	2,0611	0,0018	0,0049	0,0061	0,0011	0,0026
44	Construction, excluding wood construction	0,0572	0,0654	0,0388	0,0711	0,0496	0,0894	0,0415	4,6822	0,0646	0,1190	0,0256	0,1222
45	Wholesale and retail trade	0,1596	0,1288	0,1030	0,1306	0,2031	0,0681	0,0470	0,5064	5,7273	0,3886	0,2906	0,4265
46	Hotels and restaurants	0,0334	0,0419	0,0305	0,0296	0,0323	0,0278	0,0252	0,0186	0,0322	5,0922	0,0105	0,0205
47	Land transport; transport via pipelines	0,2550	0,1387	0,0808	0,1209	0,1804	0,1637	0,0544	0,2572	0,2526	0,1290	5,3448	0,0582
48	Water transport	0,0038	0,0032	0,0023	0,0026	0,0032	0,0026	0,0017	0,0048	0,0047	0,0026	0,0030	2,9290
49	Other transport; post and telecommunications	0,0725	0,0683	0,0479	0,0582	0,0689	0,0394	0,0383	0,0565	0,1501	0,0649	0,0698	0,4431
50	Financial intermediation and insurance	0,0155	0,0171	0,0130	0,0175	0,0143	0,0103	0,0080	0,0237	0,0313	0,0365	0,0327	0,0514
51	Real estate, renting and business activities; R&D	0,2048	0,2324	0,1837	0,2744	0,1893	0,1193	0,0961	0,0969	0,2224	0,4374	0,0664	0,1877
52	Community, social and other service activities	0,1383	0,1689	0,1371	0,1524	0,1336	0,1102	0,0977	0,1511	0,2172	0,3606	0,0659	0,0880
Domestic working hours multiplier (1000h)		3,4890	3,9344	2,8612	4,0934	5,1328	2,4634	2,7892	6,7298	7,1220	9,0925	6,1604	4,7276

(continues)

Appendix 11 (continues)
Contribution of industries to domestic working hours multipliers (1000 hours/ mill. FIM output)

		Industry			
Industry		49	50	51	52
1	Forestry	0,0055	0,0072	0,0132	0,0061
2	Sawmilling, planing and impregnation of wood	0,0027	0,0027	0,0072	0,0019
3	Manufacture of plywood and veneer sheets	0,0005	0,0007	0,0013	0,0004
4	Manufacture of particle board and fibreboard	0,0003	0,0004	0,0009	0,0002
5	Manufacture of wooden houses	0,0001	0,0001	0,0003	0,0001
6	Manufacture of builders' joinery and carpentry	0,0019	0,0032	0,0111	0,0014
7	Manufacture of wooden containers	0,0007	0,0003	0,0005	0,0003
8	Manufacture of other wood products	0,0001	0,0001	0,0001	0,0001
9	Manufacture of chemical pulp	0,0010	0,0011	0,0016	0,0014
10	Manufacture of mechanical pulp and newsprint	0,0007	0,0009	0,0013	0,0016
11	Manufacture of uncoated magazine paper	0,0009	0,0011	0,0017	0,0023
12	Manufacture of coated magazine paper	0,0015	0,0022	0,0032	0,0019
13	Manufacture of fine paper	0,0015	0,0020	0,0031	0,0027
14	Manufacture of kraft paper and other paper	0,0011	0,0014	0,0020	0,0015
15	Manufacture of paperboard	0,0010	0,0013	0,0013	0,0011
16	Manufacture of corrugated board and paperboard containers	0,0011	0,0007	0,0010	0,0010
17	Manufacture of paper and paperboard products excluding 16	0,0006	0,0006	0,0009	0,0012
18	Publishing and printing of newspapers	0,0112	0,0139	0,0200	0,0281
19	Publishing of books, magazines and other printed matter	0,0206	0,0199	0,0379	0,0750
20	Manufacture of chairs and seats, use of wood	0,0011	0,0016	0,0029	0,0012
21	Manufacture of office and shop furniture, use of wood	0,0007	0,0008	0,0013	0,0006
22	Manufacture of kitchen furniture, use of wood	0,0008	0,0011	0,0019	0,0009
23	Manufacture of other furniture, use of wood	0,0012	0,0015	0,0028	0,0012
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0167	0,0315	0,1141	0,0129
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0006	0,0009	0,0019	0,0009
28	Agriculture, hunting & fishing	0,0683	0,0300	0,0371	0,1157
29	Mining and quarrying	0,0108	0,0034	0,0075	0,0031
30	Manufacture of food products, beverages and tobacco	0,0200	0,0089	0,0109	0,0318
31	Manufacture of textiles, wearing apparel and leather products	0,0078	0,0032	0,0055	0,0068
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0069	0,0018	0,0032	0,0022
34	Manufacture of chemicals and chemical products	0,0089	0,0041	0,0080	0,0091
35	Manufacture of rubber and plastic products	0,0201	0,0050	0,0098	0,0115
36	Manufacture of other non-metallic mineral products	0,0368	0,0064	0,0153	0,0052
37	Manufacture of basic metals and metal products	0,0422	0,0107	0,0216	0,0099
38	Manufacture of machinery and equipment	0,0173	0,0073	0,0144	0,0136
39	Manufacture of electrical machinery and apparatus	0,0318	0,0175	0,0247	0,0154
40	Manufacture of motor vehicles	0,0309	0,0035	0,0044	0,0095
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0037	0,0153	0,0047	0,0036
42	Electricity, gas and steam supply, excluding 27	0,0156	0,0214	0,0469	0,0230
43	Collection, purification and distribution of water	0,0022	0,0059	0,0251	0,0026
44	Construction, excluding wood construction	0,6751	0,0755	0,2314	0,0408
45	Wholesale and retail trade	0,2760	0,1537	0,2960	0,2904
46	Hotels and restaurants	0,0787	0,0290	0,0236	0,0382
47	Land transport; transport via pipelines	0,1124	0,0383	0,0513	0,0621
48	Water transport	0,0050	0,0022	0,0023	0,0030
49	Other transport; post and telecommunications	2,9320	0,0906	0,0983	0,0773
50	Financial intermediation and insurance	0,0136	2,8877	0,0409	0,0218
51	Real estate, renting and business activities; R&D	0,1440	0,2534	2,0894	0,0921
52	Community, social and other service activities	0,0872	0,1621	0,3085	6,2246
Domestic working hours multiplier (1000h)		4,7214	3,9346	3,6149	7,2596

Appendix 12
Contribution of domestic and foreign industries to Global Warming Potential multipliers (tons CO_2 equiv./ mill. FIM output)

		Industry											
Industry		1	2	3	4	5	6	7	8	9	10	11	12
1	Forestry	17,6959	8,8432	4,5063	1,5438	3,6342	2,3488	3,4630	1,7973	5,5446	2,4499	2,4507	2,4517
2	Sawmilling, planing and impregnation of wood	0,0026	6,9503	0,0942	0,8535	1,5198	1,3224	2,5665	1,1485	0,4110	0,2062	0,2067	0,2073
3	Manufacture of plywood and veneer sheets	0,0006	0,0143	20,5582	0,1085	0,2086	0,5757	0,7366	0,8257	0,0212	0,0158	0,0159	0,0161
4	Manufacture of particle board and fibreboard	0,0037	0,0155	0,0688	124,2842	0,7883	2,1128	1,2247	1,1378	0,0098	0,0296	0,0307	0,0321
5	Manufacture of wooden houses	0,0001	0,0013	0,0012	0,0014	2,5119	0,0039	0,0040	0,0022	0,0010	0,0006	0,0006	0,0006
6	Manufacture of builders' joinery and carpentry	0,0006	0,0066	0,0089	0,0145	0,9538	8,2280	0,0180	0,0119	0,0046	0,0110	0,0116	0,0122
7	Manufacture of wooden containers	0,0000	0,0001	0,0003	0,0008	0,0002	0,0002	0,1085	0,0004	0,0000	0,0004	0,0004	0,0004
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0001	0,0001	0,0002	0,0023	0,2095	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0234	0,1027	0,4296	1,2777	0,2606	0,3428	0,2667	0,2589	38,3673	8,2803	8,2802	8,2800
10	Manufacture of mechanical pulp and newsprint	0,0017	0,0067	0,0100	0,0189	0,0117	0,0127	0,0090	0,0098	0,0062	10,2148	0,0589	0,0591
11	Manufacture of uncoated magazine paper	0,0128	0,0514	0,0717	0,1197	0,0904	0,1026	0,0714	0,0739	0,0503	0,0979	65,7844	0,1001
12	Manufacture of coated magazine paper	0,0153	0,0796	0,1196	0,2035	0,1514	0,1735	0,1133	0,1219	0,0861	0,1689	0,1700	63,3946
13	Manufacture of fine paper	0,0159	0,0686	0,1128	0,2279	0,1262	0,1476	0,0917	0,1011	0,0685	0,7645	0,7656	0,7671
14	Manufacture of kraft paper and other paper	0,0123	0,0343	0,4026	1,4903	0,0708	0,1132	0,0667	0,0933	0,0856	0,4562	0,4566	0,4571
15	Manufacture of paperboard	0,0453	0,1734	1,1913	4,8915	0,3435	0,4896	0,2515	0,3525	0,1341	1,1418	1,1429	1,1444
16	Manufacture of corrugated board and paperboard containers	0,0046	0,0669	0,0891	0,2540	0,0993	0,1340	0,0446	0,0448	0,0295	0,3211	0,3211	0,3211
17	Manufacture of paper and paperboard products excluding 16	0,0062	0,0119	0,0197	0,0375	0,0251	0,0759	0,0136	0,0156	0,0088	0,0268	0,0271	0,0276
18	Publishing and printing of newspapers	0,0001	0,0003	0,0003	0,0005	0,0005	0,0004	0,0003	0,0004	0,0002	0,0004	0,0004	0,0004
19	Publishing of books, magazines and other printed matter	0,0040	0,0089	0,0107	0,0150	0,0140	0,0136	0,0097	0,0114	0,0063	0,0125	0,0128	0,0131
20	Manufacture of chairs and seats, use of wood	0,0003	0,0008	0,0011	0,0015	0,0025	0,0015	0,0029	0,0011	0,0005	0,0012	0,0012	0,0012
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0001	0,0001	0,0002	0,0005	0,0003	0,0004	0,0002	0,0001	0,0002	0,0002	0,0002
22	Manufacture of kitchen furniture, use of wood	0,0003	0,0005	0,0006	0,0071	0,0042	0,0029	0,0041	0,0017	0,0004	0,0007	0,0008	0,0008
23	Manufacture of other furniture, use of wood	0,0002	0,0004	0,0004	0,0009	0,0018	0,0007	0,0021	0,0005	0,0002	0,0005	0,0005	0,0006
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0051	0,0489	0,0741	0,1006	0,0983	0,0896	0,0586	0,0632	0,0240	0,0955	0,1010	0,1083
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,3125	1,6263	2,7838	5,3067	2,4226	2,7136	1,8339	2,0042	2,4027	4,7516	4,7723	4,7993
28	Agriculture, hunting & fishing	0,4763	1,0751	1,8215	2,8246	1,6345	1,9288	1,1602	1,5467	1,1226	5,2615	5,2891	5,3252
29	Mining and quarrying	0,4546	1,0439	1,6625	3,6293	1,5012	1,7100	1,1625	1,0426	1,7051	4,8828	4,8802	4,8769
30	Manufacture of food products, beverages and tobacco	0,0607	0,1369	0,2291	0,3458	0,2058	0,2433	0,1472	0,1768	0,1425	0,5271	0,5307	0,5353
31	Manufacture of textiles, wearing apparel and leather products	0,0410	0,0345	0,0337	0,0422	0,0574	0,0529	0,0358	0,7856	0,0277	0,0401	0,0404	0,0408
32	Reproduction of recorded media	0,0000	0,0002	0,0002	0,0003	0,0003	0,0003	0,0002	0,0002	0,0001	0,0002	0,0002	0,0002
33	Manuf. of coke, refined petroleum products and nuclear fuel	2,7458	3,6936	4,6262	11,2933	3,9634	4,1848	3,4682	3,1257	4,1402	6,3127	6,2694	6,2126
34	Manufacture of chemicals and chemical products	0,6690	1,6498	13,2914	27,6533	4,7761	10,1840	2,6861	7,3187	12,8070	15,5859	15,5900	15,5953
35	Manufacture of rubber and plastic products	0,0147	0,0457	0,0934	0,1100	0,1169	0,1565	0,0547	0,1541	0,0411	0,0962	0,0964	0,0966
36	Manufacture of other non-metallic mineral products	0,1302	0,2971	0,5639	0,6548	5,3752	4,6842	0,3361	0,3514	0,3992	0,5632	0,5701	0,5793
37	Manufacture of basic metals and metal products	0,1444	0,6285	0,7654	1,5303	2,3902	3,3619	2,1136	1,3404	0,5451	1,0856	1,0994	1,1175
38	Manufacture of machinery and equipment	0,0053	0,0503	0,0635	0,1364	0,1026	0,0944	0,0593	0,0525	0,0499	0,1087	0,1125	0,1175
39	Manufacture of electrical machinery and apparatus	0,0048	0,0103	0,0121	0,0179	0,0180	0,0135	0,0110	0,0113	0,0082	0,0153	0,0156	0,0160
40	Manufacture of motor vehicles	0,0029	0,0243	0,0257	0,0423	0,0381	0,0390	0,0304	0,0258	0,0159	0,0345	0,0342	0,0337
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0035	0,0063	0,0071	0,0108	0,0164	0,0157	0,0127	0,0130	0,0048	0,0085	0,0086	0,0088
42	Electricity, gas and steam supply, excluding 27	2,1740	32,8033	51,4582	102,0212	34,2070	36,3559	32,0793	27,2939	47,2831	104,8403	104,9846	105,1734
43	Collection, purification and distribution of water	0,0005	0,0036	0,0048	0,0071	0,0075	0,0070	0,0046	0,0062	0,0027	0,0055	0,0057	0,0060
44	Construction, excluding wood construction	0,0649	0,1206	0,1428	0,1868	0,1739	0,1553	0,1188	0,1150	0,0721	0,1731	0,1783	0,1852
45	Wholesale and retail trade	0,1179	0,1150	0,1014	0,1247	0,1248	0,1090	0,1014	0,0874	0,0819	0,1103	0,1108	0,1115
46	Hotels and restaurants	0,0197	0,0358	0,0450	0,0563	0,0496	0,0449	0,0367	0,0345	0,0265	0,0435	0,0451	0,0472
47	Land transport; transport via pipelines	0,6702	10,6686	9,4202	13,8439	10,3097	9,2503	9,9514	7,8099	5,0934	12,2654	11,5957	10,7193
48	Water transport	0,0348	0,1652	0,1195	0,1690	0,1130	0,1028	0,1078	0,0813	0,0693	0,1367	0,1314	0,1244
49	Other transport; post and telecommunications	0,2709	1,1914	1,3047	1,8553	1,5647	1,3926	1,2815	1,1674	0,8008	1,4852	1,4427	1,3870
50	Financial intermediation and insurance	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
51	Real estate, renting and business activities; R&D	0,0517	0,3267	0,4388	0,6237	0,6591	0,6088	0,4154	0,5769	0,2609	0,5107	0,5296	0,5543
52	Community, social and other service activities	0,0096	0,0559	0,0799	0,1102	0,1042	0,0966	0,0684	0,0788	0,0442	0,0854	0,0887	0,0930
Global Warming Potential multiplier (including foreign prod.)		26,3308	72,2955	116,8666	308,0499	80,8500	93,7988	66,4075	61,4839	122,0075	183,2268	238,2620	235,1526

(continues)

Appendix 12 (continues)
Contribution of domestic and foreign industries to Global Warming Potential multipliers (tons CO_2 equiv./ mill. FIM output)

		Industry											
Industry		13	14	15	16	17	18	19	20	21	22	23	24
1	Forestry	2,4524	2,4583	2,4441	0,9559	1,1358	0,2887	0,5064	0,4925	0,4596	1,2167	1,4530	2,1562
2	Sawmilling, planing and impregnation of wood	0,2075	0,2117	0,2024	0,0965	0,0972	0,0337	0,0525	0,2116	0,2212	0,5639	0,9225	1,3926
3	Manufacture of plywood and veneer sheets	0,0162	0,0169	0,0150	0,0250	0,0112	0,0057	0,0077	0,6345	0,4012	0,3603	0,5162	0,5419
4	Manufacture of particle board and fibreboard	0,0328	0,0413	0,0217	0,1048	0,0359	0,0261	0,0269	4,8765	9,0297	17,1136	6,6425	1,8458
5	Manufacture of wooden houses	0,0006	0,0006	0,0006	0,0004	0,0003	0,0002	0,0002	0,0009	0,0008	0,0012	0,0045	0,1842
6	Manufacture of builders' joinery and carpentry	0,0124	0,0170	0,0070	0,0185	0,0119	0,0088	0,0089	0,0152	0,0319	0,0350	0,5525	1,5033
7	Manufacture of wooden containers	0,0004	0,0004	0,0004	0,0005	0,0003	0,0001	0,0002	0,0002	0,0004	0,0003	0,0002	0,0003
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0007	0,0003	0,0010	0,0009	0,0001
9	Manufacture of chemical pulp	8,2806	8,2806	8,2785	3,1811	3,7722	0,9440	1,6946	0,2959	0,3364	0,4217	0,3728	0,3861
10	Manufacture of mechanical pulp and newsprint	0,0594	0,0596	0,0582	0,0296	0,0407	0,9232	0,2499	0,0109	0,0124	0,0132	0,0130	0,0106
11	Manufacture of uncoated magazine paper	0,1024	0,1029	0,0953	0,1085	0,5295	0,1604	5,1889	0,0837	0,0968	0,0974	0,0971	0,0784
12	Manufacture of coated magazine paper	0,1747	0,1755	0,1643	0,2022	0,3363	0,1510	0,9175	0,1438	0,1628	0,1620	0,1593	0,1186
13	Manufacture of fine paper	55,1494	0,7708	0,7609	1,3784	2,9323	0,6587	3,5175	0,1309	0,1496	0,1556	0,1485	0,1167
14	Manufacture of kraft paper and other paper	0,4580	27,7459	0,4546	2,0344	7,2124	0,0964	0,3868	0,1377	0,1961	0,3208	0,2109	0,1417
15	Manufacture of paperboard	1,1470	1,1483	100,9554	28,3206	3,5858	0,2719	0,8207	0,6470	0,8410	1,1848	0,8027	0,3390
16	Manufacture of corrugated board and paperboard containers	0,3209	0,3209	0,3215	22,4098	0,4953	0,0601	0,1479	0,2401	0,2678	0,3211	0,3064	0,0840
17	Manufacture of paper and paperboard products excluding 16	0,0279	0,0293	0,0256	0,1229	28,8915	0,0291	0,0516	0,0398	0,0638	0,0352	0,0302	0,1542
18	Publishing and printing of newspapers	0,0004	0,0004	0,0003	0,0005	0,0006	0,1155	0,0008	0,0004	0,0004	0,0005	0,0005	0,0004
19	Publishing of books, magazines and other printed matter	0,0136	0,0137	0,0123	0,0211	0,0289	0,0392	2,6360	0,0131	0,0137	0,0150	0,0153	0,0145
20	Manufacture of chairs and seats, use of wood	0,0013	0,0015	0,0009	0,0011	0,0014	0,0014	0,0013	4,3641	0,2193	0,1337	0,0215	0,0608
21	Manufacture of office and shop furniture, use of wood	0,0002	0,0002	0,0001	0,0002	0,0002	0,0002	0,0002	0,0154	1,0664	0,0337	0,0025	0,0042
22	Manufacture of kitchen furniture, use of wood	0,0008	0,0009	0,0006	0,0008	0,0009	0,0009	0,0009	0,0341	0,1228	4,2094	0,0245	0,0483
23	Manufacture of other furniture, use of wood	0,0006	0,0007	0,0004	0,0005	0,0006	0,0006	0,0006	0,0220	0,0719	0,0326	2,0529	0,0313
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	61,3317
25	Renovation of buildings, use of wood	0,1108	0,1608	0,0504	0,0677	0,1099	0,0857	0,0850	0,0618	0,0643	0,0752	0,0799	0,0459
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	4,8368	4,8580	4,7092	3,2898	3,6783	2,3291	2,7596	2,6481	2,9495	3,0713	2,7617	1,9043
28	Agriculture, hunting & fishing	5,3320	5,2907	5,3942	4,0671	6,2049	2,5199	2,8219	2,0655	1,6901	1,8961	2,3874	1,5981
29	Mining and quarrying	4,8703	4,8764	4,8825	2,5697	2,5933	1,1290	1,6133	1,4986	2,0448	2,0097	1,5852	0,9358
30	Manufacture of food products, beverages and tobacco	0,5362	0,5307	0,5444	0,4628	0,5518	0,3058	0,3319	0,2198	0,2008	0,2287	0,3070	0,2017
31	Manufacture of textiles, wearing apparel and leather products	0,0411	0,0420	0,0394	0,0682	0,1681	0,0407	0,0443	1,5212	0,1208	0,1659	0,0644	0,0617
32	Reproduction of recorded media	0,0003	0,0003	0,0002	0,0002	0,0003	0,0004	0,0003	0,0003	0,0003	0,0003	0,0003	0,0002
33	Manuf. of coke, refined petroleum products and nuclear fuel	6,1528	6,0947	6,3712	4,7099	4,7434	2,6869	3,2964	3,7277	4,7593	5,1053	4,2188	2,7521
34	Manufacture of chemicals and chemical products	15,5912	15,6199	15,5769	13,7580	13,8405	5,1536	9,7839	11,4705	11,2130	11,2777	10,8696	4,3526
35	Manufacture of rubber and plastic products	0,0962	0,0973	0,0964	0,3203	0,3745	0,0640	0,0847	0,3142	0,2877	0,2372	0,1302	0,1081
36	Manufacture of other non-metallic mineral products	0,5793	0,6427	0,5135	0,4517	0,5325	0,4683	0,4694	0,6448	0,7081	0,8038	1,3120	1,4287
37	Manufacture of basic metals and metal products	1,1160	1,1362	1,1154	1,4645	1,2131	0,6358	0,8089	2,9871	6,7691	5,0989	2,8135	1,2150
38	Manufacture of machinery and equipment	0,1169	0,1104	0,1316	0,0861	0,0969	0,0552	0,0601	0,0684	0,0925	0,0843	0,0778	0,0449
39	Manufacture of electrical machinery and apparatus	0,0163	0,0163	0,0157	0,0159	0,0161	0,0182	0,0172	0,0185	0,0334	0,0234	0,0224	0,0129
40	Manufacture of motor vehicles	0,0328	0,0312	0,0375	0,0325	0,0347	0,0343	0,0326	0,0347	0,0502	0,0457	0,0357	0,0227
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0089	0,0091	0,0083	0,0102	0,0117	0,0113	0,0110	0,0571	0,1070	0,0816	0,0356	0,0133
42	Electricity, gas and steam supply, excluding 27	105,4342	105,6156	104,5069	56,5385	63,1265	27,6628	37,9920	33,0498	35,6805	41,7599	38,3695	22,9332
43	Collection, purification and distribution of water	0,0063	0,0065	0,0052	0,0061	0,0082	0,0096	0,0089	0,0071	0,0070	0,0080	0,0088	0,0042
44	Construction, excluding wood construction	0,1860	0,2304	0,1376	0,1376	0,1815	0,2055	0,1899	0,1089	0,1139	0,1367	0,1420	0,0911
45	Wholesale and retail trade	0,1118	0,1144	0,1083	0,1500	0,1185	0,1271	0,1257	0,0836	0,0947	0,1093	0,1036	0,7271
46	Hotels and restaurants	0,0471	0,0442	0,0530	0,0526	0,0671	0,0597	0,0538	0,0368	0,0382	0,0448	0,0467	0,0275
47	Land transport; transport via pipelines	9,7885	8,8179	13,2762	9,9677	9,8283	3,1736	3,9792	6,0714	6,9215	8,5642	7,8675	6,6093
48	Water transport	0,1158	0,1057	0,1503	0,1082	0,1143	0,0763	0,0772	0,0656	0,0726	0,0914	0,0919	0,1195
49	Other transport; post and telecommunications	1,3204	1,2324	1,5990	1,6169	1,6036	3,5181	2,9537	1,1238	1,1874	1,4405	1,4303	1,0097
50	Financial intermediation and insurance	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
51	Real estate, renting and business activities; R&D	0,6035	0,6319	0,4245	0,5719	0,8069	0,8898	0,8358	0,6159	0,6200	0,7028	0,7550	0,3791
52	Community, social and other service activities	0,0957	0,0939	0,0929	0,1018	0,1341	0,7704	0,6191	0,0915	0,0933	0,1067	0,1138	0,0661
Global Warming Potential multiplier (including foreign prod.)		225,6069	197,8073	273,6610	159,6394	159,2805	55,8472	85,2737	81,0037	89,6863	109,5986	89,9808	117,2097

(continues)

Appendix 12 (continues)
Contribution of domestic and foreign industries to Global Warming Potential multipliers (tons CO_2 equiv./ mill. FIM output)

		Industry											
Industry		25	26	27	28	29	30	31	32	33	34	35	36
1	Forestry	1,6453	1,9651	0,1197	0,1231	0,0962	0,1676	0,1084	0,1053	0,0975	0,3035	0,2140	0,1664
2	Sawmilling, planing and impregnation of wood	1,1481	1,1584	0,0509	0,0421	0,0308	0,0393	0,0250	0,0292	0,0302	0,0485	0,0442	0,0592
3	Manufacture of plywood and veneer sheets	0,2014	0,1899	0,0102	0,0071	0,0093	0,0084	0,0077	0,0139	0,0093	0,0095	0,0179	0,0140
4	Manufacture of particle board and fibreboard	2,4162	1,9363	0,0164	0,0397	0,0429	0,0407	0,0370	0,0836	0,0386	0,0304	0,0901	0,0445
5	Manufacture of wooden houses	0,0088	0,5506	0,0001	0,0002	0,0003	0,0002	0,0001	0,0001	0,0002	0,0002	0,0002	0,0003
6	Manufacture of builders' joinery and carpentry	1,3204	0,7827	0,0054	0,0112	0,0169	0,0125	0,0085	0,0089	0,0145	0,0100	0,0099	0,0130
7	Manufacture of wooden containers	0,0001	0,0002	0,0001	0,0001	0,0002	0,0001	0,0002	0,0001	0,0001	0,0003	0,0003	0,0011
8	Manufacture of other wood products	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,2828	0,3184	0,2040	0,3499	0,2590	0,4939	0,3987	0,3165	0,2734	1,6448	0,8631	0,3824
10	Manufacture of mechanical pulp and newsprint	0,0101	0,0110	0,0163	0,0154	0,0186	0,0188	0,0148	0,0180	0,0187	0,0161	0,0168	0,0141
11	Manufacture of uncoated magazine paper	0,0800	0,0833	0,1433	0,1265	0,1399	0,1416	0,1128	0,1462	0,1428	0,1330	0,1312	0,1093
12	Manufacture of coated magazine paper	0,1161	0,1234	0,2420	0,2086	0,2302	0,7458	0,1996	0,2937	0,2414	0,3023	0,5807	0,3564
13	Manufacture of fine paper	0,1366	0,1329	0,1749	0,1874	0,1866	0,5480	0,1742	0,2324	0,1925	0,2300	0,4243	0,2704
14	Manufacture of kraft paper and other paper	0,1881	0,1638	0,0728	0,1649	0,0794	0,2916	0,0855	0,0987	0,0809	0,1079	0,2016	0,1315
15	Manufacture of paperboard	0,3580	0,3301	0,2954	0,2818	0,3521	0,5982	0,4789	0,3874	0,3396	0,5138	0,9191	0,6299
16	Manufacture of corrugated board and paperboard containers	0,0796	0,0728	0,0352	0,0910	0,1072	0,2944	0,2365	0,0660	0,0834	0,1568	0,2067	0,1880
17	Manufacture of paper and paperboard products excluding 16	0,4189	0,3034	0,0119	0,0452	0,0239	0,0751	0,0296	0,0373	0,0252	0,0276	0,0634	0,0551
18	Publishing and printing of newspapers	0,0003	0,0004	0,0003	0,0006	0,0008	0,0007	0,0007	0,0007	0,0007	0,0005	0,0005	0,0005
19	Publishing of books, magazines and other printed matter	0,0128	0,0148	0,0098	0,0326	0,0204	0,0272	0,0213	0,0253	0,0205	0,0152	0,0177	0,0151
20	Manufacture of chairs and seats, use of wood	0,0792	0,0584	0,0008	0,0028	0,0020	0,0023	0,0017	0,0077	0,0018	0,0013	0,0015	0,0016
21	Manufacture of office and shop furniture, use of wood	0,0087	0,0015	0,0001	0,0004	0,0003	0,0003	0,0003	0,0021	0,0003	0,0002	0,0003	0,0003
22	Manufacture of kitchen furniture, use of wood	0,0366	0,0727	0,0006	0,0020	0,0013	0,0016	0,0010	0,0019	0,0012	0,0009	0,0010	0,0010
23	Manufacture of other furniture, use of wood	0,0316	0,0200	0,0004	0,0013	0,0009	0,0010	0,0006	0,0050	0,0008	0,0006	0,0007	0,0008
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	14,4298	0,0478	0,0452	0,1057	0,1551	0,1165	0,0763	0,0696	0,1352	0,0927	0,0875	0,1051
26	Do-it-yourself construction and renovation, use of wood	0,0000	9,0543	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	1,6164	1,8659	2788,0593	5,9161	6,4141	6,1312	4,7311	15,9437	10,2440	10,6049	6,9019	5,9597
28	Agriculture, hunting & fishing	1,4069	1,5781	2,1504	422,3924	2,3594	181,6220	7,9176	2,5636	2,5159	4,7835	7,1562	2,2769
29	Mining and quarrying	0,7954	0,9139	8,9804	2,4006	65,1929	2,2265	1,5907	1,1709	40,4824	5,3797	2,5231	6,0097
30	Manufacture of food products, beverages and tobacco	0,1749	0,1978	0,2383	2,5740	0,3016	25,2824	0,6541	0,2300	0,3193	0,6028	0,4393	0,2799
31	Manufacture of textiles, wearing apparel and leather products	0,0620	0,0625	0,0448	0,2809	0,0752	0,1691	17,1978	0,0892	0,0743	0,0746	0,2872	0,2007
32	Reproduction of recorded media	0,0001	0,0002	0,0002	0,0002	0,0005	0,0004	0,0004	65,5035	0,0005	0,0003	0,0003	0,0003
33	Manuf. of coke, refined petroleum products and nuclear fuel	2,3483	2,6823	11,3345	7,6004	9,7094	6,5635	4,6543	3,6825	281,7408	14,6784	6,9473	8,0087
34	Manufacture of chemicals and chemical products	3,8612	3,7465	3,4954	15,3561	6,5933	12,2397	23,4244	12,0883	9,4114	180,8161	51,7952	9,7168
35	Manufacture of rubber and plastic products	0,0966	0,1059	0,1248	0,2609	0,1047	0,3398	0,3516	1,9768	0,1306	0,2202	9,4292	0,2460
36	Manufacture of other non-metallic mineral products	0,9760	1,6996	0,4476	0,6797	0,8619	1,1165	0,8738	0,4910	0,7293	1,0002	0,9857	112,0130
37	Manufacture of basic metals and metal products	1,0098	1,1711	1,6738	1,2636	1,5255	1,6515	0,9756	1,0001	1,5282	1,3867	1,7362	3,2821
38	Manufacture of machinery and equipment	0,0363	0,0472	0,1147	0,1818	0,2646	0,1364	0,0525	0,0501	0,1949	0,0938	0,0875	0,1693
39	Manufacture of electrical machinery and apparatus	0,0108	0,0134	0,0282	0,0348	0,0238	0,0269	0,0154	0,0677	0,0228	0,0157	0,0206	0,0175
40	Manufacture of motor vehicles	0,0194	0,0228	0,0277	0,0381	0,0615	0,0447	0,0260	0,0312	0,0506	0,0327	0,0478	0,0491
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0119	0,0136	0,0093	0,0253	0,0139	0,0202	0,1066	0,1261	0,0142	0,0136	0,0163	0,0294
42	Electricity, gas and steam supply, excluding 27	19,2743	22,0667	256,7368	39,4010	42,4013	42,5976	31,9234	25,3913	67,0701	70,6159	47,4175	40,2381
43	Collection, purification and distribution of water	0,0034	0,0043	0,0066	0,0049	0,0105	0,0103	0,0095	0,0091	0,0110	0,0091	0,0089	0,0091
44	Construction, excluding wood construction	0,0730	0,0930	0,1584	0,1934	0,2182	0,2011	0,1290	0,1232	0,2065	0,1565	0,1479	0,1720
45	Wholesale and retail trade	0,6393	0,7222	0,0749	0,5087	0,1567	0,3004	0,1080	0,2328	0,2552	0,1361	0,1247	0,1152
46	Hotels and restaurants	0,0223	0,0279	0,0351	0,0277	0,0477	0,0471	0,0462	0,0354	0,0526	0,0478	0,0652	0,0442
47	Land transport; transport via pipelines	5,8612	6,7075	5,6816	4,3838	20,3259	11,5878	6,0093	4,5268	14,9584	9,2279	7,1862	12,5650
48	Water transport	0,1008	0,1159	0,0679	0,0821	0,1018	0,1006	0,0708	2,3009	0,4094	0,1019	0,1014	0,0872
49	Other transport; post and telecommunications	0,8293	1,0215	0,6562	1,4949	1,0944	1,7544	1,2793	1,0756	1,4058	1,3454	1,3726	1,4862
50	Financial intermediation and insurance	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
51	Real estate, renting and business activities; R&D	0,3117	0,3915	0,4952	0,4464	1,1497	0,8492	0,9096	0,8815	1,0584	0,7053	0,7702	0,7091
52	Community, social and other service activities	0,0547	0,0677	0,0833	0,1518	0,1339	0,1642	0,1228	0,0908	0,1425	0,1199	0,1369	0,1147
Global Warming Potential multiplier (including foreign prod.)		62,6060	62,7314	3082,1813	507,5388	160,9165	298,8092	105,1989	141,6320	434,7777	305,8150	149,5977	206,3595

(continues)

Appendix 12 (continues)
Contribution of domestic and foreign industries to Global Warming Potential multipliers (tons CO_2 equiv./ mill. FIM output)

		Industry											
Industry		37	38	39	40	41	42	43	44	45	46	47	48
1	Forestry	0,0964	0,0835	0,0697	0,0871	0,2555	0,1369	0,0501	0,1160	0,0679	0,0942	0,0275	0,0733
2	Sawmilling, planing and impregnation of wood	0,0326	0,0305	0,0219	0,0294	0,1276	0,0582	0,0181	0,0548	0,0166	0,0278	0,0071	0,0166
3	Manufacture of plywood and veneer sheets	0,0103	0,0109	0,0071	0,0120	0,0977	0,0116	0,0046	0,0074	0,0051	0,0078	0,0026	0,0058
4	Manufacture of particle board and fibreboard	0,0443	0,0444	0,0321	0,0975	1,0357	0,0188	0,0168	0,0284	0,0305	0,0457	0,0139	0,0470
5	Manufacture of wooden houses	0,0002	0,0003	0,0001	0,0002	0,0004	0,0002	0,0001	0,0002	0,0001	0,0002	0,0001	0,0001
6	Manufacture of builders' joinery and carpentry	0,0108	0,0134	0,0081	0,0144	0,0228	0,0061	0,0054	0,0078	0,0061	0,0164	0,0032	0,0065
7	Manufacture of wooden containers	0,0004	0,0004	0,0003	0,0002	0,0002	0,0001	0,0000	0,0002	0,0000	0,0001	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000	0,0003	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,2447	0,1841	0,1810	0,2101	0,3114	0,2333	0,1267	0,2240	0,1943	0,2344	0,0784	0,2034
10	Manufacture of mechanical pulp and newsprint	0,0173	0,0160	0,0134	0,0168	0,0140	0,0186	0,0075	0,0112	0,0256	0,0191	0,0063	0,0183
11	Manufacture of uncoated magazine paper	0,1372	0,1224	0,0985	0,1255	0,1063	0,1639	0,0614	0,0873	0,1590	0,1345	0,0484	0,1444
12	Manufacture of coated magazine paper	0,2254	0,2024	0,1623	0,2094	0,2145	0,2769	0,1147	0,1664	0,2044	0,3345	0,0981	0,3503
13	Manufacture of fine paper	0,1840	0,1652	0,1427	0,1710	0,1860	0,2001	0,0877	0,1358	0,2056	0,2647	0,0809	0,2955
14	Manufacture of kraft paper and other paper	0,0818	0,0698	0,0679	0,0720	0,1127	0,0833	0,0366	0,0602	0,0850	0,1212	0,0330	0,1193
15	Manufacture of paperboard	0,3817	0,2961	0,3666	0,3007	0,6709	0,3378	0,1443	0,2572	0,2492	0,3089	0,0885	0,1880
16	Manufacture of corrugated board and paperboard containers	0,1225	0,0758	0,1659	0,0727	0,3262	0,0403	0,0200	0,0703	0,0319	0,0878	0,0163	0,0350
17	Manufacture of paper and paperboard products excluding 16	0,0325	0,0266	0,0323	0,0259	0,0380	0,0136	0,0105	0,0278	0,0917	0,0399	0,0150	0,0621
18	Publishing and printing of newspapers	0,0007	0,0007	0,0006	0,0007	0,0006	0,0004	0,0003	0,0004	0,0010	0,0010	0,0003	0,0010
19	Publishing of books, magazines and other printed matter	0,0201	0,0195	0,0182	0,0203	0,0178	0,0113	0,0078	0,0157	0,0501	0,0276	0,0115	0,0476
20	Manufacture of chairs and seats, use of wood	0,0018	0,0022	0,0015	0,0087	0,0382	0,0010	0,0008	0,0013	0,0024	0,0022	0,0011	0,0047
21	Manufacture of office and shop furniture, use of wood	0,0006	0,0004	0,0004	0,0013	0,0086	0,0002	0,0002	0,0004	0,0003	0,0003	0,0002	0,0006
22	Manufacture of kitchen furniture, use of wood	0,0012	0,0016	0,0010	0,0073	0,0124	0,0006	0,0005	0,0008	0,0018	0,0015	0,0008	0,0038
23	Manufacture of other furniture, use of wood	0,0015	0,0013	0,0008	0,0047	0,0078	0,0005	0,0003	0,0008	0,0011	0,0010	0,0005	0,0023
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0930	0,1032	0,0757	0,1153	0,0744	0,0517	0,0503	0,0527	0,0548	0,1664	0,0234	0,0567
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	7,1298	4,1178	2,8480	4,5483	4,0383	28,3902	7,0424	3,5932	3,0172	3,1566	1,6918	2,1414
28	Agriculture, hunting & fishing	2,2230	2,3766	2,0929	2,1230	2,4389	2,4596	1,3396	1,8341	3,5024	49,3999	0,8118	4,3001
29	Mining and quarrying	7,9506	1,9657	1,2115	2,1924	2,9479	10,2720	0,9152	3,9444	0,9517	1,0137	1,7597	2,5842
30	Manufacture of food products, beverages and tobacco	0,2822	0,2992	0,2617	0,2621	0,2942	0,2726	0,1548	0,2171	0,4419	6,4485	0,0992	0,5552
31	Manufacture of textiles, wearing apparel and leather products	0,0751	0,0815	0,0753	0,0945	0,3336	0,0512	0,0442	0,1774	0,0777	0,1032	0,0350	0,0740
32	Reproduction of recorded media	0,0004	0,0004	0,0004	0,0005	0,0003	0,0002	0,0002	0,0002	0,0003	0,0006	0,0001	0,0003
33	Manuf. of coke, refined petroleum products and nuclear fuel	12,9435	4,3186	3,0328	4,9896	6,8267	12,9646	2,1464	6,0114	3,6714	2,9865	10,7379	15,2931
34	Manufacture of chemicals and chemical products	7,1944	4,4396	5,5417	6,3901	11,8537	3,9982	4,6871	9,1507	3,7084	4,5502	1,7722	2,6164
35	Manufacture of rubber and plastic products	0,1055	0,1839	0,1833	0,2509	0,3375	0,1428	0,3391	0,3630	0,2491	0,1383	0,1192	0,0812
36	Manufacture of other non-metallic mineral products	0,9957	0,7733	0,6266	1,8806	1,8698	0,5120	0,6706	10,8378	0,5565	0,6520	0,2338	0,7963
37	Manufacture of basic metals and metal products	49,1776	8,0958	3,7469	8,5757	8,1103	1,9145	0,6749	7,3200	0,7309	0,8291	0,7245	0,8781
38	Manufacture of machinery and equipment	0,1715	3,1182	0,0703	0,4750	0,0823	0,1312	0,1257	0,1712	0,0275	0,0532	0,1237	0,0384
39	Manufacture of electrical machinery and apparatus	0,0279	0,0830	1,3821	0,0650	0,0412	0,0323	0,0105	0,0505	0,0304	0,0226	0,0157	0,0629
40	Manufacture of motor vehicles	0,1148	0,2792	0,0348	6,9305	0,0507	0,0317	0,0204	0,0616	0,0244	0,0269	0,1553	0,0731
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0756	0,0309	0,0205	0,0511	11,6219	0,0106	0,0072	0,0483	0,0220	0,0154	0,0098	0,0389
42	Electricity, gas and steam supply, excluding 27	46,9847	27,7111	19,5138	30,5670	31,1987	942,2696	45,3770	26,1138	20,8581	22,0822	11,3587	15,5843
43	Collection, purification and distribution of water	0,0090	0,0109	0,0098	0,0117	0,0087	0,0076	3,2790	0,0056	0,0090	0,0113	0,0027	0,0064
44	Construction, excluding wood construction	0,1536	0,1612	0,1217	0,1719	0,1267	0,1812	0,0818	7,3149	0,1222	0,2123	0,0564	0,3046
45	Wholesale and retail trade	0,1826	0,1520	0,1434	0,1537	0,2049	0,0857	0,0495	0,4282	4,1035	0,3302	0,2282	0,3966
46	Hotels and restaurants	0,0547	0,0645	0,0572	0,0506	0,0500	0,0402	0,0321	0,0320	0,0401	3,2711	0,0167	0,0441
47	Land transport; transport via pipelines	9,8606	5,3685	3,8811	5,1268	6,7195	6,4987	1,8638	7,7618	6,4803	3,9408	121,4630	2,8629
48	Water transport	0,1081	0,0951	0,0815	0,0816	0,0910	0,0776	0,0433	0,1057	0,0943	0,0584	0,0617	47,6934
49	Other transport; post and telecommunications	1,3949	1,3220	1,1323	1,2048	1,2676	0,7506	0,6079	1,0160	1,9940	1,0040	0,9619	8,0109
50	Financial intermediation and insurance	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
51	Real estate, renting and business activities; R&D	0,9432	1,0405	0,9781	1,1636	0,8215	0,5664	0,3722	0,5591	0,7355	1,3540	0,2760	0,7556
52	Community, social and other service activities	0,1322	0,1526	0,1481	0,1426	0,1200	0,0952	0,0722	0,1251	0,1481	0,2499	0,0520	0,0841
Global Warming Potential multiplier (including foreign prod.)		150,0323	67,7128	48,6639	79,1066	95,1359	1013,4218	70,7219	88,5704	53,0813	103,8480	153,3243	106,9588

(continues)

Appendix 12 (continues)
Contribution of domestic and foreign industries to Global Warming Potential multipliers (tons CO_2 equiv./ mill. FIM output)

		Industry			
Industry		49	50	51	52
1	Forestry	0,0526	0,0535	0,0971	0,0535
2	Sawmilling, planing and impregnation of wood	0,0176	0,0145	0,0372	0,0116
3	Manufacture of plywood and veneer sheets	0,0043	0,0049	0,0091	0,0033
4	Manufacture of particle board and fibreboard	0,0250	0,0333	0,0722	0,0213
5	Manufacture of wooden houses	0,0001	0,0001	0,0003	0,0001
6	Manufacture of builders' joinery and carpentry	0,0064	0,0088	0,0291	0,0045
7	Manufacture of wooden containers	0,0001	0,0000	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,1261	0,1127	0,1716	0,1588
10	Manufacture of mechanical pulp and newsprint	0,0114	0,0120	0,0178	0,0210
11	Manufacture of uncoated magazine paper	0,0887	0,0886	0,1421	0,1881
12	Manufacture of coated magazine paper	0,1471	0,1728	0,2575	0,1620
13	Manufacture of fine paper	0,1318	0,1448	0,2311	0,2062
14	Manufacture of kraft paper and other paper	0,0513	0,0564	0,0803	0,0624
15	Manufacture of paperboard	0,1729	0,1840	0,1971	0,1768
16	Manufacture of corrugated board and paperboard containers	0,0285	0,0151	0,0232	0,0233
17	Manufacture of paper and paperboard products excluding 16	0,0250	0,0240	0,0424	0,0432
18	Publishing and printing of newspapers	0,0006	0,0006	0,0009	0,0013
19	Publishing of books, magazines and other printed matter	0,0253	0,0220	0,0419	0,0802
20	Manufacture of chairs and seats, use of wood	0,0017	0,0021	0,0038	0,0017
21	Manufacture of office and shop furniture, use of wood	0,0003	0,0003	0,0005	0,0002
22	Manufacture of kitchen furniture, use of wood	0,0013	0,0015	0,0025	0,0013
23	Manufacture of other furniture, use of wood	0,0008	0,0009	0,0017	0,0008
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0590	0,0881	0,3076	0,0427
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	2,1930	2,4126	5,2916	2,7275
28	Agriculture, hunting & fishing	3,4452	1,2168	1,4593	3,8659
29	Mining and quarrying	1,5595	0,5419	1,0501	0,6551
30	Manufacture of food products, beverages and tobacco	0,4419	0,1561	0,1842	0,4766
31	Manufacture of textiles, wearing apparel and leather products	0,0796	0,0252	0,0476	0,0612
32	Reproduction of recorded media	0,0002	0,0003	0,0003	0,0001
33	Manuf. of coke, refined petroleum products and nuclear fuel	6,2472	1,7559	3,2039	2,2045
34	Manufacture of chemicals and chemical products	2,7822	1,1342	2,2366	3,0959
35	Manufacture of rubber and plastic products	0,1274	0,0331	0,0649	0,0774
36	Manufacture of other non-metallic mineral products	1,7959	0,3415	0,7747	0,3508
37	Manufacture of basic metals and metal products	1,5380	0,4153	0,7804	0,4775
38	Manufacture of machinery and equipment	0,0486	0,0163	0,0329	0,0341
39	Manufacture of electrical machinery and apparatus	0,0376	0,0223	0,0337	0,0229
40	Manufacture of motor vehicles	0,1064	0,0137	0,0189	0,0605
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0185	0,0562	0,0237	0,0220
42	Electricity, gas and steam supply, excluding 27	15,2628	16,5644	35,7397	18,8631
43	Collection, purification and distribution of water	0,0050	0,0102	0,0417	0,0051
44	Construction, excluding wood construction	1,1124	0,1319	0,3830	0,0806
45	Wholesale and retail trade	0,2407	0,1259	0,2417	0,2372
46	Hotels and restaurants	0,1269	0,0341	0,0272	0,0430
47	Land transport; transport via pipelines	3,5277	1,1985	1,7504	1,9325
48	Water transport	0,1082	0,0477	0,0503	0,0647
49	Other transport; post and telecommunications	34,9703	1,2452	1,3467	1,0882
50	Financial intermediation and insurance	0,0000	0,0000	0,0000	0,0000
51	Real estate, renting and business activities; R&D	0,5552	0,7741	5,8005	0,3632
52	Community, social and other service activities	0,0745	0,1078	0,2046	3,8191
Global Warming Potential multiplier (including foreign prod.)		77,3829	29,4228	62,5556	41,8933

Appendix 13
Contribution of domestic and foreign industries to Acidification Potential multipliers (tons SO_2 equiv./ mill. FIM output)

		Industry											
Industry		1	2	3	4	5	6	7	8	9	10	11	12
1	Forestry	0,1522	0,0760	0,0387	0,0133	0,0312	0,0202	0,0298	0,0155	0,0477	0,0211	0,0211	0,0211
2	Sawmilling, planing and impregnation of wood	0,0000	0,0492	0,0007	0,0060	0,0108	0,0094	0,0182	0,0081	0,0029	0,0015	0,0015	0,0015
3	Manufacture of plywood and veneer sheets	0,0000	0,0003	0,4811	0,0025	0,0049	0,0135	0,0172	0,0193	0,0005	0,0004	0,0004	0,0004
4	Manufacture of particle board and fibreboard	0,0000	0,0001	0,0003	0,6160	0,0039	0,0105	0,0061	0,0056	0,0000	0,0001	0,0002	0,0002
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000	0,0433	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0000	0,0001	0,0001	0,0001	0,0091	0,0787	0,0002	0,0001	0,0000	0,0001	0,0001	0,0001
7	Manufacture of wooden containers	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0015	0,0000	0,0000	0,0000	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0045	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0006	0,0025	0,0106	0,0316	0,0064	0,0085	0,0066	0,0064	0,9491	0,2048	0,2048	0,2048
10	Manufacture of mechanical pulp and newsprint	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,0783	0,0005	0,0005
11	Manufacture of uncoated magazine paper	0,0000	0,0001	0,0001	0,0002	0,0002	0,0002	0,0001	0,0001	0,0001	0,0002	0,1256	0,0002
12	Manufacture of coated magazine paper	0,0000	0,0001	0,0002	0,0004	0,0003	0,0003	0,0002	0,0002	0,0002	0,0003	0,0003	0,1128
13	Manufacture of fine paper	0,0000	0,0001	0,0002	0,0003	0,0002	0,0002	0,0001	0,0002	0,0001	0,0011	0,0011	0,0011
14	Manufacture of kraft paper and other paper	0,0001	0,0003	0,0031	0,0115	0,0005	0,0009	0,0005	0,0007	0,0007	0,0035	0,0035	0,0035
15	Manufacture of paperboard	0,0002	0,0007	0,0046	0,0187	0,0013	0,0019	0,0010	0,0013	0,0005	0,0044	0,0044	0,0044
16	Manufacture of corrugated board and paperboard containers	0,0000	0,0002	0,0002	0,0007	0,0003	0,0004	0,0001	0,0001	0,0001	0,0009	0,0009	0,0009
17	Manufacture of paper and paperboard products excluding 16	0,0000	0,0000	0,0000	0,0001	0,0000	0,0001	0,0000	0,0000	0,0000	0,0001	0,0001	0,0001
18	Publishing and printing of newspapers	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
19	Publishing of books, magazines and other printed matter	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
20	Manufacture of chairs and seats, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
23	Manufacture of other furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0001	0,0005	0,0008	0,0010	0,0010	0,0009	0,0006	0,0007	0,0002	0,0010	0,0010	0,0011
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0008	0,0041	0,0070	0,0133	0,0061	0,0068	0,0046	0,0050	0,0060	0,0119	0,0120	0,0120
28	Agriculture, hunting & fishing	0,0006	0,0013	0,0022	0,0034	0,0020	0,0023	0,0014	0,0019	0,0014	0,0063	0,0064	0,0064
29	Mining and quarrying	0,0024	0,0055	0,0087	0,0190	0,0079	0,0090	0,0061	0,0055	0,0089	0,0256	0,0256	0,0256
30	Manufacture of food products, beverages and tobacco	0,0003	0,0006	0,0010	0,0016	0,0009	0,0011	0,0007	0,0008	0,0006	0,0024	0,0024	0,0024
31	Manufacture of textiles, wearing apparel and leather products	0,0003	0,0003	0,0003	0,0003	0,0004	0,0004	0,0003	0,0060	0,0002	0,0003	0,0003	0,0003
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0100	0,0134	0,0168	0,0410	0,0144	0,0152	0,0126	0,0113	0,0150	0,0229	0,0227	0,0225
34	Manufacture of chemicals and chemical products	0,0036	0,0089	0,0719	0,1495	0,0258	0,0551	0,0145	0,0396	0,0693	0,0843	0,0843	0,0843
35	Manufacture of rubber and plastic products	0,0002	0,0005	0,0011	0,0013	0,0013	0,0018	0,0006	0,0018	0,0005	0,0011	0,0011	0,0011
36	Manufacture of other non-metallic mineral products	0,0006	0,0015	0,0028	0,0032	0,0266	0,0231	0,0017	0,0017	0,0020	0,0028	0,0028	0,0029
37	Manufacture of basic metals and metal products	0,0009	0,0039	0,0048	0,0096	0,0149	0,0210	0,0132	0,0084	0,0034	0,0068	0,0069	0,0070
38	Manufacture of machinery and equipment	0,0000	0,0003	0,0004	0,0008	0,0006	0,0005	0,0003	0,0003	0,0003	0,0006	0,0006	0,0007
39	Manufacture of electrical machinery and apparatus	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001
40	Manufacture of motor vehicles	0,0000	0,0001	0,0001	0,0002	0,0002	0,0002	0,0002	0,0001	0,0001	0,0002	0,0002	0,0002
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0000	0,0000	0,0000	0,0000	0,0001	0,0001	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000
42	Electricity, gas and steam supply, excluding 27	0,0068	0,1020	0,1601	0,3174	0,1064	0,1131	0,0998	0,0849	0,1471	0,3261	0,3266	0,3272
43	Collection, purification and distribution of water	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
44	Construction, excluding wood construction	0,0008	0,0014	0,0017	0,0022	0,0020	0,0018	0,0014	0,0013	0,0008	0,0020	0,0021	0,0022
45	Wholesale and retail trade	0,0007	0,0006	0,0006	0,0007	0,0007	0,0006	0,0006	0,0005	0,0005	0,0006	0,0006	0,0006
46	Hotels and restaurants	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001
47	Land transport; transport via pipelines	0,0062	0,0979	0,0865	0,1271	0,0946	0,0849	0,0913	0,0717	0,0467	0,1126	0,1064	0,0984
48	Water transport	0,0005	0,0025	0,0018	0,0025	0,0017	0,0015	0,0016	0,0012	0,0010	0,0020	0,0020	0,0019
49	Other transport; post and telecommunications	0,0021	0,0091	0,0100	0,0142	0,0120	0,0107	0,0098	0,0089	0,0061	0,0114	0,0110	0,0106
50	Financial intermediation and insurance	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
51	Real estate, renting and business activities; R&D	0,0001	0,0003	0,0005	0,0007	0,0007	0,0007	0,0004	0,0006	0,0003	0,0005	0,0006	0,0006
52	Community, social and other service activities	0,0000	0,0001	0,0002	0,0003	0,0003	0,0002	0,0002	0,0002	0,0001	0,0002	0,0002	0,0002
Acidification Potential multiplier (including foreign prod.)		0,1900	0,3850	0,9193	1,4112	0,4334	0,4961	0,3440	0,3151	1,3127	0,9387	0,9805	0,9599

(continues)

Appendix 13 (continues)
Contribution of domestic and foreign industries to Acidification Potential multipliers (tons SO_2 equiv./ mill. FIM output)

		Industry											
Industry		13	14	15	16	17	18	19	20	21	22	23	24
1	Forestry	0,0211	0,0211	0,0210	0,0082	0,0098	0,0025	0,0044	0,0042	0,0040	0,0105	0,0125	0,0185
2	Sawmilling, planing and impregnation of wood	0,0015	0,0015	0,0014	0,0007	0,0007	0,0002	0,0004	0,0015	0,0016	0,0040	0,0065	0,0099
3	Manufacture of plywood and veneer sheets	0,0004	0,0004	0,0004	0,0006	0,0003	0,0001	0,0002	0,0148	0,0094	0,0084	0,0121	0,0127
4	Manufacture of particle board and fibreboard	0,0002	0,0002	0,0001	0,0005	0,0002	0,0001	0,0001	0,0242	0,0448	0,0848	0,0329	0,0091
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0032
6	Manufacture of builders' joinery and carpentry	0,0001	0,0002	0,0001	0,0002	0,0001	0,0001	0,0001	0,0001	0,0003	0,0003	0,0053	0,0144
7	Manufacture of wooden containers	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,2048	0,2049	0,2048	0,0787	0,0933	0,0234	0,0419	0,0073	0,0083	0,0104	0,0092	0,0096
10	Manufacture of mechanical pulp and newsprint	0,0005	0,0005	0,0004	0,0002	0,0003	0,0071	0,0019	0,0001	0,0001	0,0001	0,0001	0,0001
11	Manufacture of uncoated magazine paper	0,0002	0,0002	0,0002	0,0002	0,0010	0,0003	0,0099	0,0002	0,0002	0,0002	0,0002	0,0001
12	Manufacture of coated magazine paper	0,0003	0,0003	0,0003	0,0004	0,0006	0,0003	0,0016	0,0003	0,0003	0,0003	0,0003	0,0002
13	Manufacture of fine paper	0,0827	0,0012	0,0011	0,0021	0,0044	0,0010	0,0053	0,0002	0,0002	0,0002	0,0002	0,0002
14	Manufacture of kraft paper and other paper	0,0035	0,2138	0,0035	0,0157	0,0556	0,0007	0,0030	0,0011	0,0015	0,0025	0,0016	0,0011
15	Manufacture of paperboard	0,0044	0,0044	0,3861	0,1083	0,0137	0,0010	0,0031	0,0025	0,0032	0,0045	0,0031	0,0013
16	Manufacture of corrugated board and paperboard containers	0,0009	0,0009	0,0009	0,0603	0,0013	0,0002	0,0004	0,0006	0,0007	0,0009	0,0008	0,0002
17	Manufacture of paper and paperboard products excluding 16	0,0001	0,0001	0,0000	0,0002	0,0556	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0003
18	Publishing and printing of newspapers	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
19	Publishing of books, magazines and other printed matter	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0020	0,0000	0,0000	0,0000	0,0000	0,0000
20	Manufacture of chairs and seats, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0229	0,0012	0,0007	0,0001	0,0003
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0091	0,0003	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0002	0,0008	0,0289	0,0002	0,0003
23	Manufacture of other furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0002	0,0005	0,0002	0,0153	0,0002
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,6331
25	Renovation of buildings, use of wood	0,0011	0,0017	0,0005	0,0007	0,0011	0,0009	0,0009	0,0006	0,0007	0,0008	0,0008	0,0005
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0121	0,0122	0,0118	0,0082	0,0092	0,0058	0,0069	0,0066	0,0074	0,0077	0,0069	0,0048
28	Agriculture, hunting & fishing	0,0064	0,0064	0,0065	0,0049	0,0075	0,0030	0,0034	0,0025	0,0020	0,0023	0,0029	0,0019
29	Mining and quarrying	0,0256	0,0256	0,0256	0,0135	0,0136	0,0059	0,0085	0,0079	0,0107	0,0105	0,0083	0,0049
30	Manufacture of food products, beverages and tobacco	0,0024	0,0024	0,0025	0,0021	0,0025	0,0014	0,0015	0,0010	0,0009	0,0010	0,0014	0,0009
31	Manufacture of textiles, wearing apparel and leather products	0,0003	0,0003	0,0003	0,0005	0,0013	0,0003	0,0003	0,0117	0,0009	0,0013	0,0005	0,0005
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0223	0,0221	0,0231	0,0171	0,0172	0,0097	0,0120	0,0135	0,0173	0,0185	0,0153	0,0100
34	Manufacture of chemicals and chemical products	0,0843	0,0845	0,0842	0,0744	0,0748	0,0279	0,0529	0,0620	0,0606	0,0610	0,0588	0,0235
35	Manufacture of rubber and plastic products	0,0011	0,0011	0,0011	0,0037	0,0043	0,0007	0,0010	0,0036	0,0033	0,0027	0,0015	0,0012
36	Manufacture of other non-metallic mineral products	0,0029	0,0032	0,0025	0,0022	0,0026	0,0023	0,0023	0,0032	0,0035	0,0040	0,0065	0,0071
37	Manufacture of basic metals and metal products	0,0070	0,0071	0,0070	0,0092	0,0076	0,0040	0,0051	0,0187	0,0423	0,0319	0,0176	0,0076
38	Manufacture of machinery and equipment	0,0007	0,0006	0,0007	0,0005	0,0005	0,0003	0,0003	0,0004	0,0005	0,0005	0,0004	0,0003
39	Manufacture of electrical machinery and apparatus	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0001
40	Manufacture of motor vehicles	0,0002	0,0002	0,0002	0,0002	0,0002	0,0002	0,0002	0,0002	0,0003	0,0002	0,0002	0,0001
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0000	0,0000	0,0000	0,0000	0,0001	0,0001	0,0001	0,0003	0,0005	0,0004	0,0002	0,0001
42	Electricity, gas and steam supply, excluding 27	0,3280	0,3285	0,3251	0,1759	0,1964	0,0861	0,1182	0,1028	0,1110	0,1299	0,1194	0,0713
43	Collection, purification and distribution of water	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
44	Construction, excluding wood construction	0,0022	0,0027	0,0016	0,0016	0,0021	0,0024	0,0022	0,0013	0,0013	0,0016	0,0017	0,0011
45	Wholesale and retail trade	0,0006	0,0006	0,0006	0,0008	0,0007	0,0007	0,0007	0,0005	0,0005	0,0006	0,0006	0,0041
46	Hotels and restaurants	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000
47	Land transport; transport via pipelines	0,0898	0,0809	0,1219	0,0915	0,0902	0,0291	0,0365	0,0557	0,0635	0,0786	0,0722	0,0607
48	Water transport	0,0017	0,0016	0,0022	0,0016	0,0017	0,0011	0,0012	0,0010	0,0011	0,0014	0,0014	0,0018
49	Other transport; post and telecommunications	0,0101	0,0094	0,0122	0,0124	0,0123	0,0269	0,0226	0,0086	0,0091	0,0110	0,0110	0,0077
50	Financial intermediation and insurance	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
51	Real estate, renting and business activities; R&D	0,0006	0,0007	0,0005	0,0006	0,0009	0,0010	0,0009	0,0007	0,0007	0,0008	0,0008	0,0004
52	Community, social and other service activities	0,0002	0,0002	0,0002	0,0003	0,0003	0,0019	0,0015	0,0002	0,0002	0,0003	0,0003	0,0002
Acidification Potential multiplier (including foreign prod.)		0,9205	1,0418	1,2511	0,6984	0,6843	0,2492	0,3538	0,3837	0,4249	0,5245	0,4293	0,9256

(continues)

Appendix 13 (continues)
Contribution of domestic and foreign industries to Acidification Potential multipliers (tons SO_2 equiv./ mill. FIM output)

		Industry											
Industry		25	26	27	28	29	30	31	32	33	34	35	36
1	Forestry	0,0141	0,0169	0,0010	0,0011	0,0008	0,0014	0,0009	0,0009	0,0008	0,0026	0,0018	0,0014
2	Sawmilling, planing and impregnation of wood	0,0081	0,0082	0,0004	0,0003	0,0002	0,0003	0,0002	0,0002	0,0002	0,0003	0,0003	0,0004
3	Manufacture of plywood and veneer sheets	0,0047	0,0044	0,0002	0,0002	0,0002	0,0002	0,0002	0,0003	0,0002	0,0002	0,0004	0,0003
4	Manufacture of particle board and fibreboard	0,0120	0,0096	0,0001	0,0002	0,0002	0,0002	0,0002	0,0004	0,0002	0,0002	0,0004	0,0002
5	Manufacture of wooden houses	0,0002	0,0095	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0126	0,0075	0,0001	0,0001	0,0002	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001
7	Manufacture of wooden containers	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0070	0,0079	0,0050	0,0087	0,0064	0,0122	0,0099	0,0078	0,0068	0,0407	0,0214	0,0095
10	Manufacture of mechanical pulp and newsprint	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001
11	Manufacture of uncoated magazine paper	0,0002	0,0002	0,0003	0,0002	0,0003	0,0003	0,0002	0,0003	0,0003	0,0003	0,0003	0,0002
12	Manufacture of coated magazine paper	0,0002	0,0002	0,0004	0,0004	0,0004	0,0013	0,0004	0,0005	0,0004	0,0005	0,0010	0,0006
13	Manufacture of fine paper	0,0002	0,0002	0,0003	0,0003	0,0003	0,0008	0,0003	0,0003	0,0003	0,0003	0,0006	0,0004
14	Manufacture of kraft paper and other paper	0,0014	0,0013	0,0006	0,0013	0,0006	0,0022	0,0007	0,0008	0,0006	0,0008	0,0016	0,0010
15	Manufacture of paperboard	0,0014	0,0013	0,0011	0,0011	0,0013	0,0023	0,0018	0,0015	0,0013	0,0020	0,0035	0,0024
16	Manufacture of corrugated board and paperboard containers	0,0002	0,0002	0,0001	0,0002	0,0003	0,0008	0,0006	0,0002	0,0002	0,0004	0,0006	0,0005
17	Manufacture of paper and paperboard products excluding 16	0,0008	0,0006	0,0000	0,0001	0,0000	0,0001	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001
18	Publishing and printing of newspapers	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
19	Publishing of books, magazines and other printed matter	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
20	Manufacture of chairs and seats, use of wood	0,0004	0,0003	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
21	Manufacture of office and shop furniture, use of wood	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0003	0,0005	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
23	Manufacture of other furniture, use of wood	0,0002	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,1489	0,0005	0,0005	0,0011	0,0016	0,0012	0,0008	0,0007	0,0014	0,0010	0,0009	0,0011
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0934	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0041	0,0047	6,9891	0,0148	0,0161	0,0154	0,0119	0,0400	0,0257	0,0266	0,0173	0,0149
28	Agriculture, hunting & fishing	0,0017	0,0019	0,0026	0,5082	0,0028	0,2185	0,0095	0,0031	0,0030	0,0058	0,0086	0,0027
29	Mining and quarrying	0,0042	0,0048	0,0471	0,0126	0,3421	0,0117	0,0083	0,0061	0,2124	0,0282	0,0132	0,0315
30	Manufacture of food products, beverages and tobacco	0,0008	0,0009	0,0011	0,0117	0,0014	0,1152	0,0030	0,0010	0,0015	0,0027	0,0020	0,0013
31	Manufacture of textiles, wearing apparel and leather products	0,0005	0,0005	0,0003	0,0022	0,0006	0,0013	0,1319	0,0007	0,0006	0,0006	0,0022	0,0015
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,7466	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0085	0,0097	0,0411	0,0276	0,0352	0,0238	0,0169	0,0134	1,0223	0,0533	0,0252	0,0291
34	Manufacture of chemicals and chemical products	0,0209	0,0203	0,0189	0,0830	0,0357	0,0662	0,1267	0,0654	0,0509	0,9777	0,2801	0,0525
35	Manufacture of rubber and plastic products	0,0011	0,0012	0,0014	0,0030	0,0012	0,0039	0,0040	0,0227	0,0015	0,0025	0,1081	0,0028
36	Manufacture of other non-metallic mineral products	0,0048	0,0084	0,0022	0,0034	0,0043	0,0055	0,0043	0,0024	0,0036	0,0049	0,0049	0,5533
37	Manufacture of basic metals and metal products	0,0063	0,0073	0,0105	0,0079	0,0095	0,0103	0,0061	0,0062	0,0095	0,0087	0,0108	0,0205
38	Manufacture of machinery and equipment	0,0002	0,0003	0,0006	0,0010	0,0015	0,0008	0,0003	0,0003	0,0011	0,0005	0,0005	0,0009
39	Manufacture of electrical machinery and apparatus	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0001	0,0004	0,0001	0,0001	0,0001	0,0001
40	Manufacture of motor vehicles	0,0001	0,0001	0,0001	0,0002	0,0003	0,0002	0,0001	0,0002	0,0003	0,0002	0,0003	0,0003
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001	0,0005	0,0006	0,0001	0,0001	0,0001	0,0001
42	Electricity, gas and steam supply, excluding 27	0,0600	0,0686	0,7986	0,1226	0,1319	0,1325	0,0993	0,0790	0,2086	0,2197	0,1475	0,1252
43	Collection, purification and distribution of water	0,0000	0,0000	0,0000	0,0000	0,0001	0,0001	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000
44	Construction, excluding wood construction	0,0009	0,0011	0,0018	0,0023	0,0025	0,0023	0,0015	0,0014	0,0024	0,0018	0,0017	0,0020
45	Wholesale and retail trade	0,0036	0,0040	0,0004	0,0028	0,0009	0,0017	0,0006	0,0013	0,0014	0,0008	0,0007	0,0006
46	Hotels and restaurants	0,0000	0,0000	0,0001	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001
47	Land transport; transport via pipelines	0,0538	0,0616	0,0521	0,0402	0,1866	0,1064	0,0552	0,0415	0,1373	0,0847	0,0660	0,1153
48	Water transport	0,0015	0,0017	0,0010	0,0012	0,0015	0,0015	0,0011	0,0343	0,0061	0,0015	0,0015	0,0013
49	Other transport; post and telecommunications	0,0064	0,0078	0,0050	0,0114	0,0084	0,0134	0,0098	0,0082	0,0108	0,0103	0,0105	0,0114
50	Financial intermediation and insurance	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
51	Real estate, renting and business activities; R&D	0,0003	0,0004	0,0005	0,0005	0,0012	0,0009	0,0010	0,0009	0,0011	0,0008	0,0008	0,0008
52	Community, social and other service activities	0,0001	0,0002	0,0002	0,0004	0,0003	0,0004	0,0003	0,0002	0,0004	0,0003	0,0003	0,0003
Acidification Potential multiplier (including foreign prod.)		0,3929	0,3686	7,9855	0,8727	0,7974	0,7560	0,5088	1,0904	1,7139	1,4814	0,7358	0,9872

(continues)

Appendix 13 (continues)
Contribution of domestic and foreign industries to Acidification Potential multipliers (tons SO_2 equiv./ mill. FIM output)

Industry		37	38	39	40	41	42	43	44	45	46	47	48
1	Forestry	0,0008	0,0007	0,0006	0,0007	0,0022	0,0012	0,0004	0,0010	0,0006	0,0008	0,0002	0,0006
2	Sawmilling, planing and impregnation of wood	0,0002	0,0002	0,0002	0,0002	0,0009	0,0004	0,0001	0,0004	0,0001	0,0002	0,0001	0,0001
3	Manufacture of plywood and veneer sheets	0,0002	0,0003	0,0002	0,0003	0,0023	0,0003	0,0001	0,0002	0,0001	0,0002	0,0001	0,0001
4	Manufacture of particle board and fibreboard	0,0002	0,0002	0,0002	0,0005	0,0051	0,0001	0,0001	0,0001	0,0002	0,0002	0,0001	0,0002
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0001	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0001	0,0001	0,0002	0,0000	0,0001
7	Manufacture of wooden containers	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0061	0,0046	0,0045	0,0052	0,0077	0,0058	0,0031	0,0055	0,0048	0,0058	0,0019	0,0050
10	Manufacture of mechanical pulp and newsprint	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0002	0,0001	0,0000	0,0001
11	Manufacture of uncoated magazine paper	0,0003	0,0002	0,0002	0,0002	0,0002	0,0003	0,0001	0,0002	0,0003	0,0003	0,0001	0,0003
12	Manufacture of coated magazine paper	0,0004	0,0004	0,0003	0,0004	0,0004	0,0005	0,0002	0,0003	0,0004	0,0006	0,0002	0,0006
13	Manufacture of fine paper	0,0003	0,0002	0,0002	0,0003	0,0003	0,0003	0,0001	0,0002	0,0003	0,0004	0,0001	0,0004
14	Manufacture of kraft paper and other paper	0,0006	0,0005	0,0005	0,0006	0,0009	0,0006	0,0003	0,0005	0,0007	0,0009	0,0003	0,0009
15	Manufacture of paperboard	0,0015	0,0011	0,0014	0,0011	0,0026	0,0013	0,0006	0,0010	0,0010	0,0012	0,0003	0,0007
16	Manufacture of corrugated board and paperboard containers	0,0003	0,0002	0,0004	0,0002	0,0009	0,0001	0,0001	0,0002	0,0001	0,0002	0,0000	0,0001
17	Manufacture of paper and paperboard products excluding 16	0,0001	0,0001	0,0001	0,0000	0,0001	0,0000	0,0000	0,0001	0,0002	0,0001	0,0000	0,0001
18	Publishing and printing of newspapers	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
19	Publishing of books, magazines and other printed matter	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
20	Manufacture of chairs and seats, use of wood	0,0000	0,0000	0,0000	0,0000	0,0002	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
23	Manufacture of other furniture, use of wood	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0010	0,0011	0,0008	0,0012	0,0008	0,0005	0,0005	0,0005	0,0006	0,0017	0,0002	0,0006
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0179	0,0103	0,0071	0,0114	0,0101	0,0712	0,0177	0,0090	0,0076	0,0079	0,0042	0,0054
28	Agriculture, hunting & fishing	0,0027	0,0029	0,0025	0,0026	0,0029	0,0030	0,0016	0,0022	0,0042	0,0594	0,0010	0,0052
29	Mining and quarrying	0,0417	0,0103	0,0064	0,0115	0,0155	0,0539	0,0048	0,0207	0,0050	0,0053	0,0092	0,0136
30	Manufacture of food products, beverages and tobacco	0,0013	0,0014	0,0012	0,0012	0,0013	0,0012	0,0007	0,0010	0,0020	0,0294	0,0005	0,0025
31	Manufacture of textiles, wearing apparel and leather products	0,0006	0,0006	0,0006	0,0007	0,0026	0,0004	0,0003	0,0014	0,0006	0,0008	0,0003	0,0006
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0470	0,0157	0,0110	0,0181	0,0248	0,0470	0,0078	0,0218	0,0133	0,0108	0,0390	0,0555
34	Manufacture of chemicals and chemical products	0,0389	0,0240	0,0300	0,0346	0,0641	0,0216	0,0253	0,0495	0,0201	0,0246	0,0096	0,0141
35	Manufacture of rubber and plastic products	0,0012	0,0021	0,0021	0,0029	0,0039	0,0016	0,0039	0,0042	0,0029	0,0016	0,0014	0,0009
36	Manufacture of other non-metallic mineral products	0,0049	0,0038	0,0031	0,0093	0,0092	0,0025	0,0033	0,0535	0,0027	0,0032	0,0012	0,0039
37	Manufacture of basic metals and metal products	0,3073	0,0506	0,0234	0,0536	0,0507	0,0120	0,0042	0,0457	0,0046	0,0052	0,0045	0,0055
38	Manufacture of machinery and equipment	0,0010	0,0174	0,0004	0,0027	0,0005	0,0007	0,0007	0,0010	0,0002	0,0003	0,0007	0,0002
39	Manufacture of electrical machinery and apparatus	0,0001	0,0004	0,0072	0,0003	0,0002	0,0002	0,0001	0,0003	0,0002	0,0001	0,0001	0,0003
40	Manufacture of motor vehicles	0,0006	0,0015	0,0002	0,0365	0,0003	0,0002	0,0001	0,0003	0,0001	0,0001	0,0008	0,0004
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0003	0,0001	0,0001	0,0002	0,0531	0,0000	0,0000	0,0002	0,0001	0,0001	0,0000	0,0002
42	Electricity, gas and steam supply, excluding 27	0,1462	0,0862	0,0607	0,0951	0,0971	2,9312	0,1412	0,0812	0,0649	0,0687	0,0353	0,0485
43	Collection, purification and distribution of water	0,0000	0,0001	0,0001	0,0001	0,0000	0,0000	0,0172	0,0000	0,0000	0,0001	0,0000	0,0000
44	Construction, excluding wood construction	0,0018	0,0019	0,0014	0,0020	0,0015	0,0021	0,0010	0,0852	0,0014	0,0025	0,0007	0,0035
45	Wholesale and retail trade	0,0010	0,0008	0,0008	0,0009	0,0011	0,0005	0,0003	0,0024	0,0229	0,0018	0,0013	0,0022
46	Hotels and restaurants	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0052	0,0000	0,0001
47	Land transport; transport via pipelines	0,0905	0,0493	0,0356	0,0471	0,0617	0,0596	0,0171	0,0712	0,0595	0,0362	1,1149	0,0263
48	Water transport	0,0016	0,0014	0,0012	0,0012	0,0014	0,0012	0,0006	0,0016	0,0014	0,0009	0,0009	0,7119
49	Other transport; post and telecommunications	0,0107	0,0101	0,0087	0,0092	0,0097	0,0057	0,0047	0,0078	0,0153	0,0077	0,0074	0,0613
50	Financial intermediation and insurance	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
51	Real estate, renting and business activities; R&D	0,0010	0,0011	0,0010	0,0012	0,0009	0,0006	0,0004	0,0006	0,0008	0,0014	0,0003	0,0008
52	Community, social and other service activities	0,0003	0,0004	0,0004	0,0004	0,0003	0,0002	0,0002	0,0003	0,0004	0,0006	0,0001	0,0002
Acidification Potential multiplier (including foreign prod.)		0,7309	0,3027	0,2149	0,3541	0,4378	3,2285	0,2591	0,4715	0,2396	0,2869	1,2370	0,9734

(continues)

Appendix 13 (continues)
Contribution of domestic and foreign industries to Acidification Potential multipliers (tons SO_2 equiv./ mill. FIM output)

		Industry			
Industry		49	50	51	52
1	Forestry	0,0005	0,0005	0,0008	0,0005
2	Sawmilling, planing and impregnation of wood	0,0001	0,0001	0,0003	0,0001
3	Manufacture of plywood and veneer sheets	0,0001	0,0001	0,0002	0,0001
4	Manufacture of particle board and fibreboard	0,0001	0,0002	0,0004	0,0001
5	Manufacture of wooden houses	0,0000	0,0000	0,0000	0,0000
6	Manufacture of builders' joinery and carpentry	0,0001	0,0001	0,0003	0,0000
7	Manufacture of wooden containers	0,0000	0,0000	0,0000	0,0000
8	Manufacture of other wood products	0,0000	0,0000	0,0000	0,0000
9	Manufacture of chemical pulp	0,0031	0,0028	0,0042	0,0039
10	Manufacture of mechanical pulp and newsprint	0,0001	0,0001	0,0001	0,0002
11	Manufacture of uncoated magazine paper	0,0002	0,0002	0,0003	0,0004
12	Manufacture of coated magazine paper	0,0003	0,0003	0,0005	0,0003
13	Manufacture of fine paper	0,0002	0,0002	0,0003	0,0003
14	Manufacture of kraft paper and other paper	0,0004	0,0004	0,0006	0,0005
15	Manufacture of paperboard	0,0007	0,0007	0,0008	0,0007
16	Manufacture of corrugated board and paperboard containers	0,0001	0,0000	0,0001	0,0001
17	Manufacture of paper and paperboard products excluding 16	0,0000	0,0000	0,0001	0,0001
18	Publishing and printing of newspapers	0,0000	0,0000	0,0000	0,0000
19	Publishing of books, magazines and other printed matter	0,0000	0,0000	0,0000	0,0001
20	Manufacture of chairs and seats, use of wood	0,0000	0,0000	0,0000	0,0000
21	Manufacture of office and shop furniture, use of wood	0,0000	0,0000	0,0000	0,0000
22	Manufacture of kitchen furniture, use of wood	0,0000	0,0000	0,0000	0,0000
23	Manufacture of other furniture, use of wood	0,0000	0,0000	0,0000	0,0000
24	Construction of new buildings, use of wood	0,0000	0,0000	0,0000	0,0000
25	Renovation of buildings, use of wood	0,0006	0,0009	0,0032	0,0004
26	Do-it-yourself construction and renovation, use of wood	0,0000	0,0000	0,0000	0,0000
27	Electricity and hot water supply, use of wood	0,0055	0,0060	0,0133	0,0068
28	Agriculture, hunting & fishing	0,0041	0,0015	0,0018	0,0047
29	Mining and quarrying	0,0082	0,0028	0,0055	0,0034
30	Manufacture of food products, beverages and tobacco	0,0020	0,0007	0,0008	0,0022
31	Manufacture of textiles, wearing apparel and leather products	0,0006	0,0002	0,0004	0,0005
32	Reproduction of recorded media	0,0000	0,0000	0,0000	0,0000
33	Manuf. of coke, refined petroleum products and nuclear fuel	0,0227	0,0064	0,0116	0,0080
34	Manufacture of chemicals and chemical products	0,0150	0,0061	0,0121	0,0167
35	Manufacture of rubber and plastic products	0,0015	0,0004	0,0007	0,0009
36	Manufacture of other non-metallic mineral products	0,0089	0,0017	0,0038	0,0017
37	Manufacture of basic metals and metal products	0,0096	0,0026	0,0049	0,0030
38	Manufacture of machinery and equipment	0,0003	0,0001	0,0002	0,0002
39	Manufacture of electrical machinery and apparatus	0,0002	0,0001	0,0002	0,0001
40	Manufacture of motor vehicles	0,0006	0,0001	0,0001	0,0003
41	Manuf. of furniture, excl. 20-23, manuf. n.e.c. and recycling	0,0001	0,0003	0,0001	0,0001
42	Electricity, gas and steam supply, excluding 27	0,0475	0,0515	0,1112	0,0587
43	Collection, purification and distribution of water	0,0000	0,0001	0,0002	0,0000
44	Construction, excluding wood construction	0,0130	0,0015	0,0045	0,0009
45	Wholesale and retail trade	0,0013	0,0007	0,0013	0,0013
46	Hotels and restaurants	0,0002	0,0001	0,0000	0,0001
47	Land transport; transport via pipelines	0,0324	0,0110	0,0161	0,0177
48	Water transport	0,0016	0,0007	0,0008	0,0010
49	Other transport; post and telecommunications	0,2678	0,0095	0,0103	0,0083
50	Financial intermediation and insurance	0,0000	0,0000	0,0000	0,0000
51	Real estate, renting and business activities; R&D	0,0006	0,0008	0,0062	0,0004
52	Community, social and other service activities	0,0002	0,0003	0,0005	0,0095
Acidification Potential multiplier (including foreign prod.)		0,4503	0,1119	0,2188	0,1543