

Air emission accounts

**Activity A.12: Methodology on environmental accounting
with emphasis on air and waste accounts
9-12 December 2013**

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UN mission on environmental accounting

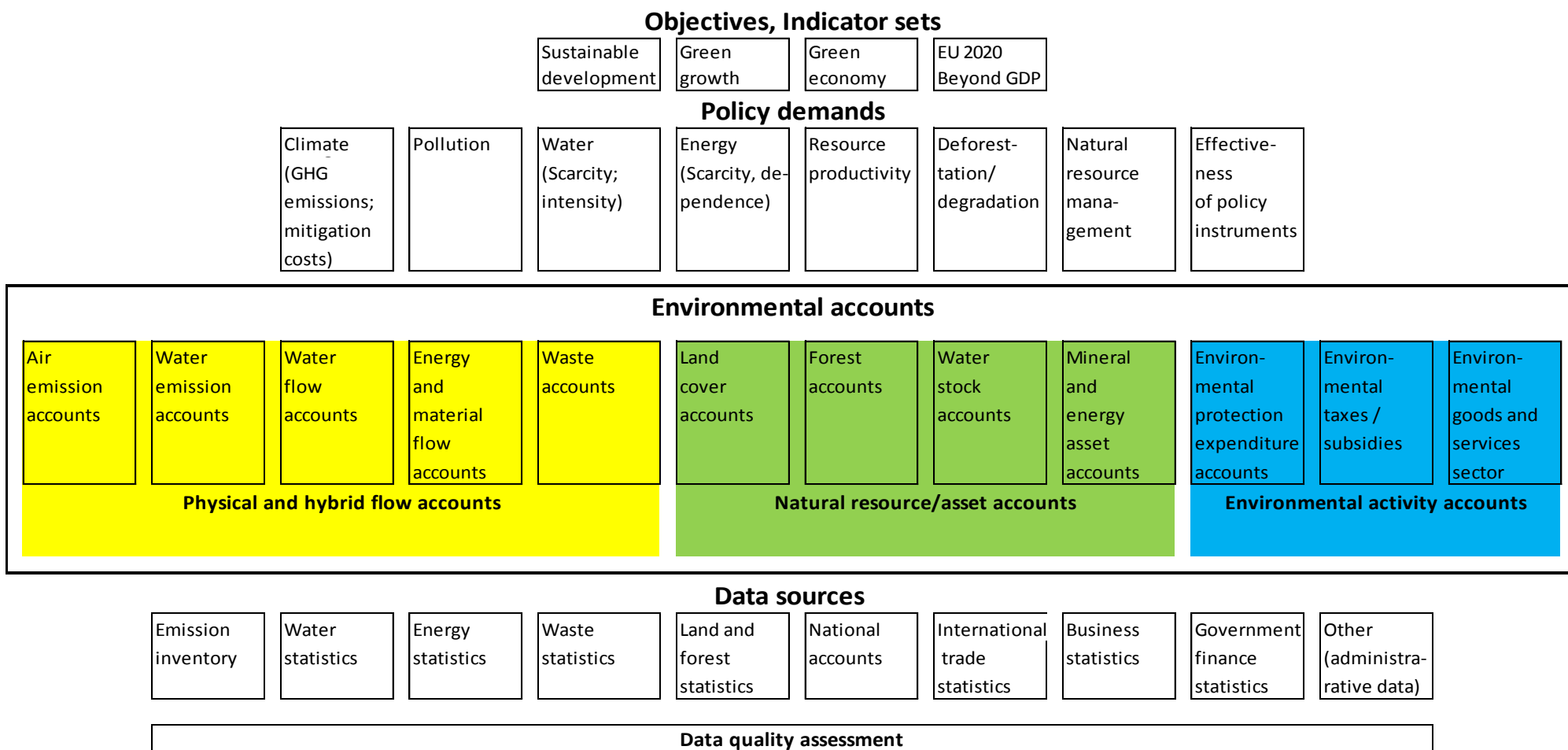


Figure A.1, Flow chart

Implementation Strategy for the System of Environmental-Economic Accounting SEEA

Prepared by the Committee of Experts on Environmental-Economic Accounting

Stocks and flows in environmental accounting

Stocks 1.1. and 31.12.

Changes in stocks

- Mineral and energy resources:
metals, other minerals, oil, gas,
coal, peat
- Land (space)
- Soil
- Timber: cultivated, natural
- Aquatic resources: cultivated, natural
- Other biological resources
- Water: surface, ground, soil water

- Growth, discoveries
- Extraction, natural losses, catastrophes
- Reappraisals, revaluations

Flows, supply and use 1.1.– 31.12.

By industry and by material

- Natural inputs: material, air, water, space,
light, heat, wind, other flows
- Products in the economy:
raw materials, intermediate products, final
products
- Residuals: waste, emissions into air,
emissions into water, dissipative residuals and
losses, natural resource residuals

- Environmental expenditures,
- Environmental goods and services
- Environmental taxes and transfers
- Env. licences, emission trade

SEEA CF: Supply and Use Table

Table 2.3.2 Basic form of a Physical Supply and Use Table*

SUPPLY TABLE						
	Industries	Households	Accumulation	Rest of the World	Environment	Totals
Natural inputs					Flows from the environment	Total supply of natural inputs
Products	Output			Imports		Total supply of products
Residuals	Residuals generated by industry	Residuals generated by household final consumption	Residuals from scrapping and demolition of produced assets			Total supply of residuals
USE TABLE						
	Industries	Households	Accumulation	Rest of the World	Environment	Totals
Natural inputs	Extraction of natural inputs					Total use of natural inputs
Products	Intermediate consumption	Household final consumption	Gross Capital Formation	Exports		Total use of products
Residuals	Collection & treatment of waste and other residuals		Accumulation of waste in controlled landfill sites		Residual flows direct to environment	Total use of residuals

* Note: Grey cells are null by definition. Blank cells may contain relevant flows. These flows are explained in detail in Chapter 3.

Environmental accounting in the EU and in Finland

EU strategy on environmental accounting

- ❑ Objectives of sustainable development, environmental policy, the Lisbon treaty
- ❑ The sixth environmental program of the EU; air protection, waste prevention and recycling, sustainable use of natural resources
- ❑ Beyond GDP 2007; environmental accounting to support wellbeing
- ❑ EU2020 strategy: resource efficiency, green economy
- ❑ ESS Sponsorship Group; sustainable environment

EU regulation on environmental accounting

- ❑ In 2013 mandatory reporting, data 2008-2011
 - ❑ Air emissions by industry
 - ❑ Economy-wide material flow accounts
 - ❑ Environmental taxes by industry
- ❑ In 2017 mandatory reporting, data 2013-2015
 - ❑ Energy accounts (PSUT)
 - ❑ Environmental protection expenditures
 - ❑ Environmental goods and services sector
- ❑ Annual reporting continues
- ❑ New modules planned
 - water accounts, waste accounts, forest accounts, mineral stocks,...

Basics on air emission accounts

- Emissions by
 - economic activity (NACE A*64) and
 - by 14 emission type, including greenhouse gases
- Bridging tables between GHG reporting and air emission accounts
- **Economic activities** , not **sectors** like in GHG reporting !
- The first full data sets from EU countries to eurostat in September 2013 (2008-2011 data)
- Quality reports to Eurostat by January 2014

A U 01-99	Total industries
A	Agriculture, forestry and fishing
A01	Crop and animal production, hunting and related service activities
A02	Forestry and logging
A03	Fishing and aquaculture
B	Mining and quarrying
C	Manufacturing
C10-C12	<i>Manufacture of food products, beverages and tobacco</i>
C13-C15	<i>Manufacture of textiles, wearing apparel and leather products</i>
C16-C18	<i>Manufacture of wood, paper, printing and reproduction</i>
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
C17	Manufacture of paper and paper products
C18	Printing and reproduction of recorded media
C19	<i>Manufacture of coke and refined petroleum products</i>
C20	<i>Manufacture of chemicals and chemical products</i>
C21	<i>Manufacture of basic pharmaceutical products and</i>
C22_C23	<i>Manufacture of rubber and plastic products and other non-metallic</i>
C22	Manufacture of rubber and plastic products
C23	Manufacture of other non-metallic mineral products
C24_C25	<i>Manufacture of basic metals and fabricated metal products, except machinery and equipment</i>
C24	Manufacture of basic metals
C25	Manufacture of fabricated metal products, except machinery and equipment
C26	<i>Manufacture of computer, electronic and optical products</i>
C27	<i>Manufacture of electrical equipment</i>
C28	<i>Manufacture of machinery and equipment n.e.c.</i>
C29_C30	<i>Manufacture of motor vehicles, trailers, semi-trailers and of other</i>
C29	Manufacture of motor vehicles, trailers and semi-trailers
C30	Manufacture of other transport equipment
C31-C33	<i>Manufacture of furniture; jewellery, musical instruments, toys; repair and installation of machinery and equipment</i>
C31_C32	Manufacture of furniture; other manufacturing
C33	Repair and installation of machinery and equipment

D	Electricity, gas, steam and air conditioning supply
E	Water supply; sewerage, waste management and
E36	Water collection, treatment and supply
E37-E39	Sewerage, waste management, remediation activities
F	Construction
G	Wholesale and retail trade; repair of motor vehicles and
G45	Wholesale and retail trade and repair of motor vehicles and motorcycles
G46	Wholesale trade, except of motor vehicles and motorcycles
G47	Retail trade, except of motor vehicles and motorcycles
H	Transportation and storage
H49	Land transport and transport via pipelines
H50	Water transport
H51	Air transport
H52	Warehousing and support activities for transportation
H53	Postal and courier activities
I	Accommodation and food service activities
J	Information and communication
J58-J60	<i>Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting</i>
J58	Publishing activities
J59_J60	Motion picture, video, television programme production; programming and
J61	<i>Telecommunications</i>
J62_J63	<i>Computer programming, consultancy, and information service</i>
K	Financial and insurance activities
K64	Financial service activities, except insurance and pension funding
K65	Insurance, reinsurance and pension funding, except compulsory social
K66	Activities auxiliary to financial services and insurance activities
L	Real estate activities
L68A	<i>Of which: Imputed rents of owner-occupied dwellings</i>

M	Professional, scientific and technical activities
M69-M71	<i>Legal and accounting activities; activities of head offices; management consultancy activities; architectural and engineering activities; technical testing and analysis</i>
M69_M70	Legal and accounting activities; activities of head offices; management consultancy activities
M71	Architectural and engineering activities; technical testing and analysis
M72	<i>Scientific research and development</i>
M73-M75	<i>Advertising and market research; other professional, scientific and technical activities; veterinary activities</i>
M73	Advertising and market research
M74_M75	Other professional, scientific and technical activities; veterinary activities
N	Administrative and support service activities
N77	Rental and leasing activities
N78	Employment activities
N79	Travel agency, tour operator reservation service and related activities
N80-N82	Security and investigation, service and landscape, office administrative and support activities
O	Public administration and defence; compulsory social security
P	Education
Q	Human health and social work activities
Q86	Human health activities
Q87_Q88	Residential care activities and social work activities without accommodation
R	Arts, entertainment and recreation
R90-R92	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities
R93	Sports activities and amusement and recreation activities
S	Other service activities
S94	Activities of membership organisations
S95	Repair of computers and personal and household goods
S96	Other personal service activities
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	Activities of extraterritorial organisations and bodies

Household air emissions

Households, totals

- Transport
- Heating
- Other

...Plus Bridging items

Bridging items

Total Air emissions accounts (industry (row 5) + households (row 91))

less National residents abroad

- National fishing vessels operating abroad
- Land transport
- Water transport
- Air transport

plus Non-residents on the territory

- Land transport
- Water transport
- Air transport

Other adjustments and statistical discrepancy

'Total CO₂ emissions without LULUCF' as reported to UNFCCC (table 10s1)

Year of submission to UNFCCC

Emissions

Greenhouse gases

- CO₂ from fossil fuels
- N₂O
- CH₄
- HFC
- PFC
- SF₆
- Can be aggregated as tons of CO₂ -equivalent

Other emissions

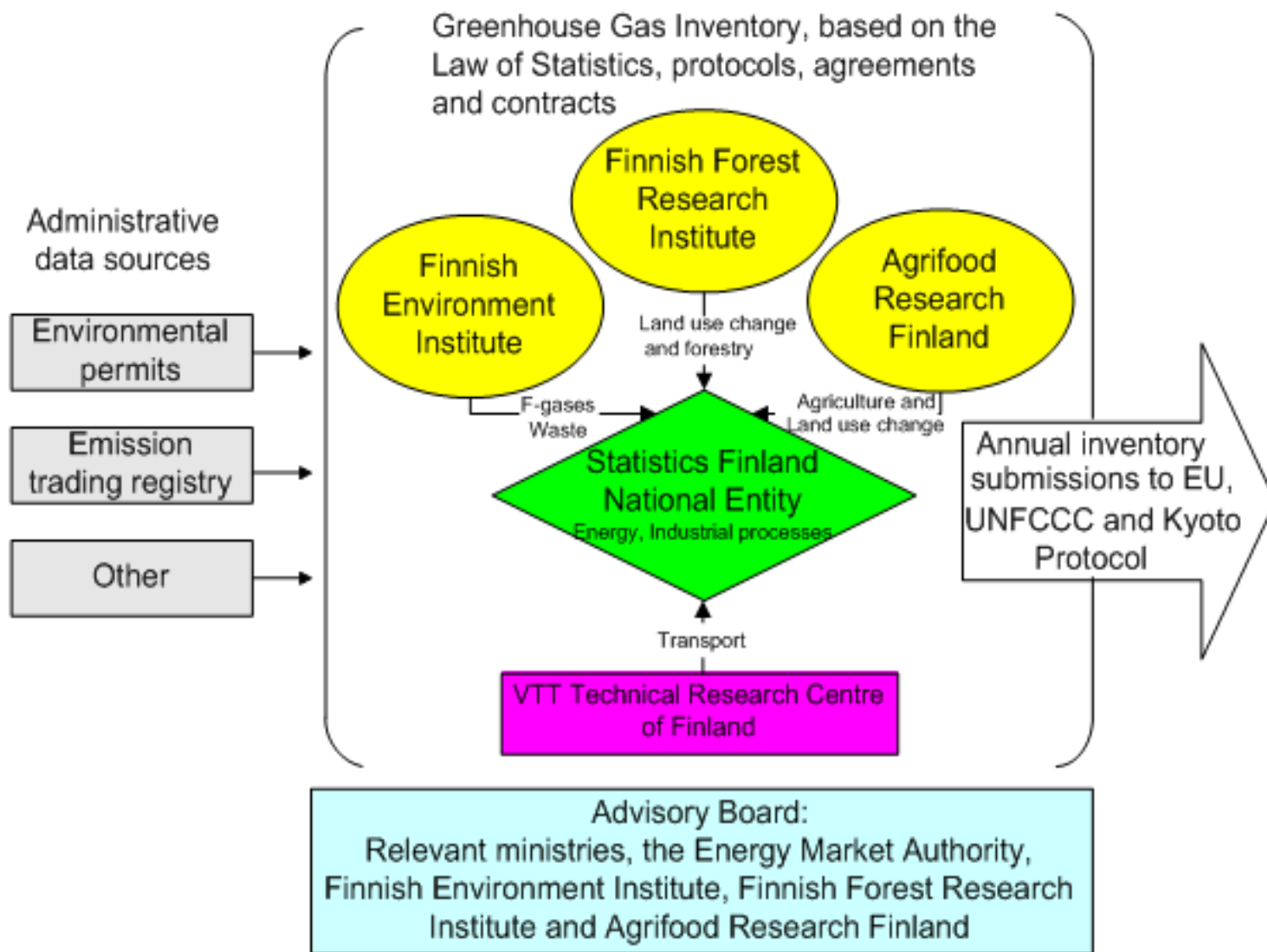
- CO₂ from biomass
- NO_x
- SO_x
- NH₃
- NMVOC
- CO
- PM₁₀
- PM_{2.5}

The main data sources in Finland 1(5)

- National greenhouse gas (GHG) inventory system
 - Specified in Kyoto protocol
 - Includes emission calculations in common form (CRF-tables) and background report (National Inventory System)
 - Contains annual data on the emissions of direct GHGs
 - Estimates by using data on activities and emission coefficients
 - Collaboration between Statistics Finland and expert organisations



Statistics Finland Greenhouse gas inventory system: Institutional arrangements



The main data sources 2(5)

- Database of environmental permits (VAHTI)
 - Tool for regional **Centres for Economic Development, Transport and the Environment** (ELY Centres) in their work on processing and monitoring of environmental permits

The main data sources 3(5)

- Greenhouse gas emission calculation system (ILMARI)
 - Used at Statistics Finland to compile annual data for GHG emission reports
 - Point sources
 - Mobile sources
 - Calculation system for traffic exhaust emissions and energy consumption (LIPASTO)
 - Civil Aviation Administration (CAA)
 - Other fuel combustion

The main data sources 4(5)

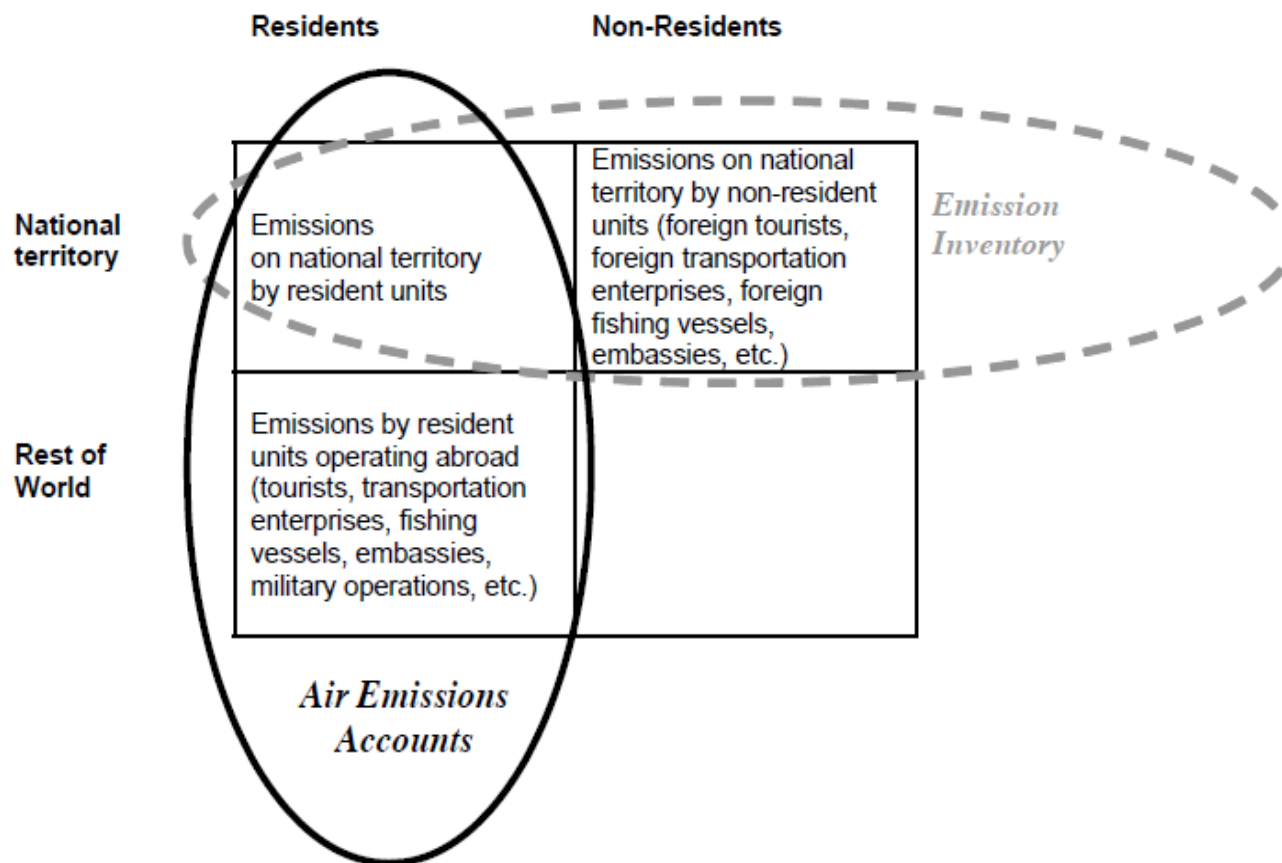
- Calculation system for traffic exhaust emissions and energy consumption (LIPASTO of Technical Research Centre of Finland – VTT)
 - Road traffic calculation model (LIISA)
 - Rail traffic calculation model (RAILI)
 - Water traffic calculation model (MEERI)
 - Air traffic calculation model (ILMI)
 - Work machine calculation model (TYKO)

Compiling methods 1(4)

- Starting point: Greenhouse gas inventory system and Greenhouse gas emissions calculation system (ILMARI)
 - Mobile sources -> Linking to NACE classification by using monetary supply and use tables
- Road traffic emissions calculation model (LIISA)
 - Allocated to branches of industry and households by using monetary input-output tables

Compiling methods 2(4): Bridging table

Figure 10: Differences between geographic and economic definitions of a country



Compiling methods 3(4): Bridging table

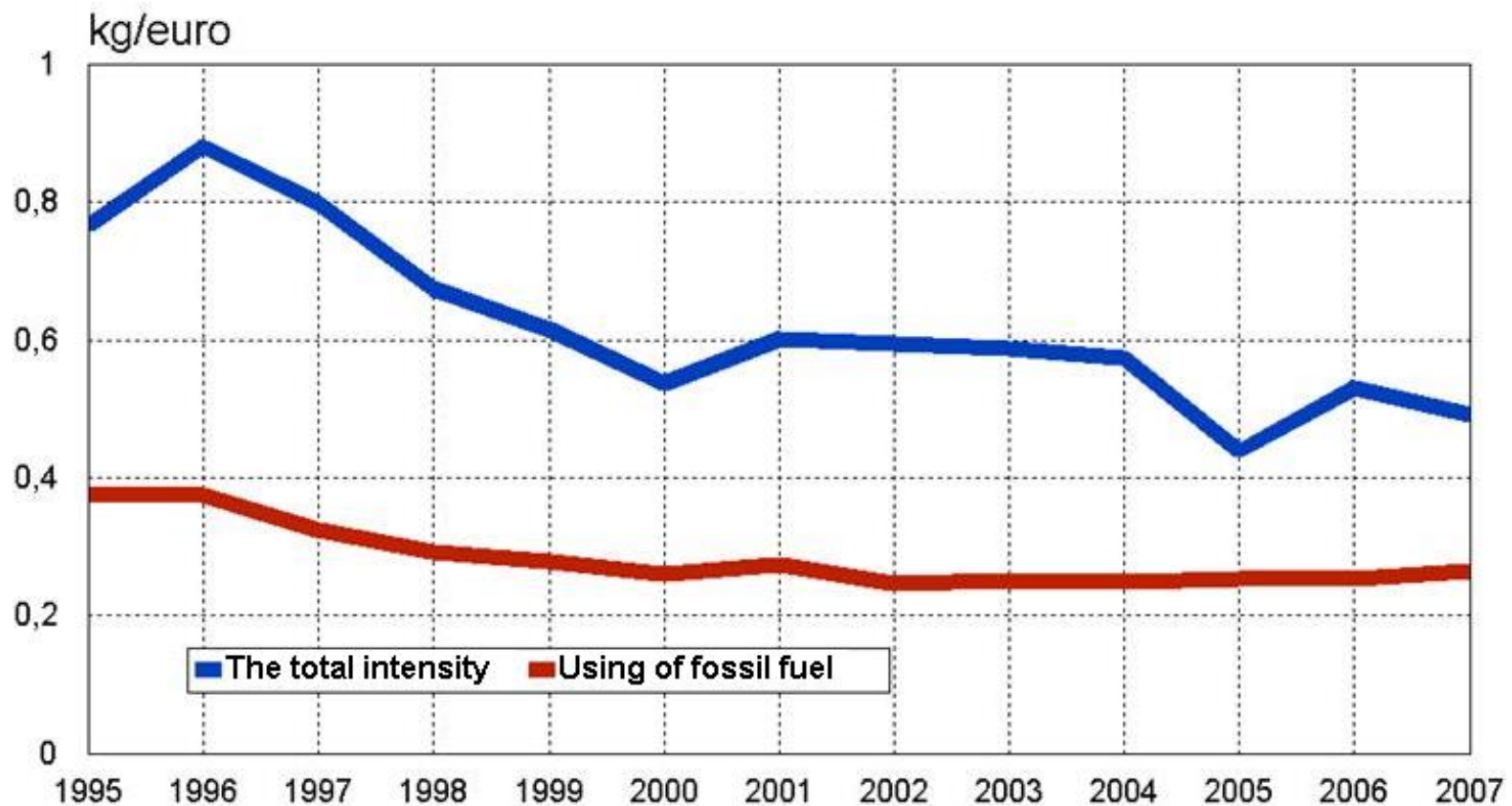
- Emissions from Finnish residents' road traffic abroad
 - Statistics Finland: energy statistics, border interviews, supply and use tables
 - Finnish Bus Association
 - Automobile and Touring Club of Finland (ATCF)
 - Road traffic calculation model (LIISA)
- Emissions from foreign water and air transport:
 - Air and water traffic calculation models (ILMI and MEERI)

Compiling methods 4(4)

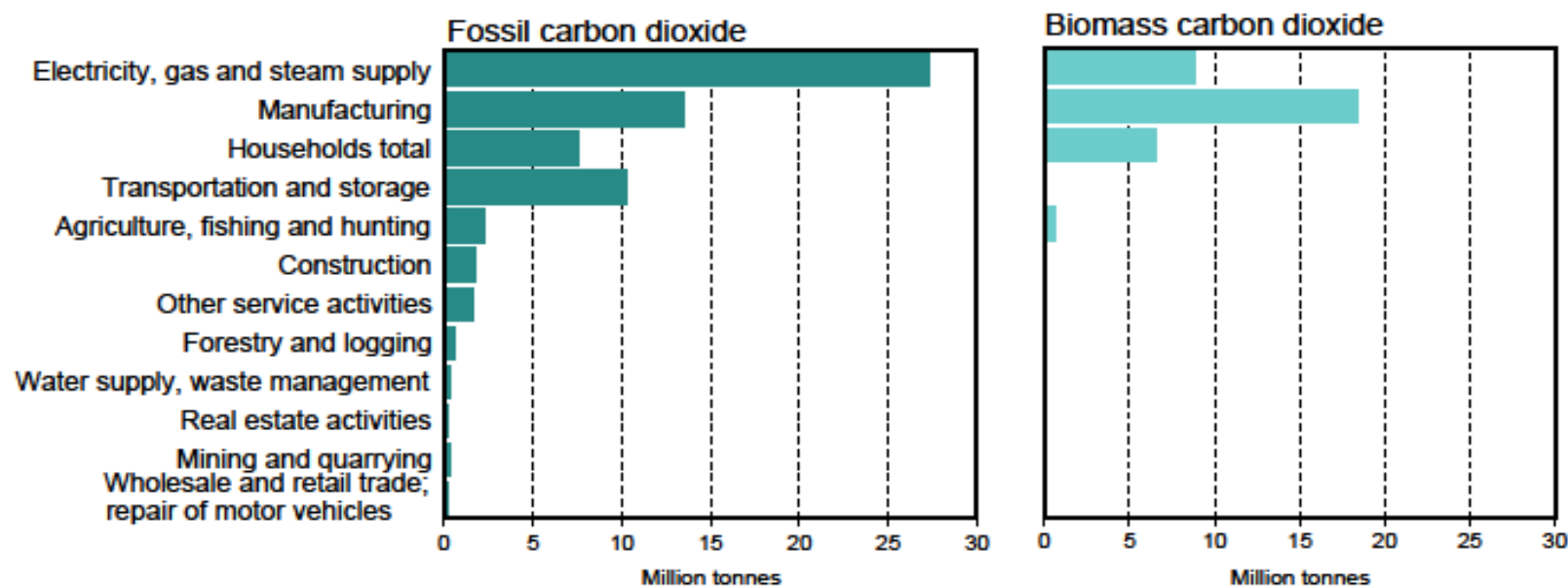
Bridging table

- Emissions from non-residents' road traffic in Finland
 - Vehicle kilometres of foreign buses in Finland are approximately the same as vehicle kilometres of Finnish buses abroad
 - Fuel purchases for cars (tourism account of National Accounts and border interviews of Statistics Finland)
 - Shares of taxes in prices of gasoline and diesel fuel (Energy statistics of Statistics Finland)
 - Fuel consumption of Russian tourists and transit traffic (Survey of Technical Research Centre of Finland - VTT)

Examples of results: Emission intensity of pulp and paper industry, Fossil CO₂ emissions per total output



Carbon dioxide emissions into air by industry group 2010¹

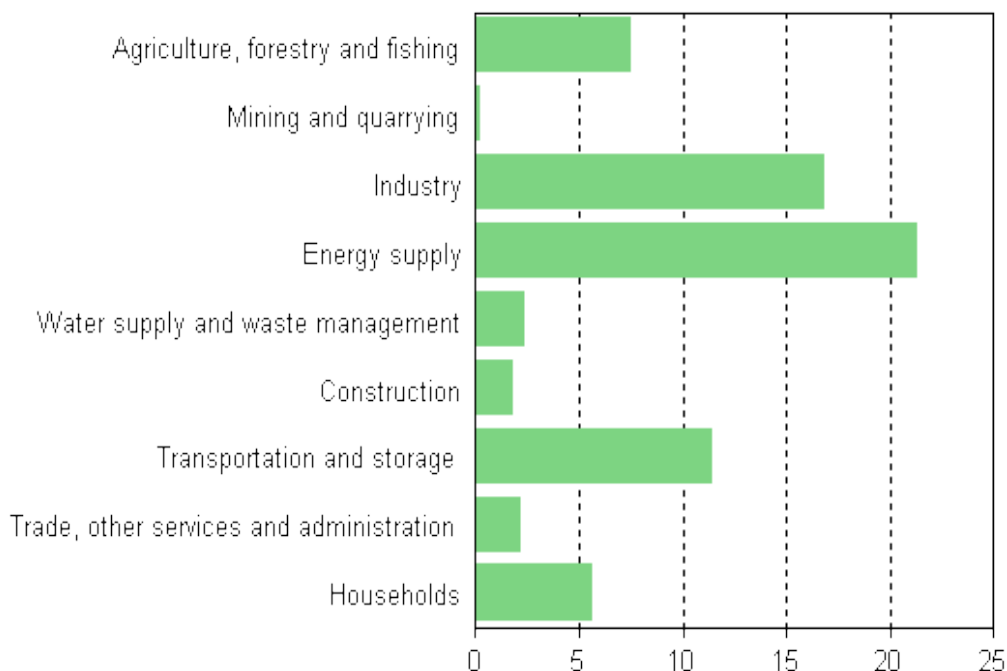


¹ Does not include sinks

Source: Statistics Finland

Emission into air and environmental taxes by industry

**Greenhouse gas emissions
by industry in 2011,
Million tons CO₂ equivalent**



**Environmental taxes
by industry and tax type in 2011,
EUR million**

