Norwegian Economic and Environmental Accounts (NOREEA) Project 2003

2003 Final Report to Eurostat

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1 Summary

The ***NOR***wegian ***E***conomic and ***E***nvironmental ***A***ccounts Project (NOREEA) is established as a cooperative project between the Division for National Accounts and the Division for Environment Statistics at Statistics Norway. This final report describes the results from the NOREEA project that ran from 16 December 2002 until 15 December 2003.

The project objectives for this year include:

1. Initiate NAMEA work related to land-take of enterprises with a focus on the manufacturing industries.
2. Expand the NAMEA air emissions to include additional emission types, revise NAMEA publication categories based on the revised national accounts, and improve the HFCs, PFCs and SF_6 data for publication at more detailed levels.
3. Begin to establish environmental taxes using a NAMEA-type framework that will contribute to integrating these types of taxes with the more general tax statistics.
4. The development of a data collection system within Statistics Norway and a calculation methodology that can be used for the next reporting to the Environmental Protection Expenditures and Revenues Eurostat/OECD joint questionnaire (JQ-EPER).

The purpose of the NAMEA actions is to investigate new areas and improve and enlarge existing data sets to be included in the Norwegian hybrid (NAMEA) accounts. The purpose of the environment expenditures actions is to expand the current system and to prepare for a more complete reporting to the Joint Questionnaire in 2004 based on the methodology and data reporting systems work that has been taking place in Statistics Norway for the past few years. Both of these actions have helped to integrate environmental accounts into the larger statistical system at Statistics Norway.

The following provides a brief summary of the work performed for the NOREEA project in 2003.

NAMEA-work related to land accounts

A thorough evaluation of the data sources used in calculating land accounts was made. A number of major weaknesses were identified. Based on the quality evaluation of these linked data sources only rough estimates for the surface area of buildings and total land take are presented at the 2-digit NACE level for the manufacturing and service industries (NACE 15-37 and 50-55). In addition estimates for the changes in land-take between 1983 and 2002 at the highest NACE breakdown level (1-letter or section) were made.

Specific actions planned by the mapping authorities and the municipalities will hopefully help to improve the situation so that by 2006 these data sources may be more useful. The weakest link however, is the business register and the improvements needed there will need to be coordinated with the Division for the business register.

NAMEA- air emissions accounts

The publication of the NAMEA-air accounts has been improved to include more types of emissions (specifically heavy metals), several types of emissions are provided at a greater detail (in particular HFCs, PFCs and SF_6), the time series for all of the emissions and economic data have been extended to include the year 1990 and finally there has been a four month improvement in the release of the statistics. A consistent set of data are now available in English and Norwegian on Statistics Norway's web site in the StatBank database. The user can now choose the emission types, industry and the year from the database and download this information in the table format they want. Emissions of HFCs, PFCs and SF_6 are now available at primarily two digit NACE codes with a time series from 1990 to 2002.

NAMEA work related to environmental accounts integration for environment-related taxes

Developing a system to calculate detailed environmental taxes by industry connected to the national accounts databases and systems has been the main focus of this work. The project has resulted in being able to produce a time series from 1991 to 2001 for total environmental taxes and detailed tax breakdowns by industry for 2000 and 2001. Revenue from environmental taxes has more than doubled between 1991 and 2001. By combining tax data with air emissions and energy use data it is possible to roughly evaluate the polluter pays principle with regards to certain environmental taxes. In the cases of CO_2 and electricity there are substantial differences between the polluter and who pays the tax. On the other hand, the polluter pays principle is shown to be fairly closely followed with regards to petrol taxes and the use of petrol. These new statistics will allow for further analyses of this type in the future.

Work related to "Environmental and resource management expenditure accounts" for Joint Questionnaire reporting in 2004

There have been a number of developments and improvements to various statistical production processes since the previous reporting to the OECD/Eurostat Environmental Protection Expenditure and Revenues (EPER) joint questionnaire (JQ) in 2002. These developments will now allow us to report environmental protection expenditures to a greater degree than ever before. Increases in the reporting for the manufacturing industries and the public sector are particularly note worthy. Although good progress has been made, the municipal specialized producers are still outside of the current detailed reporting systems so this area will need specific attention in the future. In cooperation with the Division for Public Finances this problem area will hopefully be improved by the next reporting for the JQ planned for 2006. The production of these statistics is not yet fully integrated into the portfolio at Statistics Norway, so this type of coordination and development will need to continue between the Divisions for environmental statistics, national accounts and public finances.

2 NAMEA-work related to land accounts

2.1 Introduction

The goal of this project has been to make a link between land use by economic activity to land cover, specifically in order to produce land-take statistics for the manufacturing industry at a national level. An effort to make land-take statistics has been made by using a combination of national registers and maps.

The specific objectives of this project have been to:
1. Develop measures for statistical expressions for land take by NACE 2-digit level (division).
2. Calculate a first estimate for statistics at the national level for the year 2002 using the manufacturing industry as the major focus with service industries as a second focus.

Further on the methodology and expected results have been based on the following :
1. Identify and evaluate potential data sources, including administrative registers, sampled statistical information and digital maps. Identify links between the different data sources.
2. Develop and test different statistically sound measures for expressing land-take in the context of NAMEA. Estimating methodologies will need to be considered for buildings that have multiple occupants and for sample based information (primarily forest and agricultural areas). The development of imputation techniques for missing values will also be needed. Techniques for estimating ground surface areas for buildings and flanking areas will need to be established by deriving information from digital maps.
3. After testing different methods, decisions need to be made on the appropriate methodology for various types of data. Based on this methodological work, estimates at the national level for the different NACE divisions (2-digit NACE level) will be made. Tables based on the Norwegian NAMEA will be used as the data presentation approach. Households will not be included in these initial estimations since the applicable register is not yet fully established.

The linkage from land cover to land use may be described as a long chain of geographical and logical connections between data sources. Briefly the overall uncertainty to estimates is determined by a combination of uncertainties to each connection in this chain, and can not be better than the weakest part of this chain.

Hence a quality check on each part of the chain linking land use to land cover has been necessary to give estimates on the quality of figures from such a chain.

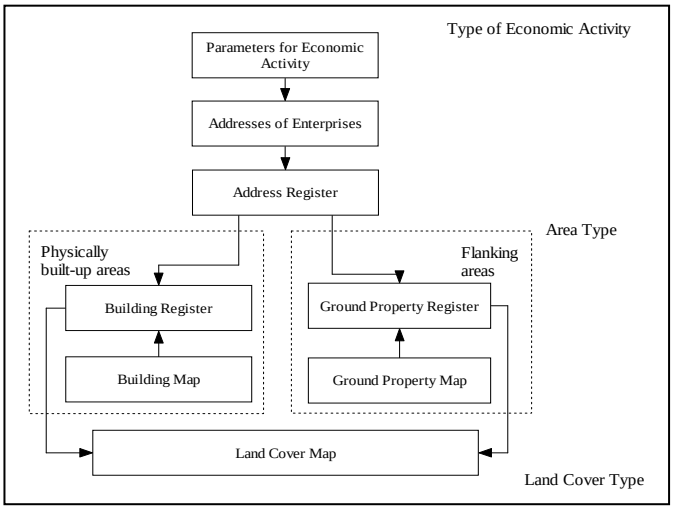
2.2 Method and data sources

This chapter describes the work needed to link economic activity to land cover using Norwegian data sources. Figure 2.1 shows how this may be done in a flow diagram, with a birds view, from economic activity in physically built-up areas (i.e.: buildings) and flanking areas (i.e.: ground property), to classification of land cover. Since measures and classification of area are considered most important or the main variable, this chapter is based upon the figure in reverse order.

Censuses and point-sampling surveys are rather expensive methodologies and are outside the scope of this project to consider as potential data sources.

This project focuses on the use of geo-coded registers, maps and map-derived registers. Data sources used in each step are described in each sub-chapter. Agricultural and forestry statistics from Statistics Norway are not suitable for this bottom up approach, due to lack of geo-referencing. This is a general weakness in the available data sources but since the focus of this work will be the manufacturing industry and not agriculture and forestry this weakness should not influence the results of this current work, however it does have implications for further developments using a similar methodological approach.

Figure 2.2 Linking Economic Activity to Land Cover



2.2.1 Transfer and coverage of land cover

Land cover maps form a fundamental basis for estimating figures on land-take. The coverage and area classification systems used in different land cover maps are important. In Norway there are two map series for land cover, topographical maps and land use / cover maps.

Topographical maps N50

The whole of Norway is covered by topographical maps at the scale of 1: 50 000 (N 50) containing much valuable information and serving as a basis for thematic maps (e.g. geology, vegetation) with very uneven coverage. The maps are of the Universal Transverse Mercator projection (UTM) and contain information on topography, resources, roads, settlement, among other subjects.

Land use / cover maps N5

Digital land use / cover maps at the scale of 1: 5 000 (N5) containing much valuable information and serving as a basis for thematic maps (e.g. soils, water, land use, vegetation) with uneven coverage. The maps contain information on topography, resources, roads, settlement, among other subjects. These maps cover most of Norway below the forest line, and contain a more detailed classification system on land cover.

Digital land use / cover maps (N5) have been used in this pilot. Some areas are not yet covered by digital maps, but will be digitalised within 2006. In areas where N5 maps are not present, N50 maps were used.

2.2.2 Transfer of area from map to register - built-up areas

Due to lack of information on area of buildings in the building register, a geographical overlay between registered buildings (GAB) and mapped buildings (CMD) needs to be done to enhance area figures for buildings. In this subchapter the data sources and procedure for transferring map areas to registered buildings are discussed.

Data sources

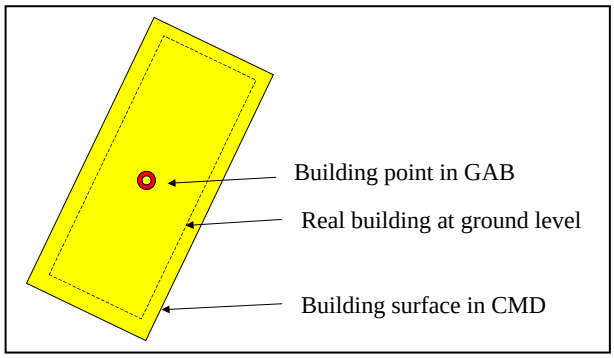
Geo-referenced buildings from the Official Ground property-, Address- and Building Register (GAB), give information on coordinates, addresses, building types and code for economic activity by NACE at the section (1 letter level) level. In some municipalities there may be a delay in the registration of new buildings, but it is likely that all buildings are registered. The register also contains information on all buildings under construction as per 31 December 1982 and all buildings that have been built or changed since 1 January 1983. All buildings before 1 January 1983 are registered but information on the buildings is of variable quality. Data to GAB are collected pursuant to the act relating to the division of landed property and provision of this act. The owner of the register is the Ministry of Environment, with the Norwegian Mapping Authority as professionally responsible. The County Mapping Office administrates the register system in the districts and together with each of the municipalities they are responsible for the entering of data. Business Development Consulting AS (BDC) runs the register, and the municipalities provide the necessary information for the B register (building register in GAB), based on data supplied by the investors and authorities. Figures for 2002 are based on processed material from the B register as per 1st of January 2002. Corrections in the GAB register after this date are not included in this current work.

Common Map Database (CMD) is a common standard of formatting and describing digital map databases in Norway. The standard is divided into thematic primary databases, where buildings form one of them. The need for CMD-data varies within a municipality. CMD-data are divided into 6 different levels of quality, so called CMD-standards, supporting different needs for map data in different areas of the municipality. The levels of

quality are named A, B1, B21, C1, C2, and D. The number of details and accuracy of georeferencing is highest for level A, and lowest for level D.

Procedure
The method may be explained in short as using geographical overlay-techniques between building cover in the map and the building point in the georeferenced building register (see figure 2.2.).

Figure 2.2 Buildings in GAB and CMD



Where there is a 1-to-1 ratio between the number of building covers and the number of building points, the area from the map is used. Where an area is not registered for the building point, and there is no matching building cover, statistical imputations are done by type of building. A list of the building codes is provided in the annex to this section of the report.

Building surfaces in CMD will in most cases be equivalent to the circumference of the building seen from aerial photos (see figure above).

We received only a few of the digital building maps (raw data) of the 434 municipalities from the Mapping Authority. For these municipalities the geographic linking between buildings in map and register was done by Statistics Norway. This ensured an equal management of data for these municipalities.

From about 300 other municipalities we received pre-managed data, a geographical overlay of mapped and registered buildings, from the Mapping Authority. In this dataset we discovered both major and minor irregularities in area numbers, and a few municipalities had to be discarded from the sample.

To avoid double counting, buildings had to be checked for doublets. In this case doublets are different building points which have their area number from the same surface/polygon in the digital map.

By doing a geographical overlay the number of building points per polygon may be counted, and then transferred back to the building point. A 0-value means that the building point lacks an equivalent building polygon in the map. The value 1 means there is a 1-to-1-situation between number of building point and polygon. Higher values mean that the building point shares its area number from the polygon in the map with other building points, in other words they are doublets on value from the map area.

Doublet values are not considered as valid values. Where available, area values from GAB are used or else statistical values by building type are imputed. Where area values from overlay are available, but map values are not, doublets may be found by their area value if the area values have several decimals. For most municipalities a value with three decimals will do. Doublets can also be identified by connecting municipality codes and building numbers.

Even when there is a 1-to-1 relationship between building points and polygons it may happen that the area number from the map is incorrect. Hence the five per cent highest and lowest values are excluded, and imputations are done for those records. After removal of doublets and extreme values the dataset is prepared to make statistical values by building type.

Not all building types have an equally good foundation for statistical purposes. The values seem however to be reasonable, compared with earlier computed statistical values based on GAB values alone. As expected the values are in general higher, since GAB values refer to area inside walls, while map data in general refer to circumference of building seen from above. These values are then used for imputation by building type on records where area information is not present.

Median values derived from GAB records have previously been used to impute data when it is lacking. These imputations build upon strata of combinations of building types and economic activity. By increasing the percentage of real values from map data, median values for imputation by each building type is possible. Median values is a good measure when having a skewed distribution and one wishes to say something about "the typical unit" in a population. In this context, therefore, median values should be used when doing area modelling.

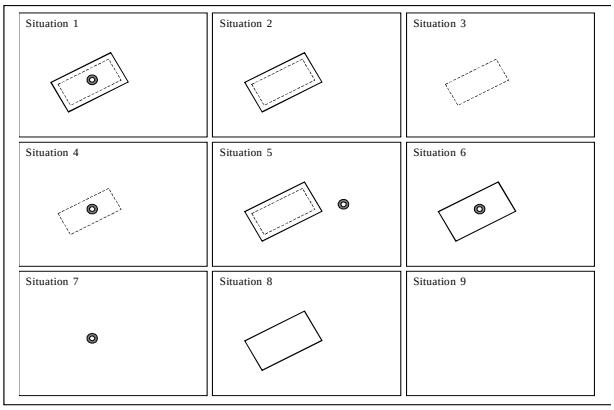
By increasing the percentage of real values from map data, median values for imputation by each building type is now possible. When limiting statistical measures to only one parameter, the building type, one avoids problems related to change in land use classification due to changes in coding for economic activity. Geometric average should be used where one wishes to say something about the total population or large samples of it. In this case, this means that the average for area values for physical built-up areas for the country or for urban settlements should be based upon a geometric average.

Municipalities can make mistakes in registering data in the GAB register. The municipalities that do not put building cases online in the GAB register fill out a form that is sent to the County Mapping Office. In some cases the form can be filled out incorrectly. There are also some municipalities that for various reasons do not always follow the current registration rules for the GAB register.

The method of processing data uses registered buildings in GAB as a starting point, which is most likely an underestimation of the total building population. To follow changes in land use one is dependent on having a form of unique building enumeration and a system for classification of buildings. Statistics on land use change therefore have to build upon records/updates in GAB. CMD lacks regular updates and can only be used to establish a status, eventually to make corrections/checks with five to ten year intervals.

If supposing that; 1) that buildings that may, are or shall be divided in GAB and/or map are correct, and 2) that there is no mismatch in GAB-CMD in relation to positioning or number of building parts, one is left with the following possible relations between reality, map data and register data, see figure 2.3.

Figure 2.3 Different situations between real building, map and register, and results for statistics.



Situation	Reality	Map	Register	Results for area statistics
1	1	1	1	Correct
2	1	1	0	Underestimation
3	1	0	0	Underestimation
4	1	0	1	Correct
5	1	1	⊄1	Correct
6	0	1	1	Overestimation
7	0	0	1	Overestimation
8	0	1	0	No influence
9	0	0	0	No influence

Left side: Doted line = real building,
line = map circumference,
donut = building point in register
Right side: 1 = one building ,
0 = no building and
⊄1 = one or more registered building points which do not fall within building circumference.

To the right of figure 2.3 there is a table that summarizes the different situations between register, maps and reality, as shown in the various diagrams in the figure, and their implications for area statistics. The following text discusses the likeliness of the different situations and their impact on area statistics.

Situation 1) (see figure 2.3) is the ideal situation, where an existing building is reflected by a building circumference in the map and coordinates in a building register. This situation makes it possible to compare area values from map data and register and to make an approximation of the building circumference at ground level. The situation gives correct results for area statistics.

Situations 2) and 3) give an underestimation, whereof situation 2) probably is the most common and the main reason for underestimation of built-up areas by buildings. Both situations are however labour intensive and costly to correct, and hence not done in this project.

Situations 4) and 5) both give correct area values. Situation 5 may be caused by incorrect coordinates, as map data in general is expected to have the best geo-references. These situations however have no influence on the area statistics itself , but influence in a non-significant way on land use change statistics. In other words, buildings are registered with the correct area information, but the coordinates do not match the positioning of the real building. In a few cases this mis-positioning implies that land use by building is linked to the wrong land cover type.

Situations 6) and 7) give an overestimation of area figures. These situations are however expected to be minor compared with that of situations 2 and 3.

Buildings which are not registered or not handled according to the building registration instructions are expected to represent a large part of the underestimation of built-up areas by buildings. Situations 8 and 9 do not have any impact on area statistics. Where maps show none-existing buildings the area values from map sources will not appear in data set for statistics.

In addition to these situations one has occasions where buildings may, are or should be divided in the register and/or map, and there are mismatches in map-register with respect to geo-positioning or number of building parts.
Also errors may occur as a result of "spaghetti" in the digital maps, where buildings that should be a part are overlapping. Such overlaps or "slivers" may cause extreme values. These occurrences are few but occur when building points appear to be registered near the address point (door) and not at the point of gravity of building. These outliers may in large part be avoided by deselecting records by area values

The municipalities are responsible for entering building cases in the GAB register. There is a certain amount of lag in the registration of building cases by the municipalities.

The average annual delay in registration of building permits, started and completed buildings has with few exceptions increased every year from 1993 to 1999 (see tables 2.1 and 2.2). The registration delay means that not all buildings registered as permitted, started or completed during the statistical year were also actually permitted, started or completed during the statistical year. The longer the registration delay the smaller this share will be.

Registration delays entail two main problems with respect to interpreting the registered figures:
- Registered building activities do not necessarily coincide with actual building activities.
- Registered change in building activities from one year to the next do not necessarily coincide with the actual change in building activities.

The longer the registration delay is, the greater the chance of major deviations between registered and actual building activities. Exactly how much building activity there actually is during a certain year can never be known until long after the end of the statistical year. For example, buildings that were actually started in 1993 have been registered every year in the GAB register until 2000. Moreover, no one knows exactly how many building projects have gone unregistered in municipalities in the course of a year. As long as no one knows whether the delay in registration will increase or decline in the future, it is not easy, such a short time after the end of the statistical year, to say whether the registered building activities in a given year are too high or too low in relation to the actual building activities.

The significance of data quality
The quality of the data set is crucial for the statistical product. In this setting these three points are particularly important:

- The data set is complete; in other words that data is registered for the whole country and for all relevant characteristics;
- The data set is correctly registered;
- The data set is up-to-date.

Spatial and temporal comparability
Before 1983, the gross floor space was used for other buildings than dwellings. The gross floor space includes the outside of outer walls, while the utility floor space is measured from the inside of outer walls.

Significance of quality of data
The quality of data is crucial for the statistical product. In this case three main aspects of quality is important:

- completeness; data is registered for the hole country and all relevant characteristics
- correctness; data registered are correct
- updated; data are valid and up to data

Completeness
GAB is the central register used in land use statistics , both for urban and peri-urban settlements. All buildings larger than 15 square meters is to be registered in GAB.

A major problem with GAB, is the low completeness for some central characteristics, as area of main floor and area of ground property. For buildings where estimates of area have been imputed, there is some uncertainty connected with the figures. Previous method for estimation of these area figures has been documented by Engelien (2000).

The completeness of CMD for buildings may vary with building type, building details, size of building and municipality. CMD buildings have in general best quality in urban settlements, and the quality declines towards more peripheral areas.

Correctness of registrations
Manual registrations of data obviously implies some errors. It happens that coordinates of buildings are found in water, in a different municipality, or even at the Equator.

This is possible due to the registration of coordinates in a different coordinate system, different projection, different zone, or that buildings have been registered without coordinates or coordinates have been registered with too few or too many numbers. This is however a minor source of error, that will not affect statistics on municipality level or land use change statistics for a specific time interval.

Buildings in the CMD are based upon a national standard for mapping and classification, which to a certain degree is based upon the skills of the aerial photo interpretation and the wishes of the map consumer. This might be a source of error, but it is hard to say if this matters or not.

Updating of registers
In some municipalities there is a time lag in registration of new buildings of several months, but it is probable that all buildings are registered. Takle *et al*. (1999) show that there is a clear increasing tendency in this registration time lag during the period 1993-98. In July 1998 the average time lag was 7 months. Registration delays entail two main problems with respect to interpreting the registered figures: Registered building activities do not necessarily coincide with actual building activities. Registered change in building activities from one year to the next do not necessarily coincide with the actual change in building activities. The longer the registration delay is, the greater the chance of major deviations between registered and actual building activities. The deviations between the overall numbers for actual and registered building activities in 1993-1997 were never over 6.5 per cent, except for started utility floor space of other buildings in 1994.

When it comes to buildings in the CMD there has been done some work by the Mapping Authority to get the municipalities to maintain the maps, however this is a slow process. There are probably few municipalities that do administrative, land survey based, maintenance of their maps.

Buildings in CMD and GAB may be said to have complementary characteristics with regard to completeness and updating. CMD have in general a better completeness or coverage of older buildings, but a low frequency on updating. GAB has in general lower completeness for older buildings, compared with CMD, but is better with respect to completeness on new buildings and frequency of updating.

2.2.3 Transfer of area from map to register - flanking areas

The method for transferring flanking areas defined by ground property to economic activities is much similar to that of built-up areas by buildings. This sub-chapter is hence not going into the same details as the previous, but the different data sources and discovered potential use and problems are discussed here.

Data sources

The ground property register (G register) is part of the official Ground property-, Address- and Building Register (GAB). All new ground properties are given estimates on area, coordinates for centre point or main building/address, and a code for use of ground. A key number is also given to each ground property to be related to an owner. The assumption is that there are delays in the registrations, but that the mentioned variables are given to all new ground properties as per 31 December 1982, and that all ground properties are registered. As per 31 December 1982 a code for use of ground should also be registered.

Digital ground property maps are the geographical delineation of properties in the ground property register. These maps and registers are to be matched by 2006. Today about 70 per cent of the registered ground properties have their match in ground property maps. These maps are not centrally stored, but will be centrally stored or accessible within 2006. Digital ground property maps have not been used in this project because of this lack of centrality storing.

Procedure

Figures for area of ground property could be transferred in much the same way as for area of buildings mentioned in the previous subchapter and is therefore not repeated.

A procedure to distribute area of ground property to different divisions of economic activity needs to be chosen. This could be done by area or number of buildings by economic activity, or by building type.

Table 2.1 Flanking areas by use of ground properties. Square kilometres and numbers. 2003

			Per cent	
Use of ground property	km^2	Number	Area	Number
In all	71 871.0	2 751 215	100.0	100.0
Not registered	13 866.8	581 458	19.3	21.1
A - Other	3 823.8	126 113	5.3	4.6
B - Housing	18 806.7	1 234 904	26.2	44.9
F - Holiday homes	6 207.4	319 019	8.6	11.6
I - Mining/Manufacturing	2 151.0	33 683	3.0	1.2
K - Public road	4 525.1	74 033	6.3	2.7
L - Agriculture and fishery	19 352.6	303 767	26.9	11.0
N - Protected area	320.8	2 341	0.4	0.1
O - Public institutions	302.1	11 655	0.4	0.4
P - Sport/recreation	129.7	9 628	0.2	0.3
T - Communication	635.5	18 185	0.9	0.7
V - Detail, central business	1 749.6	36 429	2.4	1.3

Table 2.1 shows the number and area of ground properties according to code for use of ground. About one fifth of all ground properties, both by number and registered areas, do not have any code for use of ground. These records are mainly ground properties established before 1983. 55 per cent of the manufacturing industry, by use of ground property in the ground property register, is situated at ground properties established before 1983.

These ground properties have great lacks in figures for area. A total for land take by manufacturing industry can thus not be calculated from this register alone. It should however be possible to estimate totals for new land-take by manufacturing industry based upon this register after 1983. It should also be possible to stratify this total to NACE 2-digit level from now on, given that geo-referencing of enterprises are of good quality. This stratified total could also be calibrated by using type of buildings related to the ground properties.

2.2.4 Transfer of economic activity from enterprise to building

The use of codes for economic activity from the CBR is expected to reflect land use over time better than the similar code in GAB. GAB does not have NACE codes for divisions (2-digit level), and can hence not be used to stratify land take at NACE 2-digit level.

Data sources

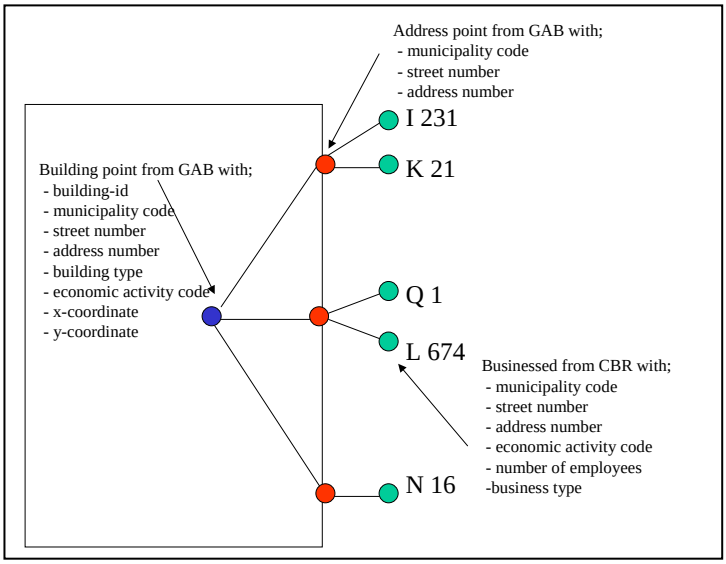
The Central Enterprise and Establishment Register (CBR) is Statistics Norway's own register. The register is run by the section for enterprise register (s410). Annually they make a situation file, with enterprises primarily geo-referenced by 17-digit address code (Myro and Torp, 2002). Economic activities in this register are here coded to 5-digit level of the NACE classification system. Enterprises from this register form the basis for this project. The register has been geo-referenced since 1999.

The address register (A register) is part of the official Ground property-, Address- and Building Register (GAB). All addresses are given a numeric key field, consisting of municipality code, road code, and house number code. As part of the housing and population census 2001, all housing addresses where registered with a unique key number. Each address is also given coordinates, often being the same as for the centre point of the building. The assumption is that there are delays in the registrations, but that the mentioned variables are given to all new ground properties as per 31 December 1982.

Procedure

Starting with CBR geo-coded on address coordinates, and by using GIS (Arc/Info workstation) and a statistical programming package (SAS), codes for economic activity in CBR are transferred to buildings in GAB (Fig. 2.4.).

Figure 2.4 Link between building - address - business - economic activity - land use



Flags for the accuracy of the geo-coded CBR where used in this transfer, to ensure that the code for economic activity, is transferred to the right building. The land use classification system for buildings builds on a combination of building type and economic activity. Hence it is crucial to transfer codes to matching building. Only exact addresses should be used.

Codes for type of business, number of employees and economic activity, is also used to ensure the correct transfer of codes. Not all types of business are expected to have influence on land use, and businesses without employees are also not considered to have influence on land use. Where there is more than one building on the same ground property, and only one enterprise present, divisions of economic activity are distributed linking address of enterprise to address in the address register, this is then linked to building, and building to ground property.

The degree of completeness
About half a per cent (0.5 per cent) of registered businesses do not have a code for economic activity, while well over half of the building population lacks registered code for economic activity. It is reasonable to expect that CBR will be useful where GAB lacks information on economic activity. It is however also reasonable to assume that the great majority of buildings in GAB that do not have a code for economic activity, do not have economic activity.

Correct registrations
It is obvious that errors occur when registering data into a database. The geo-referencing of businesses in the CBR is well documented (Myro and Torp, 2002). For land use classification of areas it is of crucial importance to the land change statistics that the right code for economic activity is being used. While the land use classification builds upon a combination of building type and code for economic activity, use of codes for economic activity from records in the CBR that lacks exact references to right building will imply that massive changes in the CBR will overshadow real changes. The accuracy of geo-referencing of businesses is more crucial the more detailed statistics one wants to present.

It is not likely to transfer all codes for economic activity from CBR to GAB, even when geo-referencing gives an exact match. Some types of economic activity or businesses do not have or have a lesser impact on land use. Often businesses are established with respect to distribution of risk, with respect to taxes, pensions etc. i.e by dividing the conduct of a business into enterprises of different economic activities, but with the same owner, it is possible to lower the total burden of taxation. Such types of economic activity are assumed to be more about ownership and personal economy etc., rather than connected with functional land use. Often such business will be geo-referenced to the same address as the "mother"-firm. Number of employees are hence used to select codes for economic activity to be transferred to buildings. The geo-referencing of employees is known to have some errors and to be skewed based on organisation form that will have an impact on land use classification. This is however expected to have a minor impact compared with errors in geo-referencing of businesses at large.

Updating of registers
CBR is assumed to reflect changes in economic activity far better than GAB alone. It is however important to distinguish between land use statistics and economic statistics isolated from geographic location. Land use statistics deal with a combination of characteristics of land itself and the functional use (here economic activity) of the same area. While economic statistics refer to enterprises or strata of enterprises.

Enterprises that do not show signs of economic activity, in these terms, are hence not used in the transferring of codes. It is a presumption that the main changes in the CBR is done, but future wash of register may have impact on the land use/land take statistics.

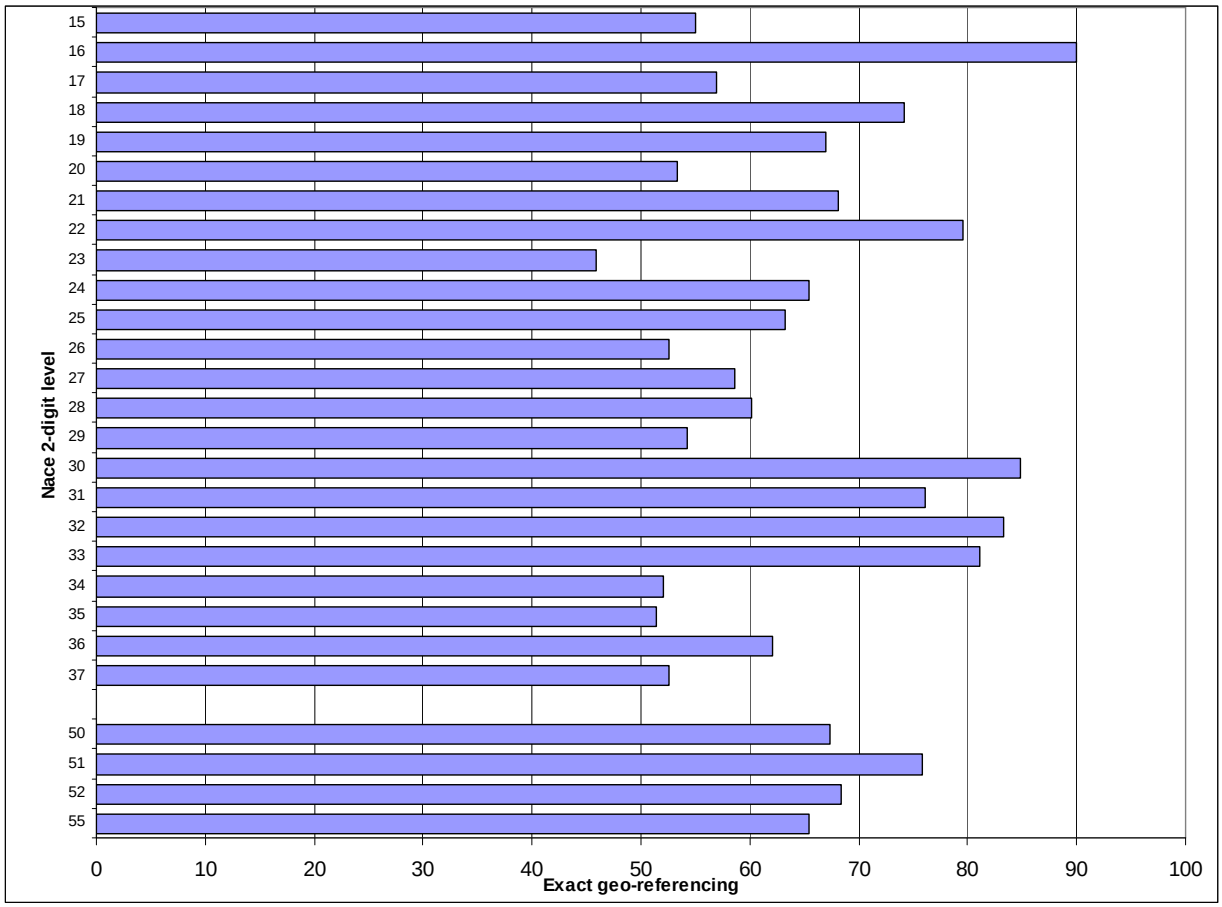
The results of transferring codes for economic activity from CBR to GAB, according to the previously described method, shows that about 55 000 buildings where given codes from the CBR, of which almost 11 000 had no code in the building register. Of those buildings that had a code in GAB, nearly 44 000 where given a new code. About 1.5 million buildings in GAB had codes for economic activity, whereof about half a million where coded as residential and other.

As only 1.5 per cent of all buildings are given code for economic activity from the CBR, one could think that the use of CBR has no significant effect. However, these figures at NACE section level are for all buildings and the whole country, independent of building type and code for economic activity in GAB. Use of CBR is of great importance in the economically intensively used areas; i.e. in urban settlements, and especially for central business districts.

2.2.5 Geo-referencing in Register of Enterprises

Given that all other data sources and procedures to transfer divisions of economic activity are good, the quality of geo-referencing of enterprises in the register of enterprises becomes crucial to the possibilities of estimating land-take by manufacturing industry. Figure 2.5 shows the percentage with exact addresses of enterprises at a NACE 2-digit level for the manufacturing industry (NACE 15-36) as of 15th of December of each year. An exact address is needed to transfer divisions of economic activity to correct building or ground property. Except for NACE 16, manufacturing of tobacco products, all divisions at the NACE 2-digit level for the manufacturing industry have less than 90 per cent exact addresses. The percentage for the total of NACE 15-36 is just above 50 per cent.

Figure 2.5 Quality of Geo-referencing. Enterprises with exact address. Manufacturing and service industries at NACE 2-digit level. Per cent. 2002.



This brings us to the conclusion that the register of enterprises is not of high enough quality to allow for more than rough estimates for transferring economic activity to land-take for built-up areas and for flanking areas. In the next section we present results at NACE 2-digit levels for the manufacturing industries (NACE 15-37) and for the service industries (NACE 50-55) but these figures have required major estimations so can only be considered rough estimates at this time.

The quality problem with the register of enterprises seems to be a continuing problem, as new enterprises do not have better geo-referencing than the older ones. At the current time it is not clear what is going to be done to improve this situation. It is likely that new enterprises are to be matched with the official address register from 2006, and that some register washing will be done to enhance the quality of geo-referencing for old enterprises. To which degree this will have an impact on enterprises in the manufacturing industry is unknown. This and other projects will however give a better understanding of, and focus on, the need for enhanced geo-referencing of the register of enterprises.

2.2.6 Calculation methodology for estimates at NACE 2-digit level at **national levels**

Even if geo-referencing should have been better, we have made an attempt to produce figures for land-take. Land-take is calculated both for buildings and for surrounding properties.

Land-take by buildings

Basis for calculations are that the building is located with NACE-code and a unique address.

- if the building is identified in CMD, the base area for the real building (see figure 2.2) is used
- if the building is not identified in CMD, but in GAB, the base area from GAB is used
- if the building is identified in GAB but without size information, a median value based on both CMD and GAB is used as the base area.

The base area for all identified buildings are then summed up. Thus, we have then established a file for the share of the building mass for each NACE 2-digit level shown in figure 2.5, which represents a share ranging from 46 to 90 percent of the total number of enterprises from the CBR. To get total figures for the whole nation, these figures are grossed up using the factors shown in figure 2.5.

(We have compared the resulting calculations using the grossing up factor percentage of enterprises included with the results from using the enterprises' percentage of number of employees. At the higher levels of aggregation, there is no significant differences, and in the following calculated estimates we used the number of enterprises as the grossing up factor.)

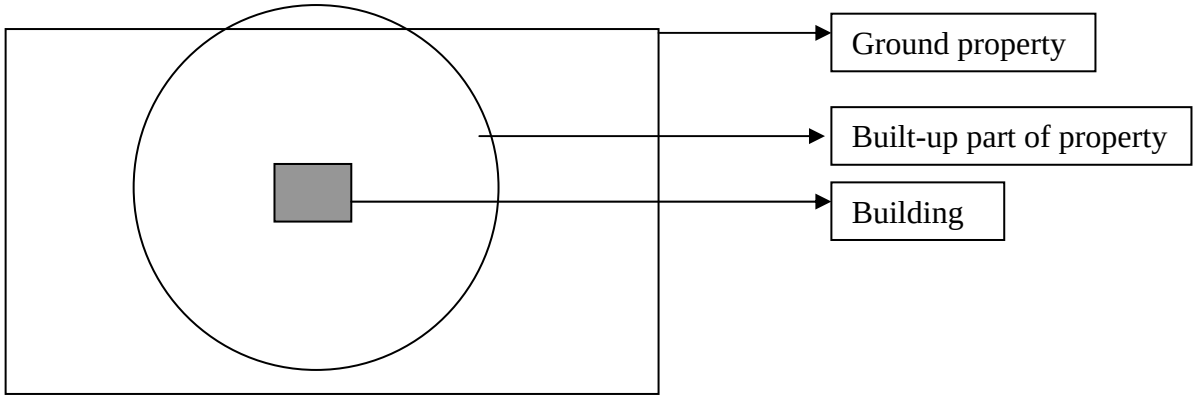
Land-take by ground properties

Basis for calculations are the same as described in the paragraph above for land-take by buildings.

However, we have better information on the base area for buildings than for the base area for properties. Information on the actual ground property on which the building is constructed can be found in the G part of GAB. For some buildings there was a lack of information about the area of the ground property. For some instances the areas also could be so large that it was not reasonable to assign the land use characteristics of the building to the total area of the ground property.

A special routine for handling these instances was developed; if the ground property area was within the limits of 1.5 to 15 times the size of the ground surface of the building, the site was designed with the same size as the ground property area. If the ground property area was less than 1.5 times the building's surface, the site was set to 1.5 times the building surface. Finally if the ground property was larger than 15 times the building's surface or, if the ground property area was missing, the site was fixed at 6.4 times for all buildings, which is calculated to be an average factor between building's surface and property. See figure 2.6

Figure 2.6. How to delimit built-up part of large properties.

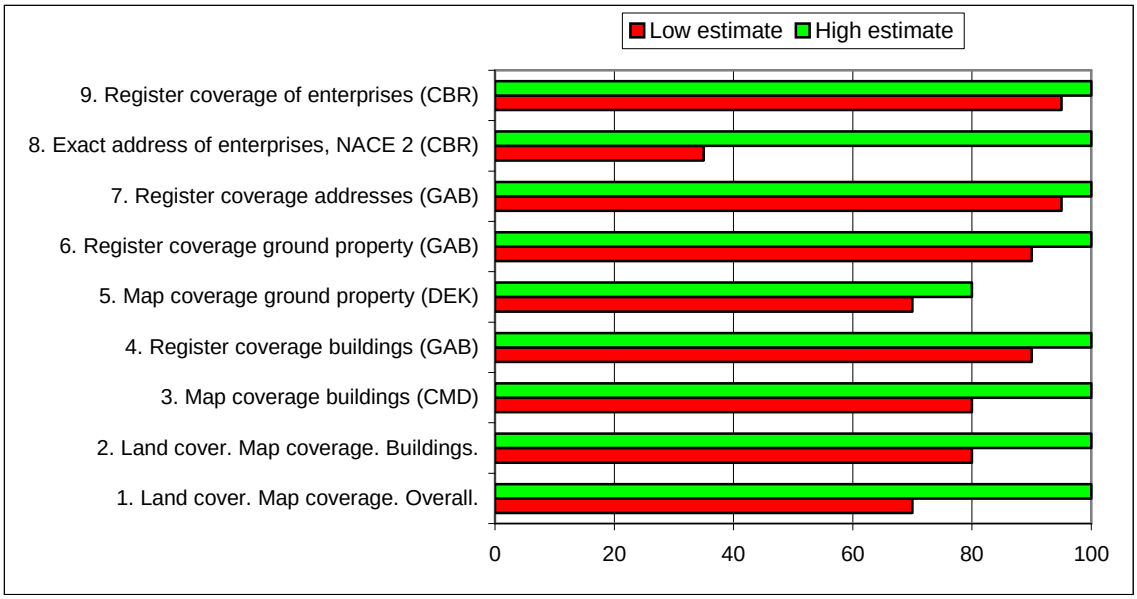


If it happens that several buildings exist at the same property, the given or the calculated area is shared between the NACE groups for the actual buildings.

2.3 Results

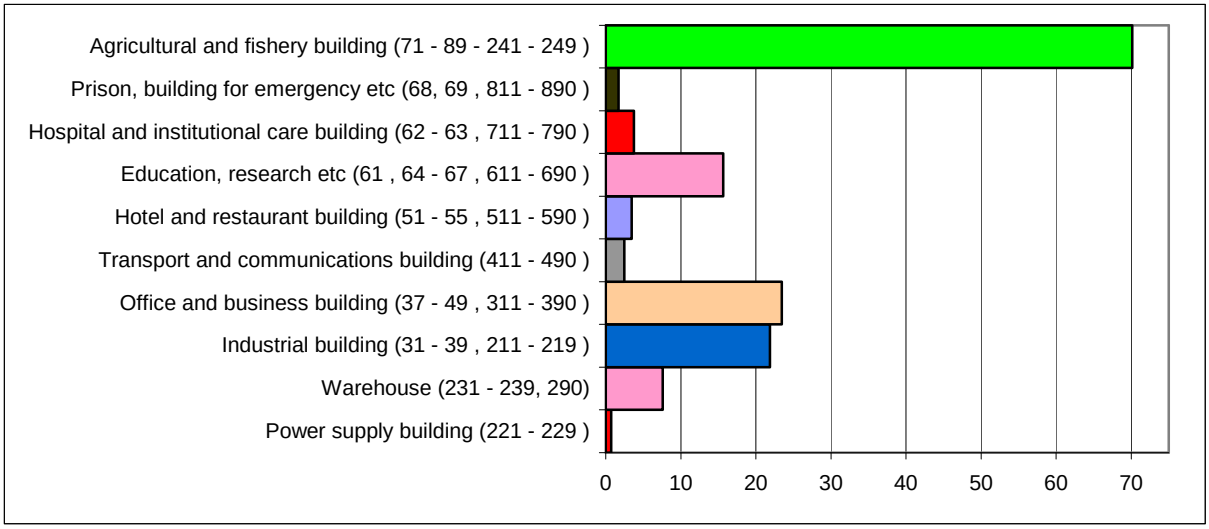
Results from identifying and evaluating potential data sources is shown in figure 2.7 below. The figure shows high and low estimates on the quality of potential data sources. Generally estimates are made independent from each data source. Estimates are based on combinations of maps and registers, and experience with delays in registering and mapping. Estimates also refers to different divisions of economic activity. Linking economic activity to land cover, and giving estimates for areas on different geographical levels, are depending on the division of economic activity. The unknown skewness in the strata or coverage of each potential data source makes it impossible to give exact figures for uncertainties with respect to land-take statistics based upon divisions of economic activity. Due especially to the great variation in the quality of geo-referencing of enterprises it has only been possible to develop rough estimates and not sound measures for expressing land-take in the context of NAMEA. As it is not likely that enterprises with exact addresses are a systematic and random sample of the population of enterprises, one can not give sound statistical measures for the distribution of economic activity on NACE 2-digit level. What we have chosen to do is to make estimates at the NACE 2-digit level by using the percentage of the number of enterprises that are included in the building areas and land take area calculations to simply gross up the values. These tables are presented later in this chapter after a discussion of different criteria and evaluations are made of the current data situation.

Figure 2.7 Evaluation of quality of potential data sources. Per cent.



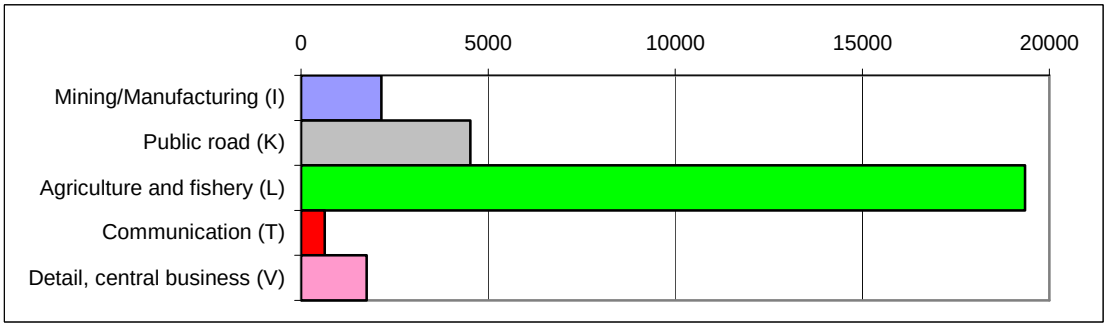
By using aggregations of codes for building types in the building register it is possible to give some figures on built-up areas by buildings. Figure 2.8 shows a possible aggregation of building types (in parenthesis). The codes of the different building types are found in the annex for this chapter. These figures could form a raw starting point for an estimate for some divisions of economic activity at the NACE 2-digit level. The codes for building types do not however match for all divisions of the manufacturing industry, and an enhancement in geo-referencing of the register for enterprises is necessary to give figures on a NACE 2-digit level.

Figure 2.8 Land-take. Built-up areas by aggregations of building types. Square kilometres.



Likewise codes for uses of ground property in the ground property register could be used as a starting point for giving overall figures for land-take by economic activity on the flanking areas level. Figure 2.9 shows registered areas by some codes for use of ground (in parenthesis). Also in this case an enhancement in geo-referencing of the register for enterprises is necessary to give figures on NACE 2-digit level.

Figure 2.9 Land-take. Flanking areas by use of ground property. Square kilometers.



Land take for the manufacturing and service industries

As this evaluation shows, the data presented in the following 2 tables need to be considered only as first estimates of land take for the manufacturing and service industries in Norway. In tables 2.2 and 2.3, building areas and land take are presented for 2002. These values can be considered estimates of the status in 2002. In table 2.4 the new land take that has occurred between 1983 and 2003 outside urban areas are presented at a more aggregate level (NACE section level)

Table 2.2 Land take by industry for the Manufacturing industry, NACE 15-37, 2002.

NACE category	Surface area of the Buildings sq. km	Land Take sq. km
Total for NACE 15-37	**17.29**	**64.40**
15 Manufacture of food products and beverages	2.90	10.99
16 Manufacturing of tobacco products	0.01	0.05
17 Manufacturing of textiles	0.56	1.98
18 Manufacturing of wearing apparel; dressing and dyeing of fur	0.34	1.18
19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	0.06	0.19
20 Manufacturing of wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	1.97	8.20
21 Manufacturing of pulp, paper and paper products	0.26	0.97
22 Publishing, printing and reproduction of recorded media	2.48	8.08
23 Manufacturing of coke, refined petroleum products and nuclear fuel	0.01	0.04
24 Manufacturing of chemicals and chemical products	0.44	1.83
25 Manufacturing of rubber and plastic products	0.48	2.01
26 Manufacturing of other non-metallic mineral products	1.08	3.82
27 Manufacturing of basic metals	0.44	1.64
28 Manufacturing of fabricated metal products, except machinery and equipment	1.59	6.00
29 Manufacturing of machinery and equipment n.e.c.	1.69	7.01
30 Manufacturing of office machinery and computers	0.03	0.19
31 Manufacturing of electrical machinery and apparatus n.e.c.	0.48	1.76
32 Manufacturing of radio, television and communication equipment and apparatus	0.10	0.44
33 Manufacturing of medical, precision & optical instruments, watches and clocks	0.31	0.90
34 Manufacturing of motor vehicles, trailers and semi-trailers	0.18	0.76
35 Manufacturing of other transport equipment	1.16	4.30
36 Manufacturing of furniture; manufacturing n.e.c.	1.13	4.07
37 Recycling	0.16	0.74

Table 2.3 Land take by industry for the Services industry, NACE 50-55, 2002.

NACE category	Surface area of the Buildings sq. km	Land Take sq. km
Total for NACE 50-55	**30.08**	**112.82**
50 Sale, maintenance and repair of motor vehicles, motorcycles; retail sale of automotive fuel	4.94	20.40
51 Wholesale trade and commission trade, except of motor vehicles and motorcycles	8.28	30.71
52 Retail trade, repair of personal and household goods	11.77	39.03
55 Hotels and restaurants	5.09	22.92

New land take outside urban areas

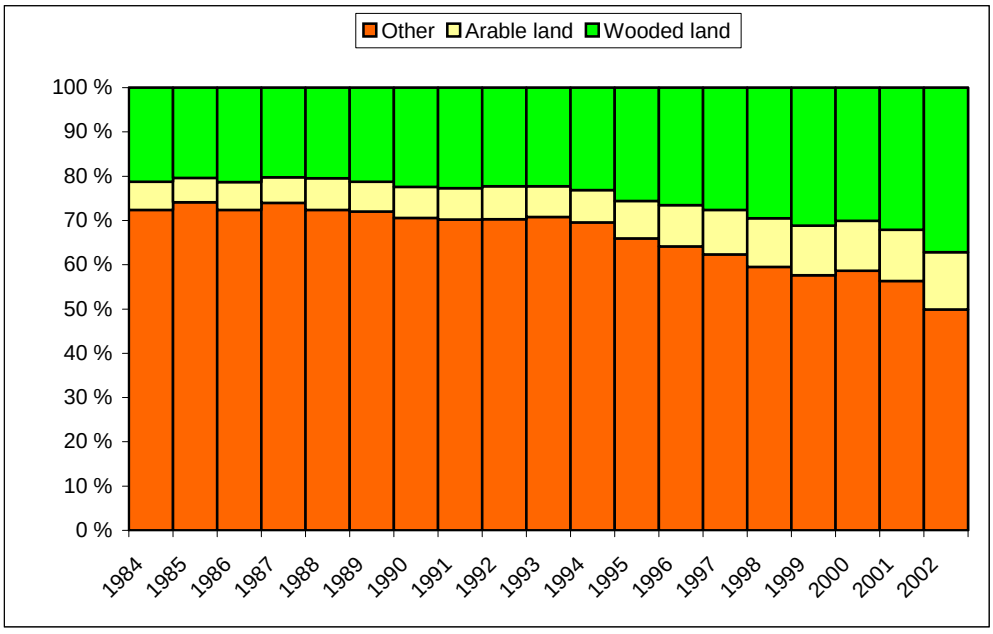
Table 2.4 shows a linkage between land-use (classified by 1-letter NACE, i.e. section) and land cover divided into 3 main categories. Figures are built-up areas by buildings in square kilometres for the whole country outside urban settlements. Year of construction of building and the geo-referenced register of enterprises 2003 has been used. Change in use of buildings can not be traced, but it is an assumption that there has not been a mentionable change in this relatively short period outside urban settlements. Land cover "other" consists mainly of previously built-up areas, bare rocks or unmapped areas. Figures are also given for built-up categories that are not related to economic activity (lower-case letters). Figures are estimates based upon methodology described in this work. Land cover maps on scale 1 : 5 000 has been used in combination with building register and geo-referenced register of enterprises.

Table 2.4 New land-take between 1. January 1983 and 1. January 2003 occurring outside urban settlements as these areas were defined in 2002. Built-up areas and land cover. Square kilometres.

	In all	Arable land	Wooded land	Other
In all	**30.58**	**2.67**	**7.98**	**19.92**
NACE A AGRICULTURE, HUNTING AND FORESTRY (071)	5.92	1.11	0.84	3.97
NACE B FISHING (072)	0.37	0.02	0.04	0.31
NACE C MINING AND QUARRYING (021)	0.08	0.00	0.01	0.07
NACE D MANUFACTURING (022)	2.38	0.06	0.33	1.98
NACE E ELECTRICITY, GAS AND WATER SUPPLY (062)	0.14	0.01	0.04	0.08
NACE F CONSTRUCTION (061)	0.13	0.01	0.03	0.09
NACE G WHOLESALE AND RETAIL TRADE (031)	0.80	0.02	0.17	0.61
NACE H HOTELS AND RESTAURANTS (033)	0.64	0.03	0.17	0.43
NACE I TRANSPORT, STORAGE AND COMMUNICATION (051)	0.32	0.01	0.08	0.23
NACE J FINANCIAL INTERMEDIATION (032)	0.02	0.00	0.01	0.01
NACE K REAL ESTATE, RENTING AND BUSINESS ACTIVITIES (034)	0.24	0.01	0.06	0.16
NACE L PUBLIC ADMINISTRATION AND DEFENCE (041)	0.38	0.01	0.09	0.27
NACE M EDUCATION (042)	0.55	0.03	0.08	0.43
NACE N HEALTH AND SOCIAL WORK (043)	0.26	0.03	0.04	0.19
NACE O OTHER COMMUNITY, SOC. AND PERS. SERVICES (045)	0.54	0.03	0.14	0.38
Residential, small houses (011)	8.81	0.84	2.16	5.81
Residential, high houses (012)	0.08	0.02	0.02	0.05
Weekend and leisure (013)	0.07	0.00	0.03	0.04
Garages and annex to residential (014)	0.10	0.01	0.03	0.06
Mixed residential and other (015)	7.98	0.39	3.41	4.18
Other built-up areas (080)	0.79	0.03	0.20	0.57

Statistics for each year of the same period (see figure 2.9), show that registered new land-take by buildings on arable and wooded land has increased. This might however be a result of up-dating of the land cover maps and not real changes in land use policy. A modelling of historic land cover by use of GIS should be possible, but has not been focused on in this work. The land cover class "Other" is assumed to a great extent consists of a mixture of previously built-up land, areas that are not mapped, bare rocks etc.

Figure 2.10 New land-take between 1. January 1983 and 1. January 2003 occurring outside urban settlements as these areas were defined in 2002. Per cent as of 1st January, 1984-2003 .



2.4 Conclusions

Although estimates were made for building areas and land take at the NACE 2-digit level the quality of these estimates is not very high. So that although it is technically possible to make these estimates, the quality of the various registers is not high enough to make these types of estimates with any confidence. Therefore we must conclude that it is not yet possible to give good estimates on land take by the manufacturing industry at NACE 2-digit level for status or for changes over time. Crucial to this conclusion has been the lack of exact addresses in the register for enterprises at a 2-digit NACE level and this is the major weakness in the data set. Other data sources have errors too, but these errors are expected to be much smaller in the near future.

At the current time there is an improvement project led by the Division for the business register focusing on the management of the population of entities in the business register and in the Ground property-, Address- and Building Register (GAB). It will be necessary that the Division of environmental statistics works in connection with this improvement project to be sure that the geo-referencing in these registers is improved as soon as possible. These registers have been identified as critical factors in the quality of the land take statistics that are produced from these registers. The geo-referenced data that needs improvement include both the figures on physically built-up areas and flanking areas. In addition to working within Statistics Norway there also needs to be increased cooperation with the other authorities in Norway that are key to improvements in the other registers. There are negotiations going on between Statistics Norway and the administrative body with the main responsibility for the data catchment of the register of enterprises. Assuming that new enterprises will be given exact addresses, it might be possible to give reliable figures for *new* land-take by economic activity at NACE 2-digit level by the end of 2005.

This work has focused on actual economic activity. By shifting the focus from actual economic activity to ownership, it should be possible to give figures on land-take to NACE 2-digit level, using identity numbers of enterprises. The focus of the NAMEA-accounts is on economic activity and not ownership so although better information is available for ownership this does not really help in the establishment of land use needed for the economic activity that occurs at the site.

2.5 Future work

Data quality and quantity has been important to this project. The accuracy of geo-coding of enterprises to address-level is crucial to make reliable statistics on land-take by industry at NACE 2-digit level, both for figures for status and change. The register used for enterprises will be connected to the official address register within 2006. The decision of a total or partial wash of addresses in the register used for enterprises has not been taken yet. It is likely however that the registering of new enterprises will be done using the official address register some time before 2006. Which means that it should be possible to make good statistics on new land-take by industry then. Using some sort of sample method one should however be able to give estimates on skewness between enterprises that do and do not have exact addresses. This could lead to the possibility of giving estimates on actual land-take for some or all divisions of economic activity.

The second most important problem encountered in this project has been the lack of information on ground property or flanking areas. The Mapping Authority and municipalities are doing a project on matching maps and registers on buildings and ground property. This project is scheduled to be finished by the end of 2005. It should however be possible to do some model work based on selected municipalities in 2005. Work could also be done on combining building types and ground property to give better information on use of ground properties.

Land cover maps are planned to be fully digital before 2006. The lack of coverage of land cover maps today has been considered to be less important to the quality of land-take statistics, but a further improvement on this matter will probably make sub-national statistics on land-take by industry possible. A modelling of historic land cover by use of GIS should be possible to give estimates on land-take by built-up areas for the last 20 years.

The system of land use classification is a long chain, not stronger than its weakest point, and it is therefore many possibilities for errors in the classification. The method builds on available data, and should give a good picture of the real world.

It is however a weakness that such large parts of the building mass lacks codes for economic activity, and that the positioning of CBR is quite new. The use of number of employees for code transfer has weaknesses, because the geo-coding of employees is known to have faults. It is expected that enhancements in this geo-coding will skew the distribution of classified land use.

2.6 References

Nomenclatures : http://www.econ.ucl.ac.be/IRES/BASE_DE_DONNEES/Nomenclatures/nomenclatures.html

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2.7 Annexes

2.7.1 Codes for type of building

From 2000,these 3-digit codes for used for type of building are in use. Older codes have all been transformed to new coding.

Residential building

Detached house
111 Detached house
112 Detached house with 2 dwelling units, including one bed-sit, basement flat etc.
113 Farmhouse

House with 2 dwellings
121 Part of semi-detached house
122 House with 2 dwellings
123 Part of semi-detached farmhouse
124 Farmhouse with 2 dwellings

Row house, linked house and house with 3 or 4 dwellings
131 Part of row house with 3 or 4 dwellings
132 Part of row house with 5 or more dwellings
133 Part of linked house incl. atrium with up to 4 dwellings
134 Part of linked house incl. atrium with 5 or more dwellings
135 Terraced house
136 House with 3 or 4 dwellings

Multi-dwelling building
141 Multi-dwelling building, 2 storeys
142 Multi-dwelling building, 3 and 4 storeys
143 Multi-dwelling building, 5 or more storeys
144 Linked multi-dwelling building, 2 storeys
145 Linked multi-dwelling building, 3 and 4 storeys
146 Linked multi-dwelling building, 5 or more storeys

Residence for communities
151 Residence and service residence for the elderly and other social groups
152 Student home
159 Other residential building for communities

Non-residential building, holiday house, residential garage etc.

Holiday house, residential garage etc.

Holiday house
161 Holiday house (chalet, summerhouse etc.)

162 Detached house used as holiday house
163 Farmhouse used as holiday house

Cabin, mountain farm hut etc.
171 Mountain farm hut, fishermen's shack etc.
172 Cabin, turf hut

Residential garage and outhouse
181 Garage, outhouse, annex linked to dwelling
182 Garage, outhouse, annex linked to holiday house
183 Boat-house, wharfside shed

Other residential building
193 Workmen's hut
199 Other residential building

Non-residential building

Industrial building and warehouse

Industrial building
211 Factory building
212 Workshop
213 Production building
214 Building for treatment plant
215 Building for waste treatment
216 Building for water supply including pumping station
219 Other industrial building

Power supply building
221 Power station (<15 000 kVA)
222 Smaller power station
223 Transformer station (>10 000 kVA)
224 Smaller transformer station, transformer box
229 Other building for power supply

Warehouse
231 Warehouse
232 Cold storage warehouse
233 Silo building
239 Other warehouse
290 Other industrial buildings and warehouses

Agricultural and fishery building
241 Building for animals, granary, fruit and vegetable storage, agricultural silo, building for hay/grain drying
242 Agricultural garage/implement shed
243 Greenhouse
244 Works building used for fishery and hunting, incl. fish farm
245 Fishery boat-house and shed
248 Other fishery and hunting building
249 Other agricultural building

Office and business building

Office building
311 Office and administration building, town hall
312 Bank building, post office
313 Media building
319 Other office building

Wholesale and retail trade building
321 Shopping centre, department store
322 Detached shops
323 Service station
329 Other wholesale and retail trade building
330 Fair and congress building
390 Other office and wholesale and retail trade building

Transport and communications building

Service and terminal building
411 Service building, airport terminal, air traffic control tower
412 Railway station and underground station
413 Bus station
414 Harbour terminal
415 Goods terminal
416 Post terminal
419 Other service and terminal building

Telecommunication building
421 Telephone building, public call box
422 Radio link station
423 Radio and television broadcast building, transformer station
424 AM station
429 Other telecommunication building

Garage and hangar building
431 Parking garage
432 Bus garage, tram and engine shed
433 Airplane hangar
439 Other garage and hangar building

Road, driving and motor vehicle examiners building
441 Driving and motor vehicle examiners building
442 Public Roads Administration Centre
443 Toll bar building, customs station and weigh station
449 Other road, motor vehicle and driving examiners building

490 Other transport and communication building

Hotel and restaurant building

Hotel building
511 Hotel building
512 Motel building
519 Other hotel building

Short-stay accommodation building
521 Pension and similar accommodation building
522 Youth hostel, holiday camp, tourist chalet
523 Apartment lodging building
524 Camping hut, holiday bungalow
529 Other short-stay accommodation building

Restaurant building
531 Restaurant building, café building
532 Food service kitchen, canteen building
533 Snack bar, kiosk
539 Other restaurant building
590 Other hotel and restaurant building

Building used for education, research, public entertainment and religious activities

School building
611 Playground
612 Kindergarten
613 Primary school
614 Lower secondary school
615 Combined primary and lower secondary school
616 Upper secondary school
619 Other school building

University and research building
621 University and higher technical education building
622 Special education building
629 Other university and research building
630 Laboratory building

Museum and library building
641 Museum and art gallery
642 Library
643 Zoological and botanical garden
649 Other museum and library building

Sports building
651 Sports hall
652 Ice arena
653 Indoor swimming pool
654 Stand and building for shower and changing rooms
655 Fitness centre
659 Other sports building

Public entertainment building
661 Cinema, theatre, concert hall, opera house
662 Community centre, local meeting hall used for public entertainment
663 Discotheque
669 Other public entertainment building

Building used for religious activities
671 Church, chapel
672 House of worship, parish house
673 Crematorium, cemetery chapel, chapel of repose
674 Synagogue, mosque
675 Convent, monastery
679 Other building used for religious activities
690 Other building used for education, research, public entertainment and religious activities

Hospital and institutional care building

Hospital
711 Local hospital
712 Central hospital
713 Regional hospital, university hospital
714 Specialized hospital
719 Other hospital

Long-stay hospital and nursing home
721 Nursing home
722 Residence and home with nursing and medical care
723 Building for rehabilitation, sanatorium
729 Other long-stay hospital and nursing home

Primary health building
731 Clinic, doctor’s office, medical centre, emergency clinic
732 Health and social services centre, health station
739 Other primary health building
790 Other hospital and institutional care building

Prison, building for emergency preparedness etc.

Prison building
811 Central prison
812 Auxiliary prison, regional prison
813 Open prison
819 Other prison building

Emergency preparedness building
821 Police station
822 Fire station, ambulance station
823 Lighthouse building, pilot station
824 Radar surveillance station for aircraft and/or ships

825 Air-raid shelter, bunker
829 Other building for emergency preparedness

830 Monument

840 Public toilet

890 Other prison, building for emergency preparedness etc.

EU Industrial Classification NACE at first level.
The following classes are used:

A	Agriculture, hunting and forestry
B	Fishing
C	Mining and quarrying
D	Manufacturing
E	Electricity, gas and water supply
F	Construction
G	Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods
H	Hotels and restaurants
I	Transport, storage and communication
J	Financial intermediation and insurance
K	Real estate management, renting and business activities
L	Public administration and defence; compulsory social security
M	Education
N	Health and social work
O	Other community, social and personal service activities
P	Paid household work
Q	Extra-territorial organizations and bodies

In addition to NACE at first level, the following classes are used in the building register:

X	Dwellings
Y	Holiday properties (cottages), private garages and other non-industrial activities.

2.7.2 Concepts, variables and classifications

Definition of the main concepts

Area class
Areas generalized by merging building near areas (see below) from the same land use class (see below). To get mutually excluding areas a combination of overlay technique and a hierarchical solution is used (Bloch, 2002/64).

Buildings completed
A building is considered completed when it is physically ready to be put into use or when at least 50 per cent of the utility floor space is actually taken into use.

Building near areas
Building near areas are places with homogenous use of land close to buildings. May be visualized as circles with areas equal to the circumference of buildings (see below).

Land use class
Land use is classified by dominating use of building in building near areas. A combination of GAB buildings and CBR businesses is used to classify built-up areas by buildings. For other areas digital maps are used. Area statistics is produced at to geographical levels; physical built-up areas and aggregated land use classes.

Buffer
To buffer or make a buffer is the geographical technique of making a zone around a point, line or polygon. Buffer limits may be settled from different criteria, as a fixed distance or a distance proportional to a certain characteristics of the element being buffered. for instance building surface area.

Overlay
Overlay is a geographical technique of merging two or more map covers, and thereby extracting information from none-/overlaying localization of phenomenon or characteristics.

Concatinating
To concatinate is to merge two ore more values/columns in a table. This is often used for making unique keyfields in a table, to establish relations between different datasets or to find doublets in a dataset

Map circumference
Map circumference of buildings as they are constructed in maps. In most cases equal to circumference of building as seen on aerial photos. In some cases land survey is source of circumference, map circumference is then equal to gross floor surface (see below).

Polygon
Polygons are here used of surfaces constructed or modelled in digital maps. These surfaces may come from interpretation and digitalisation of aerial photos, as for buildings in CMD, or be generated as circles from coordinates and area values in GAB register.

Utility floor space
Utility floor space is the floor area measured within the outer walls. To calculate the utility floor space you measure from the inside of a wall. The total utility floor space for a building will thus be the sum of the area within the outer walls for all floors. In a dwelling building for instance, the basement area will be a part of the utility floor space. The utility floor space is defined in Norwegian Standard NS 3940 Area and volume calculations.

Gross floor space
Before 1983, the gross floor space was used for other buildings than dwellings. The gross floor space includes the outside of outer walls, while the utility floor space is measured from the inside of outer walls.

Type of building
Type of building is established according to function, combined buildings, for instance combined dwelling and business building, storage and production building are grouped by the function that occupies the larger part of the utility floor space.

Economic activity / Division

In addition to building type, it is also registered what division the user of the building belongs to. The Industrial Classification is attached to the user and is therefore independent of the building type. At the time for filling out the scheme to the statistics it is not always known who the user of the building will be. Because of this the industrial classification is considered to be more uncertain than the classification of the building type. The industrial classification was former in accordance to the UN's International Standard Industrial Classification ISIC.
As from 1996 the classification is in accordance to EU's Industrial Classification NACE.

Definition of the main variables

Buildings

Buildings are buildings registered as a completed building in the GAB register. A building is considered completed when it is physically ready to be put into use or when at least 50 per cent of the utility floor space is actually in use. Type of building is established according to function, combined buildings, for instance combined dwelling and business buildings and storage and production buildings, are grouped by the function that occupies the main part of the utility floor space.

Economic activity

Economic activity as defined and registered in GAB and CRE. Where possible the code for economic activity from CRE overrules those of the GAB register.

Flanking areas

In this context flanking areas are considered equal to the ground property associated with the economic activity, including built-up areas by buildings, but excluding major roads registered in the ground property register.

Built-up areas

Areas ceiled or covered by buildings, roads, rails, arbours etc.

Standard classifications
Type of building is established according to function, combined buildings, for instance combined dwelling and business building, storage and production building are grouped by the function that occupies the larger part of the utility floor space.

Division. In addition to building type, it is also registered what division the user of the building belongs to. The Industrial Classification is attached to the user and is therefore independent of the building type. At the time for filling out the scheme to the statistics it is not always known who the user of the building will be. Because of this the industrial classification is considered to be more uncertain than the classification of the building type. The industrial classification was former in accordance to the UN's International Standard Industrial Classification ISIC. As from 1996 the classification is in accordance to EU Industrial Classification NACE at first level.

The Central Business Register does also use the Nomenclature of economic activities in the European Union (NACE - Nomenclature générale des activités économiques dans les communautés Européennes). Here division is registered with up to 6 digits, where the 6^{th} digit is a Norwegian add-on, and the five first are according to NACE 4 1993 REV.1 .

In this context the following classes are used (Nomenclature of economic activities in the European Union NACE 4 1993 REV.1):

15 M.o. food products and beverages
16 M.o. tobacco products
17 M.o. textiles
18 M.o. wearing apparel; dressing and dyeing of fur
19 M.o. Tanning and dressing of leather; luggage, handbags, saddlery, harness and footwear
20 M.o. wood and of products of wood and cork, except furniture; articles of straw and plaiting materials
21 M.o. pulp, paper and paper products
22 Publishing, printing and reproduction of recorded media
23 M.o. coke, refined petroleum products and nuclear fuel
24 M.o. chemicals and chemical products
25 M.o. rubber and plastic products
26 M.o. other non-metallic mineral products
27 M.o. basic metals
28 M.o. fabricated metal products, except machinery and equipment
29 M.o. machinery and equipment n.e.c.
30 M.o. office machinery and computers
31 M.o. electrical machinery and apparatus n.e.c.
32 M.o. radio, television and communication equipment and apparatus
33 M.o. medical, precision and optical instruments, watches and clocks
34 M.o. motor vehicles, trailers and semi-trailers
35 M.o. other transport equipment
36 M.o. furniture; manufacturing n.e.c.

* M.o = Manufacturing of.

3 NAMEA-air emissions accounts

The development of the NAMEA-air emissions accounts continues in cooperation with the air emissions group in the Division for environmental statistics. A number of new emissions types have been included the accounts. Improvements of over four months have been achieved with regards to the planned publication of these statistics in 2004.

3.1 Evaluating NACE breakdowns

With the recent revision of the national accounts at Statistics Norway an evaluation of the NACE breakdowns to be published and to be reported to Eurostat has been made. One improvement in the national accounts concerns the detailed values for shipping. Unfortunately this same detail is not available in the emissions data so although additional improvements could be made on the economic side, is not possible to make the same improvements on the emissions side. The only available emissions data is the 2-digit NACE division 61.

Beginning in 2001, there were only two oil refineries operating in Norway. This has meant that statistics for NACE 23.2 Manufacture of refined petroleum products cannot be published. The solution for this problem has been to publish this NACE group together with NACE 24.1. Unfortunately this means that important details regarding one of Norway's major industries is not possible to show in as much detail as before 2001.

An evaluation of this publication policy is being reconsidered in light of §2-6 of the Norwegian Statistics Act of 16. June 1989 No. 54 that states, "Information collected in accordance with any prescribed obligation to provide information, or which is given voluntarily, shall under no circumstances be published in such a way that it may be traced back to the supplier of any data…" The emissions data for these enterprises are available on the website for the Norwegian Pollution Control Authority (SFT). So technically, the emissions data can more easily be published since they are already available from another public source. For the economic data, on the other hand, it is not so clear.

3.2 Improvements in reporting between 2002 and those planned for 2004

The following table shows the improvements in the reporting and publishing of different air emission types in the last two years for the NAMEA-air accounts. For the planned publication in week 14 of 2004, arsenic (As), copper (Cu) and chromium (Cr) plus additional detail for particulates (PM_{10}, $PM_{2.5}$) and HFCs, PFCs and SF_6 will also be published according to the quarterly national accounts breakdowns. For reporting to Eurostat, the heavy metals and particulates will be possible to report at the two and three digit level requested on the standard NAMEA-air tables. For the other emissions (HFCs, PFCs and SF_6) the detail will only be available at two digit NACE levels. The time series for all emissions in the air emission accounts begins at 1990. This starting point was of particular importance due to the Kyoto agreements.

Table 3.1. NAMEA-air variables reported and published by Statistics Norway for 2002, 2003 and planned for publication in 2004.

Reported variables	2002 reporting to Eurostat	Statistics Norway publication on 30.07.02	Statistics Norway publication on 05.05.03	Statistics Norway publication planned for week 14 in 2004
Economic				
GDP	x	x	x	x
Employment	x	x	x	x
Household consumption	x	x	x	x
Air emissions				
CO_2	x	x	x	x
CH_4	x	x	x	x
N_2O	x	x	x	x
SO_2	x	x	x	x
NO_x	x	x	x	x
NH_3	x	x	x	x
CO	x	x	x	x
NMVOC	x	x	x	x
Pb	x	x	x	x
Cd	x	x	x	x
Hg	x	x	x	x
As				x
Zn				
Cr				x
Se				
Cu				x
Ni				
PM_{total}	X	x	x	..
PM_{10}				x
$PM_{2,5}$				x
HFCs	Partial			x
PFCs	Partial			x
SF_6	Partial			x
PAH-4	Not requested	x	x	x
Dioxins	Not requested	x	x	x
Time period	1991 – 1999	1991-2000*	1990-2001*	1990-2002*

*preliminary figures

3.3 Improved publication times by four months

Due primarily to the improvement in the publication of the quarterly national accounts, the publication of the NAMEA-air statistics will have been improved by nearly four months between 2002 and 2004. The first publication was 30. July 2002 and in 2003 we published on May 5th. For 2004 planned publication time will be during week 14 (end of March). Further publishing time improvements are doubtful since the quarterly national accounts are only published earlier in March.

3.4 Official website and database for NAMEA data

The official website address for the Norwegian NAMEA-air accounts is:
http://www.ssb.no/english/subjects/09/01/nrmiljo_en/

The official release of new statistics is always announced with an article in both Norwegian and English with accompanying figures and tables.

The database for obtaining the time series of data beginning in 1990 is available at the following StatBank location:

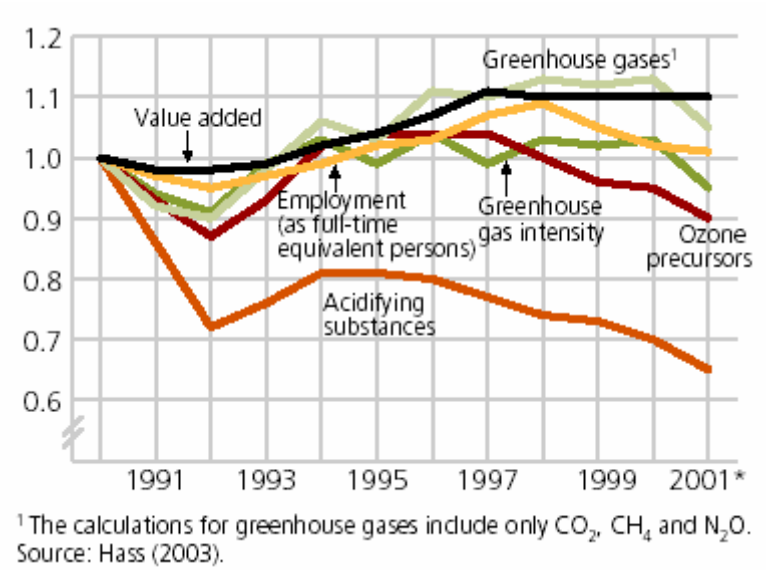
http://www.ssb.no/english/ → StatBank → 01 Natural Resources and the environment → 01.06 Environmental economics and indicators

Table 03598: Economic and environmental accounts (NAMEA) – value added and employment
Table 03597: Economic and environmental accounts (NAMEA) – Air emissions

These two tables are available in StatBank which is a database where the user can define which economic variables and air emission variables are desired to be taken out of the database.

The graphs planned for annual publication will include both emissions and economic data for certain aggregated groups of industries indexed to 1990. This will make it easier to see if industries are showing decoupling of emissions from value added. The following is an example of this type of figure for the manufacturing industries.

Figure 3.1 Economic, air emission and greenhouse gas intensity transit for manufacturing in Norway. 1990 – 2001*. Index: 1990 = 1.



[1] The calculations for greenhouse gases include only CO_2, CH_4 and N_2O.
Source: Hass (2003).

3.5 Improvements in the NACE detail for HFCs, PFCs and SF_6

Publishing all of the various greenhouse gases covered under the Kyoto agreement by detailed industry level is important since reductions in some of these gases can contribute measurably to achieving the levels set in the Kyoto agreement. Until now, the industry breakdown available for HFCs, PFCs and SF_6 has only been at a very aggregated level. The publication of these emissions at a higher level of detail is desirable. The data used to assign emissions to the various industry groups was examined in detail and it was concluded that a breakdown according to two digit NACE division would be possible but that any additional detail would not be advised due to the levels of uncertainty in the basic data.

3.5.1 Description of methodology for estimating emissions of HFCs, PFCs and SF_6

HFCs and PFCs are used as substitutes for ozone depleting substances (CFCs and HCFCs) that are being phased out under the Montreal Protocol. They are used in a variety of applications, including refrigeration and air-conditioning equipment, as well as in foam blowing, fire extinguishing, as solvents and as aerosol propellants. There is no production of HFCs and PFCs in Norway.

The emissions are calculated on the basis of information on imported bulk and products containing HFCs/PFCs. In 2002, the total emissions from HFCs and PFCs used as substitutes for ozone depleting substances were 366 ktonnes of CO_2-equivalents. Almost all of this originated from HFCs; the PFC emissions are negligible in comparison. The contribution from HFCs and PFCs to the total greenhouse gas emissions (using Kyoto definitions) that year was 0.7 per cent. The application categories, "refrigeration" and "air conditioning" contribute by far the largest part of the HFC and PFC emissions in Norway, thus the other categories contribute only small amounts to the overall emissions. Like in many other Kyoto protocol Annex I countries, the consumption of these gases has had a strong upward trend since 1990, because of the phasing out of ozone-depleting substances. The increase in emissions was 25 per cent during the period 2001-2002, while emissions increased by a factor of several thousand from 1990 to 2002.

The emissions of HFCs and PFCs are calculated using the Tier 2 methodology according to the *IPCC Good Practice Guidance*. The emissions are calculated on a detailed level, based on consumption figures and emission characteristics related to specific processes and equipment. By accounting for the time lag in emissions from the compounds are introduced into the equipment and until they leak out, gives the actual emissions. Figures on import of products containing HFCs and PFCs were collected through a survey in 1999 (SFT 1999) and the activity data for the following years were estimated by extrapolating these figures. A new survey will be carried out in the near future. Figures on imported bulk chemicals are collected each year.

PFCs from aluminium production is a major source for these emissions and accounted for 1.8 per cent of the national total GHG emissions (using Kyoto definitions) in 2001. This is a decrease from 5.8 per cent in 1990. The reduction has been achieved by improving the efficiency of the production process and by installing point feeders to reduce the numbers and duration of anode effects per cell day (AEF). This has caused a reduction of the PFC emissions per tonne aluminium produced in Norway from 3.49 kg CO_2-equivalent in 1990 to 0.99 kg CO_2-equivalent in 2001. The relative emissions of PFCs in CO_2 equivalents per tonne Aluminium produced have increased by 14 per cent from 2000 to 2001.

Calculation methodology for CF_4 and C_2F_6 (PFCs) from aluminium production is described in (SN/SFT 2000). According to *IPCC Good Practice Guidance* the calculation is a Tier 3b methodology using country specific emission factors based on measurements. Each plant annually reports production data and emissions by technology to SFT.

The largest source of SF_6 emissions in Norway is magnesium production, where SF_6 is used to cover the surface of liquid magnesium to prevent it from oxidising. Emissions have been reduced through the 1990s due to improvements in technology and process. In 2002 the single primary magnesium plant was closed, and emissions decreased sharply. The use of SF_6 as a cover gas in the aluminium foundries lasted only during the period 1992-1996.

Emissions from other SF_6 sources such as electrical switches are calculated with a time lag methodology similar to the one used for HFCs.

The allocation of emissions to industries is mainly based on expert judgment regarding the use of different types of equipment. The largest contributions to these types of emissions are from recreational and sporting activities (especially skating rinks), private households (air conditioning in cars), and the food chain (due to refrigeration) from fisheries via the food processing industry and transport to wholesale/retail trade and hotels/restaurants.

Emissions by equipment and chemical from the tier 2 calculation are allocated by the following method:

1. Emissions are allocated to product categories used in the national accounts.
2. Emissions within each product category are allocated to industries.

3. Emissions are aggregated to 2-digit NACE division and to total CO_2 equivalents for all chemicals in the HFC and PFC groups.

Most of the allocations in steps 1 and 2 are to a small number of product categories or industries based on expert judgment. For some equipment types used in most industries, such as fire extinguishers, emissions were allocated according to the gross product of the industries.

3.5.2 Emissions of HFCs, PFCs and SF_6 by 2-digit NACE

The following tables provide the emissions for these types of gases calculated into CO_2-equivalents. Included in the HFCs are the emissions for HFC-134a, HFC-125, HFC-143a, HFC-32, HFC-23, HFC-152a, HFC-227ea. Included in the PFCs are the emissions for PFC-218, PFC-14, PFC-116.

Tonnes of HFCs, PFCs and SF_6 are converted into CO_2-equivalents using Global Warming Potentials for each of the different compounds.

Table 3.2. Table showing emissions of HFCs. CO_2-equivalents. 1990-2002*

NACE	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002*
Total	**3 294 397**	**2 523 633**	**2 016 460**	**1 980 372**	**1 710 378**	**1 561 926**	**1 439 840**	**1 376 675**	**1 267 176**	**1 123 009**	**899 236**	**1 043 412**	**1 119 952**
01	-	-	0	11	55	119	205	312	443	581	725	880	1 068
02	-	-	0	11	55	119	205	312	443	581	725	880	1 068
05	1	5	17	83	380	1 132	2 502	4 054	6 086	8 065	10 540	13 164	16 478
11	0	1	4	21	95	283	626	1 013	1 518	2 009	2 624	3 275	4 095
12	-	-	-	-	-	0	0	1	2	3	5	7	11
13	-	-	-	-	-	0	0	1	2	3	5	7	11
14	-	-	-	-	-	0	0	1	2	3	5	7	11
15	1	8	27	135	623	1 850	4 089	6 666	10 141	13 552	17 766	22 247	27 895
16	-	-	-	-	-	0	1	7	18	34	52	73	106
17	-	-	-	-	-	0	0	1	2	3	5	7	11
18	-	-	-	-	-	0	0	1	2	3	5	7	11
19	-	-	-	-	-	0	0	1	2	3	5	7	11
20	-	-	-	-	-	0	1	3	9	17	26	37	53
21	-	-	-	-	-	0	1	3	9	17	26	37	53
22	-	-	-	-	-	0	2	10	27	52	79	110	158
23	-	-	-	-	-	0	1	3	9	17	26	37	53
24	-	-	-	1	4	6	11	19	33	53	74	98	134
25	-	-	-	8	-	0	85	112	181	174	159	183	225
26	-	-	-	-	-	0	1	3	9	17	26	37	53
27	-	-	1	32	140	261	400	552	721	897	1 080	1 276	1 509
28	7	29	43	714	1 713	4 198	4 649	7 043	6 610	8 684	8 580	11 069	12 450
29	1	3	8	73	165	414	537	913	1 077	1 347	1 376	1 916	2 799
30	-	-	-	-	-	0	1	3	9	17	26	37	53
31	-	-	-	-	-	0	1	3	9	17	26	37	53
32	-	-	-	-	-	0	1	15	52	63	60	116	180
33	-	-	-	-	-	0	1	3	9	17	26	37	53
34	-	-	3	29	6	11	263	340	537	497	435	486	581
35	-	-	-	-	-	0	2	14	36	69	105	147	211
36	-	-	-	-	-	0	1	3	9	17	26	37	53
37	-	-	-	-	-	0	1	3	9	17	26	37	53
40	-	-	-	-	-	0	4	20	54	103	157	220	317
41	-	-	-	-	-	0	0	1	2	3	5	7	11
45	-	-	2	48	210	391	608	868	1 185	1 544	1 921	2 336	2 871
50-52	1	7	28	121	521	1 584	3 566	5 974	9 289	12 644	16 685	21 020	26 542
55	1	6	19	102	485	1 511	3 485	5 903	9 478	13 129	17 443	22 103	27 992
60	0	1	9	115	550	1 329	2 597	4 393	7 019	9 760	12 741	15 973	19 937
61	0	1	4	25	139	476	1 115	2 077	3 520	5 009	6 679	8 484	10 722
62	0	0	0	1	11	49	138	285	485	697	926	1 174	1 484
63	0	4	12	59	273	831	1 864	3 078	4 670	6 235	8 156	10 199	12 769
64	0	0	0	0	1	2	7	20	46	81	121	167	236
65-67	0	0	0	0	2	5	17	51	114	204	303	417	591
70-74	0	1	2	9	51	199	531	1 058	1 804	2 627	3 539	4 537	5 844
75	0	1	2	8	44	156	387	727	1 196	1 703	2 277	2 903	3 718
80	0	0	1	4	20	60	140	255	431	639	885	1 158	1 544
85	0	0	1	5	22	65	156	302	535	827	1 165	1 545	2 097
90	0	0	0	2	9	27	62	104	163	225	301	384	493
91	0	0	0	2	9	27	62	104	163	225	301	384	493
92	6	45	143	703	3 219	9 627	21 326	34 601	51 945	68 809	89 888	112 229	140 381
93	0	0	1	7	33	98	218	357	543	730	961	1 207	1 524
HH	-	-	7	96	400	1 047	3 000	6 836	11 981	17 424	22 999	28 941	36 056

HH = Households

Table 3.3. Table showing emissions of PFCs. CO_2-equivalents. 1990-2002*

NACE	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002*
TOTAL	**3 294 397**	**2 523 633**	**2 016 460**	**1 980 372**	**1 710 378**	**1 561 926**	**1 439 840**	**1 376 675**	**1 267 176**	**1 123 009**	**899 236**	**1 043 412**	**1 119 952**
01	-	-	-	-	-	-	-	-	-	-	-	-	-
02	-	-	-	-	-	-	-	-	-	-	-	-	-
05	-	-	-	-	-	3	16	25	25	25	25	25	25
11	-	-	-	-	-	1	4	6	6	6	6	6	6
12	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	5	26	40	40	40	40	40	40
16	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-
27	3 294 397	2 523 633	2 016 460	1 980 372	1 710 378	1 561 833	1 439 553	1 376 288	1 266 790	1 122 622	898 849	1 043 025	1 119 565
28	-	-	-	-	-	37	33	-	-	-	-	-	-
29	-	-	-	-	-	4	3	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-
50-52	-	-	-	-	-	4	21	32	32	32	32	32	32
55	-	-	-	-	-	4	19	29	29	29	29	29	29
60	-	-	-	-	-	1	4	7	7	7	7	7	7
61	-	-	-	-	-	1	4	7	7	7	7	7	7
62	-	-	-	-	-	0	0	0	0	0	0	0	0
63	-	-	-	-	-	2	11	18	18	18	18	18	18
64	-	-	-	-	-	0	0	0	0	0	0	0	0
65-67	-	-	-	-	-	0	0	0	0	0	0	0	0
70-74	-	-	-	-	-	0	2	3	3	3	3	3	3
75	-	-	-	-	-	0	2	2	2	2	2	2	2
80	-	-	-	-	-	0	1	1	1	1	1	1	1
85	-	-	-	-	-	0	1	1	1	1	1	1	1
90	-	-	-	-	-	0	0	1	1	1	1	1	1
91	-	-	-	-	-	0	0	1	1	1	1	1	1
92	-	-	-	-	-	29	138	213	213	213	213	213	213
93	-	-	-	-	-	0	1	2	2	2	2	2	2
HH	-	-	-	-	-	-	-	-	-	-	-	-	-

HH = Households

Table 3.4. Table showing emissions of SF_6. CO_2-equivalents. 1990-2002*

NACE	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002*
TOTAL	**2 185 959**	**2 065 893**	**687 628**	**718 866**	**854 448**	**577 972**	**543 142**	**548 008**	**694 541**	**840 746**	**890 812**	**773 351**	**230 719**
01	-	-	-	-	-	-	-	-	-	-	-	-	-
02	-	-	-	-	-	-	-	-	-	-	-	-	-
05	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-
27	2 143 830	2 019 550	638 250	663 225	791 090	509 070	472 503	437 370	581 965	725 365	773 165	653 665	150 092
28	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	1 076	1 076	1 076	1 076	1 195	1 195	1 195	1 195
33	-	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-	-
40	39 992	43 941	46 715	52 717	55 244	56 777	58 210	59 669	60 992	62 192	63 544	64 895	66 246
41	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-
50-52	-	-	-	-	-	-	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-	-
61	-	-	-	-	-	-	-	-	-	-	-	-	-
62	-	-	-	-	-	-	-	-	-	-	-	-	-
63	-	-	-	-	-	-	-	-	-	-	-	-	-
64	-	-	-	-	-	-	-	-	-	-	-	-	-
65-67	-	-	-	-	-	-	-	-	-	-	-	-	-
70-74	-	-	-	-	4 780	7 170	7 170	45 410	45 410	45 410	45 410	45 410	4 780
75	-	-	-	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-	-	-	-
85	-	-	-	-	-	239	239	239	239	239	239	239	239
90	-	-	-	-	-	-	-	-	-	-	-	-	-
91	-	-	-	-	-	-	-	-	-	-	-	-	-
92	-	-	-	-	-	-	-	-	-	-	-	-	-
93	-	-	-	-	-	-	-	-	-	-	-	-	-
HH	2 137	2 402	2 664	2 924	3 334	3 641	3 944	4 245	4 860	6 346	7 259	7 946	8 167

HH = Households

3.6 References

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4 NAMEA work related to environmental accounts integration for environment-related taxes

Through the participation in the project “Energy taxes in the Nordic Countries” in autumn 2002, Statistics Norway determined that it had the data necessary to calculate taxes by industries. The project focused on detailed energy taxes by industries and calculations were done using national accounts data only for 1999.

This current project extends the work on energy taxes to now include all types of environmental taxes as defined by Eurostat/OECD (i.e. energy, transport, pollution and resource taxes). The time series for total environmental taxes for Norway as a whole has been calculated from 1991 to 2001 (see Table 4.1). Detailed breakdowns by industry (at primarily NACE 2-digit level) for all these different types of environmental taxes taxes have been made for 2000 and 2001 and are provided in the annexes to this chapter.

This chapter first describes the method used when calculating detailed environmental taxes by industry and types of final use. A number of the challenges relating to this new Norwegian statistical topic are mentioned. Then the Norwegian environmental taxes are described as well as some of the results from the calculations. Finally, comments are given to whether Statistics Norway is able to integrate environmental tax data into the NAMEA table format.

4.1 Taxes on products in the Norwegian national accounts

In the Norwegian national accounts, specific taxes on products are not specified by type or by purpose. This makes it difficult to obtain information solely concerning environmental taxes from the national accounts. To be able to calculate environmental taxes by industries, new statistics for this specific area have been developed, based on the pre-systems of the national accounts. The new accounts for environmental taxes by industries are consistent with the national accounts. So far, detailed statistics for environmental related taxes by industries (NACE 2-digit level) have been compiled for the years 1999 - 2001.

The long-term goal for the work with detailed environmental related tax statistics is to produce regular annual publications. The current short-term goal is to publish data for energy taxes in statistics Norway’s web publication "statistical magazine" in the spring of 2004. The objective in the longer term is to produce regular, official statistical publications. This assumes that the statistics on environmental taxes are approved by Statistics Norway as a new established statistical area.

4.1.1 Method used for calculating detailed taxes by industry

For the matter of comparison, the original method used when calculating taxes on products in the Norwegian national account will first be described.

1. In the national accounts, the total accrued values of the taxes are allocated to the different products charged with tax. The result is a catalogue listing ***products X total tax in mill NOK***. One product in the catalogue can be charged with several different taxes. The sum of the taxes levied on the different products in the catalogue equals total accrued taxes on products in the national accounts. The Norwegian national accounts specifies ca 1200 products.
2. In the technical computer program used to calculate the Norwegian national account (SNA-NT), the tax levied on a product is distributed proportionally among the users of that product. The industries exempted from tax are not included in this distribution.

3. The industries exempted from tax when using a charged product are defined in a catalogue listing ***products X exempted industries X 0.*** Zero indicates that none of the mentioned sectors' use of the product is part of the proportional distribution of the tax levied on this product.
4. Points 1, 2 and 3 imply that all taxpayers are facing the same level of tax rates when using a product that are charged with tax, and that different taxes levied on the same product has the same rules of exceptions. But, there might be situations where various taxes with different rules regarding exceptions for taxpayers are levied on the same product, or one tax levied on a product have differentiated tax rates depending on the industry using the charged products. In these cases a percentage is calculated, which implies the amount of the industries' consumption of the product that is to be included in the proportionally distribution of the tax levied on the product. The result is a catalogue listing ***products X exempted industries X per cent.***
5. In the Norwegian national accounts, total taxes on products are not published by industries. In the databases it is possible to find total taxes on products by industry, but it is not possible to directly locate information about detailed taxes on products by industry.

The method developed to calculate detailed taxes on products by industry, is based on the pre-systems of the Norwegian National accounts. The methodology is the same as originally used to calculate taxes on products in the Norwegian national accounts, but it is now undertaken at a more detailed level and all calculations are undertaken in Excel-spreadsheets (not SNA-NT).

1. The total accrued values of each of the detailed environmental related taxes on products are allocated to the different products charged with these taxes. The result is **one** catalogue for **each of the environmental related taxes**, listing ***products X tax in mill NOK***. The sum of taxes in each of the catalogues equals the accrued sum of each of the environmental related taxes.
2. Then, the industries exempted from the taxes by products when using a charged product are defined. The result is **one** catalogue for each energy tax, listing ***products X exempted industries X 0 or per cent.*** Among the energy taxes especially, there are many taxes with different rules of exemptions levied on the same products. The different energy taxes also have differentiated tax rates depending on the industry using the charged energy products.
3. The work with environmental taxes is not yet integrated into the technical computer program used to calculate the Norwegian national account (SNA-NT). The use of the different charged products are therefore singled out from the national accounts. These data are collected in one catalogue for each of the environmental taxes, listing ***charged products X industry X mill NOK.***
4. The calculations are undertaken using Excel spreadsheets. The calculations done are similar to what the SNA-NT does, although now the procedure is undertaken for each of the taxes. I.e. the three catalogues for each of the detailed taxes are combined with each other.
5. The result of this procedure is detailed environmental related taxes on products by industries (Nace 2-digit level).
6. The method for calculating taxes on products is different in the final national accounts as compared to the preliminary quarterly national accounts. It is therefore only possible to calculate taxes on products by industry based on final national accounts data.
7. In the long run, if environmental taxes taxes are approved as an official statistics area it will be necessary to establish routines to use the SNA-NT to do these calculations and not just use Excel spreadsheets for this.

4.1.2 Remarks to the method used to divide environmental taxes by product

The statistics for energy consumption forms the basis for the construction of the catalogues listing the industries exempted from paying tax levied on a certain product. The reason why the energy statistics is used is because these statistics list the industries' use of the charged products in physical units. The information about rates and exemptions from the general tax regulations is in most cases given as a tax rate per use of a certain amount of a given product.

There are some problems related to the use of the energy consumption statistics as the basis for these catalogues:

1. When proportionally dividing the tax revenues levied on charged products, it is the consumption of the products given in monetary value from the national account that is used. There is not necessarily harmonisation between the consumption of energy products in physical terms in the energy statistics and the consumption of energy products in monetary values in the national accounts.

2. A change in the structure of the energy statistics will directly affect the catalogues listing the industries exempted from paying tax levied on a certain product. The catalogues listing the industries exempted from paying tax change might therefore change from one year to another. It is especially the industries included in this catalogue with a percentage that are vulnerable for changes in the energy statistics.

The Norwegian environmental taxes taxes presented in this chapter consist of both taxes on products and other taxes on production. The problems related to calculating detailed taxes by industries only relate to the taxes on products, because the other detailed taxes on production already are divided by industries in the pre-systems of the national accounts. They are, however, not published at this detailed level.

The statistics presented in this chapter are based on the data from the final national accounts. It is not possible to do the same kind of calculations based on the preliminary national accounts. This means that data for the year 'n' for environmental taxes by industry can be published in March of n+3. Data for total environmental taxes can be published in March n+2.

4.1.3 Other statistics used in this chapter

The energy data used in this chapter includes consumption of energy products by Norwegians, Norwegian consumption of energy products abroad and consumption of energy products used as raw material. The energy consumption data are based on the energy statistics published by Statistics Norway, and it is not adjusted to the NAMEA definitions of energy use (i.e. only energy use leading to emissions to air should be included) when reporting to the NAMEA energy table. When considering taxes on for example CO_2, an enterprise has taxes levied on emissions arising from both energy use and use in production processes. When we are evaluating the polluter pays principle, it is the tax definition and the emissions definitions that are the ones that should correspond and not just the tax and the energy use.

The emissions to air data used in this chapter is based on the emissions data published by the Statistics Norway, but there are some major differences between the Norwegian NAMEA (National Account Matrix including Environmental Accounts) emissions data used in this chapter and the national air emissions data that are published by Statistics Norway and the Norwegian Pollution Control Authorities (SFT). The NAMEA-data uses an economic definition of Norway, which is the same that is used for the national accounts, whereas the national air emissions data use a geographic-based definition (i.e. activities inside Norway). The major differences between these data sets are the inclusion of air emissions from ocean transport and foreign air transportation activities in the NAMEA-data.

4.2 Environmental related taxes in the Norwegian national accounts

The Eurostat manual *Environmental taxes - A statistical guide* (Eurostat, 2001) presents guidelines for compiling statistics on environmental taxes, forming a basis for a harmonization of the definitions and concepts, data sources and estimation methods of the statistical work with environmental taxes. The guidelines are based on a harmonized statistical framework developed in 1997, jointly by Eurostat, the European Commission, OECD and the International Energy Agency (IEA).

The framework for statistics on environmental taxes defined in *Environmental taxes - A statistical guide* (Eurostat, 2001) has been used to help systemise the work with the Norwegian environmental taxes. The framework outlined in the guide will, as far as it is possible, be used as the basis for

statistical presentation of Norwegian environmental related taxes.

The definition of an environmental related tax, as defined by Eurostat, is:

"A tax whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment"

Based on this definition, it is the tax base and not the explicit motivation of the tax, that determines whether or not the tax is an environmental tax. See annex 1 of this chapter for Eurostat's complete list of the different tax bases.

Based on the different tax bases, Eurostat has classified the different environmental related taxes into four major tax categories:

1. Energy taxes:
   This group includes taxes on energy products used for both transport and stationary purposes.
2. Transport taxes:
   This group includes taxes related to the ownership and use of motor vehicles, transport equipment and related transport services.
3. Pollution taxes:
   This group includes taxes on measured or estimated emissions to air and water, management of solid waste and noise.
4. Resource taxes:
   This group includes taxes on resources, but taxes on extraction of minerals and petroleum designed to capture the resource rent are excluded.

According to Eurostat (Eurostat, 2001), the CO_2-tax is included under energy taxes rather then under pollution taxes. This is done because in many cases it is impossible to identify the CO_2-taxes separately in the tax statistics since these are integrated with the energy taxes. The CO_2-taxes are also partly introduced as a substitute for other energy taxes and including the CO_2-taxes among the pollution taxes would distort international comparisons. Eurostat also mentions that the SO_2-taxes may be subject to the same problem.

In the project “Energy taxes in the Nordic Countries”, there were discussions whether to include the SO_2-tax among the energy taxes or not. The main reason for including the SO_2-tax among the energy taxes was the same as mentioned above for CO_2-taxes. In Norway until 1999, it was impossible to split the CO_2-tax and the SO_2-tax into two different taxes, since they were included in one common tax on mineral products. To include the SO_2-tax among the pollution taxes from 1999 onwards would make a break in the Norwegian time series from 1991 to 2001 for energy taxes and transport taxes. For this reason and for comparability reasons with the other Nordic countries, the SO_2-tax is included among the energy taxes in the following calculations of the environmental related taxes. We still feel that this is consistent with the EUROSTAT/OECD classification of the environmental related taxes, since including the SO_2-tax among the energy taxes is mentioned as a possibility in the Eurostat manual for environmental taxes (Eurostat 2001).

A reclassification of the environmental taxes taxes, i.e. including the SO_2-tax among the energy taxes as suggested by the Nordic group, was one of the issues raised at the NAMEA-Air Task Force group meeting in June 2003. Discussions are in progress as whether a revision of the Eurostat/OECD/IEA classifications should be suggested.

There are some minor differences between the Norwegian taxes defined as environmental related taxes in the national accounts and the list presented by OECD on their website (http://www.oecd.org/document/29/0,2340,en_2649_37465_1894685_1_1_1_37465,00.html). While Statistics Norway in this presentation includes both the Car re-registration tax and the Tax on aircraft in its list, OECD has excluded both these taxes from its list of Norwegian environment taxes. The reason for including the Car re-registration tax is based on the Eurostat-list of tax-bases (see annex 1)

where "registration or use of motor vehicles, recurrent (e.g. yearly) taxes" is mentioned as one of the tax bases connected to transport-taxes. The tax on aircraft is a more doubtful case. It is included in the list of environment taxes in this presentation because Eurostat in its definition of transport taxes writes: "Transport taxes "mainly includes taxes related to the ownership and use of motor vehicles. Taxes on other transport equipment (.e.g. planes), and related transport services (e.g. duty on charter or scheduled flights) are also included here, when they confirm to the general definition of environmental taxes" (Eurostat, 2001, page 12). The question to be raised must be if the Norwegian tax on aircraft "confirms to the general definition of environmental taxes". In establishing this area as an official statistical area we will need to be in contact with the OECD to try to come to a common list concerning the Norwegian environmental taxes.

4.3 Total environmental taxes for Norway

Table 4.1 lists the accrued values of the detailed Norwegian environmental related taxes, classified as resource taxes, pollution taxes, transport taxes and resource taxes. The values in the table are consistent with the input to the National Accounts. Taxes marked with "#" are taxes where information is available to calculate accrued values. Some of the taxes in the table still have some small values attached to them the year after they are supposed to be terminated. An example is the taxes on the beverage containers that terminated in 1999 and which still have small payments registered in 2000. This is because these taxes are not time-adjusted, and the payments registered in 2000 are related to use of charged beverage containers in 1999. These taxes have neither been allocated to different industries or final user.

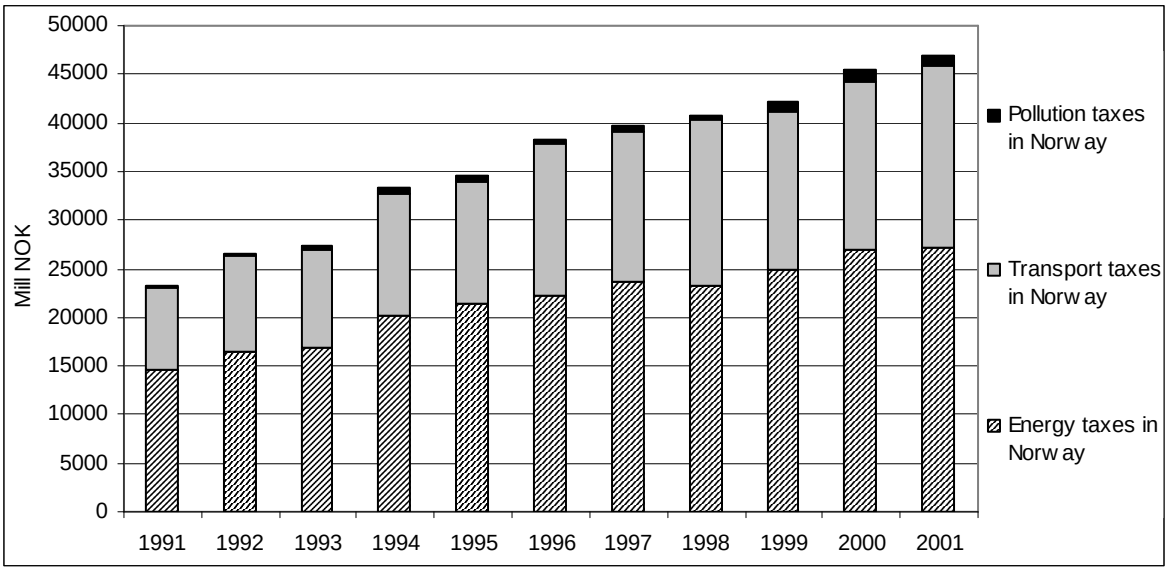
Both Table 4.1 and the following Figure 4.1 show that total Norwegian environmental taxes, in current values, have increased in the period 1991-2001. The Norwegian environmental taxes are dominated by the energy taxes, which in the period 1991-2001 have represented nearly 60 per cent of total environmental taxes. The transport taxes have in the same period represented nearly 40 per cent, while the pollution taxes have represented only 1 - 2 per cent of the total environmental taxes. As seen in Table 4.1 and Figure 4.1, the proportion of the pollution taxes of total environmental taxes increased in the late 1990s compared to the energy taxes and the transport taxes. This is due primarily to the introduction of the tax on final treatment of waste in 1999. So far no taxes have been defined as resource taxes. There are costs attached to the use of fishing and hunting rights, but these payments are considered fees and not taxes.

Table 4.1. Environmental related taxes in Norway, 1991 – 2001. Mill. NOK

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sum environmental taxes	**23189**	**26624**	**27349**	**33247**	**34469**	**38249**	**39639**	**40782**	**42272**	**45387**	**46963**
Energy taxes:	**14665**	**16424**	**16904**	**20133**	**21410**	**22199**	**23741**	**23303**	**24888**	**26935**	**27212**
CO_2-tax in the petroleum activity on the continental shelf	810	1 916	2 271	2 557	2 559	2 787	3 034	3 229	3 261	3 047	2 862
Tax on mineral products, total #	2 172	1 851	1 623	2 001	1 330	1 798	1 514	1 631	-	-	-
CO_2-tax on mineral products	-	-	-	-	-	-	-	-	3 644	3 815	3 574
Sulphur tax #	-	-	-	-	-	-	-	-	343	138	119
Basic tax on fuel oil	-	-	-	-	-	-	-	-	-	372	754
Excise on petrol #	8 345	9 122	9 126	9 581	9 935	10042	10883	11367	9 623	9 756	8 821
Auto fuel tax #	-	-	142	1 746	2 804	2 928	3 489	3 679	4 533	4 814	4 067
Tax on coal and coke	-	-	4	7	9	11	6	2	-	-	-
Tax on production of electricity #	3 338	3 535	1 132	1 286	1 519	1 533	1 471	-	-	-	-
Tax on consumption of electricity #	-	-	2 606	2 955	3 254	3 100	3 344	3 395	3 484	4 993	7 015
Pollution taxes:	**216**	**357**	**365**	**533**	**458**	**491**	**548**	**529**	**1 058**	**1 144**	**1 150**
Basic tax on non-refillable beverage containers	-	-	-	52	100	129	166	162	259	325	363
Tax on beer containers	13	19	11	91	14	13	13	11	31	3	-
Tax on wine/spirit containers	45	45	49	41	55	51	66	59	63	8	-
Tax on non-alcoholic lemonade containers	59	35	23	30	15	10	11	9	22	1	-
Tax on non-alcoholic non-fizzy lemonade containers	59	48	66	71	28	32	37	32	29	1	-
Tax on plastic beverage containers	-	-	-	-	-	-	-	-	-	15	22
Tax on metal beverage containers	-	-	-	-	-	-	-	-	-	100	102
Tax on glass beverage containers	-	-	-	-	-	-	-	-	-	48	45
Tax on paper beverage containers	-	-	-	-	-	-	-	-	-	12	15
Tax on final treatment of waste	-	-	-	-	-	-	-	-	442	483	473
Tax on artificial fertiliser	-	156	166	171	167	172	171	165	108	2	-
Tax on pesticides	-	23	22	21	19	22	21	24	35	53	35
Tax on lubricating oil	28	30	28	56	60	62	63	67	69	88	86
Tax on batteries	12	1	-	-	-	-	-	-	-	-	-
Tax on trichloroethane (TRI)	-	-	-	-	-	-	-	-	-	4	7
Tax on tetrachloroethane (PER)	-	-	-	-	-	-	-	-	-	1	2
Transport taxes:	**8308**	**9843**	**10080**	**12581**	**12601**	**15559**	**15350**	**16950**	**16326**	**17308**	**18601**
Import tax on vehicles	3 300	4 092	4 005	7 365	7 484	9 900	9 345	9 976	8 889	9 557	9 820
Tax on heavy vehicles	-	-	-	293	293	315	271	214	226	273	342
Car re-registration tax	887	892	981	1 049	1 100	1 229	1 307	1 348	1 402	1 410	1 595
Annual vehicle tax	2 240	2 731	2 978	3 134	3 225	3 403	3 688	4 247	4 442	4 636	5 348
Tax per driven km by diesel vehicles	1 745	1 968	1 966	560	2	14	4	2	8	1	-
Tax on boat motors	22	27	30	36	56	67	84	107	87	111	107
Tax on aircraft, charter #	114	133	120	21	-	-	-	-	-	-	-
Tax on aircraft, airliner #	-	-	-	123	-	-	-	-	-	-	-
Tax on aircraft #	-	-	-	-	441	631	651	1 056	1 272	1 320	1 389
Resource taxes:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: Pre-systems of the Norwegian National Systems 1991-2001
# indicates time adjusted taxes

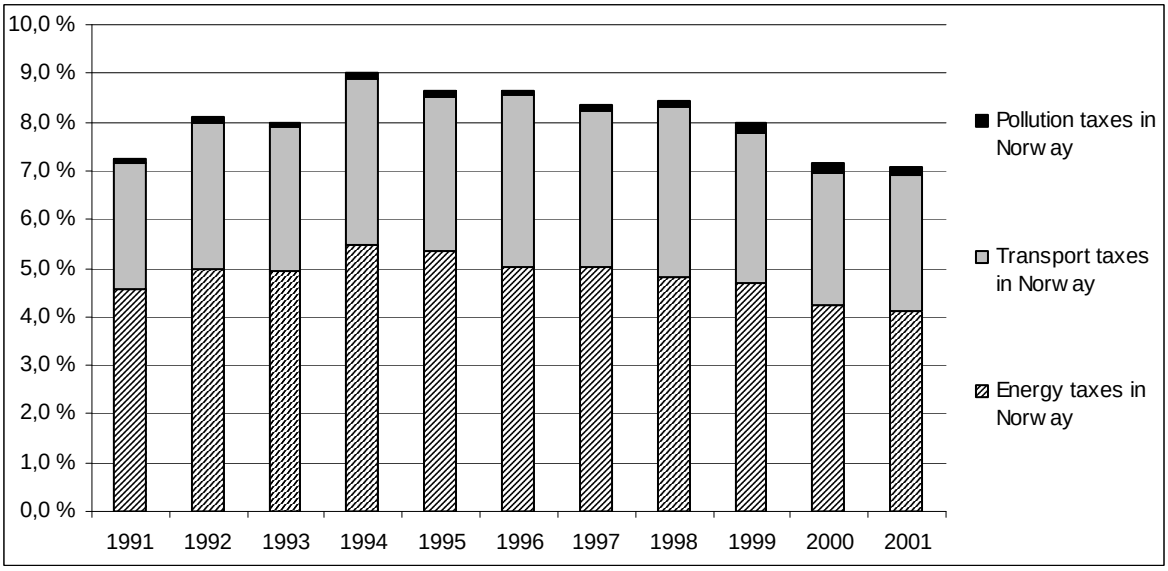
Figure 4.1. Revenues from environmental taxes, current values, 1991-2001. Mill. NOK



Resource taxes are not included in the figure since there are no Norwegian taxes defined as resource taxes.

Calculating the share of the total revenues from environmental taxes in per cent of total taxes and social contributions can be seen as indicators for the tax burden on the use of the environment. Figure 4.2 shows that for Norway as a whole, the revenue share from environmental taxes increased towards 1994, but from 1995 to 2001 the revenue share from environmental taxes has decreased slowly.

Figure 4.2. Revenues from environment taxes in per cent of total taxes and social contributions, 1991- 2001. Per cent



Resource taxes are not included in the figure since there are no Norwegian taxes defined as resource taxes.

4.4 Results according to industry breakdowns and different environmental taxes

In the previous section totals for Norway were presented. In the next section, results from the detailed breakdown of environmental taxes will be presented. The work has primarily focused on the development of a method to calculate detailed environmental taxes by industry, and little has so far been done to utilize these data in economic analyses.

Combining detailed data for energy taxes with data for energy use and emissions to air data, allows us to look at the relation between who pollutes and who pays for the pollution. The polluter pay principle expresses the idea that there should be a direct connection between the costs of pollution and benefits being made from this pollution by those who pollute. At the moment, we do not have data available to do this kind of comparisons for transport taxes and pollution taxes.

The focus of this chapter will be mainly to present and briefly comment on the different results possible to produce, while further analyses of these data will be given more emphasis in the future.

Annex 4 to 9 shows the detailed environmental related taxes by detailed industries (NACE 2-digit level).

4.4.1 Overview of the energy taxes by industries

The structure of the energy taxes in Norway changed by the end of the 1990s. In 1999 detailed taxes on energy products leading to CO_2 emissions, SO_2 emissions and use of fuel oil for heating replaced the tax on mineral products and the tax on coal and coke. The excise on petrol was, prior to 1999, partly a CO_2-tax charged on petrol. From 1999 onwards this part of the excise on petrol was eliminated and the specific CO_2-tax introduced in 1999 is also levied on petrol.

From 1999 onwards, the group of energy taxes has consisted of the CO_2-tax (incl. the CO_2-tax in the petroleum industry), the excise duties on petrol, the tax on consumption of electricity, the SO_2 tax and the basic tax on fuel oil. The first three taxes mentioned account for approximately 97 per cent of the total energy taxes, while the remaining two tax types account for approximately 3 per cent of the total energy taxes. Figure 4.3 illustrates the tax revenues according to the various types of energy taxes. The revenues from the SO_2-tax are very small compared to the revenues from some of the other taxes and it is therefore hard to see the share from the SO_2-tax in the figure. The data used in producing all the figures in this chapter are provided in annex 2 of this chapter.

Figure 4.3. Revenues from the various types of energy taxes, 2000 – 2001. Mill. NOK

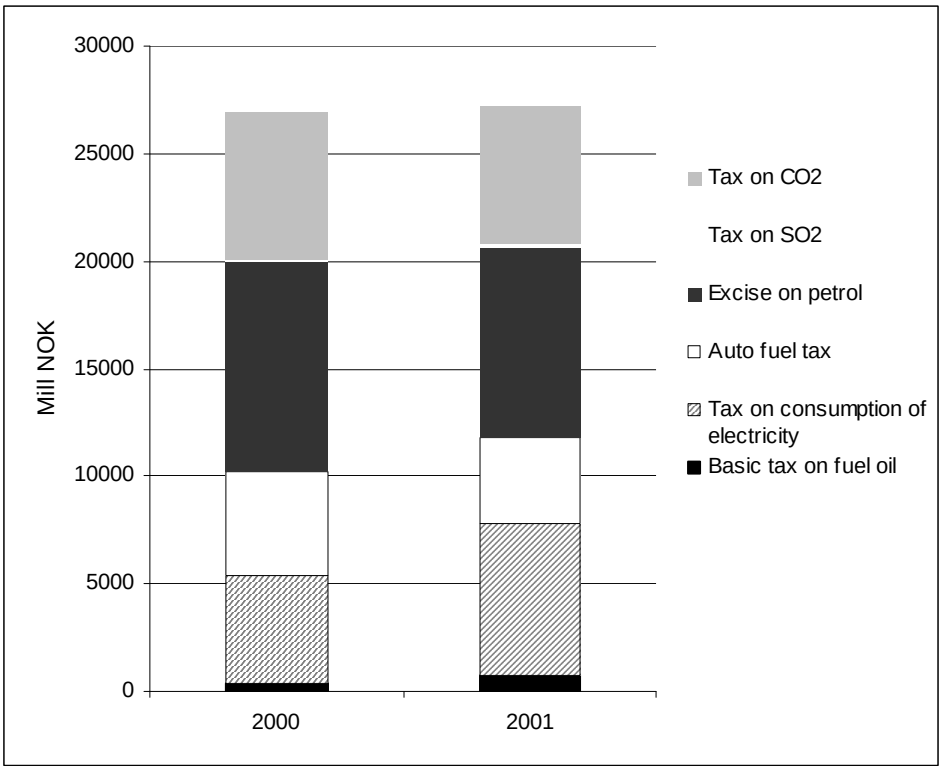


Table 4.2 shows the revenues of the different energy taxes by aggregate industries. It is the households that pay the largest part of the energy taxes. The CO_2-tax, the excise on petrol and the tax on electricity use will be analysed in more detail later in this chapter.

Table 4.2. Revenues from the different energy taxes by industries for 2000 and 2001 Mill. NOK.

	CO_2-tax		SO_2-tax		Excise on petrol		Auto fuel tax		Tax on electricity use		Basic tax on fuel oil	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Agriculture, forestry and fishing	63	57	8	4	70	51	39	11	136	269	13	12
Energy and manufacturing	3261	3212	58	54	135	136	279	245	142	251	80	194
Transport	1329	1030	37	40	414	467	3390	2808	134	169	55	73
Other industries	434	646	24	16	1251	1238	646	628	1923	2562	138	326
Households	1775	1491	12	4	7886	6930	460	375	2658	3764	87	149
Total:	6862	6436	138	119	9756	8821	4814	4067	4993	7015	372	754

4.4.2 CO_2 tax

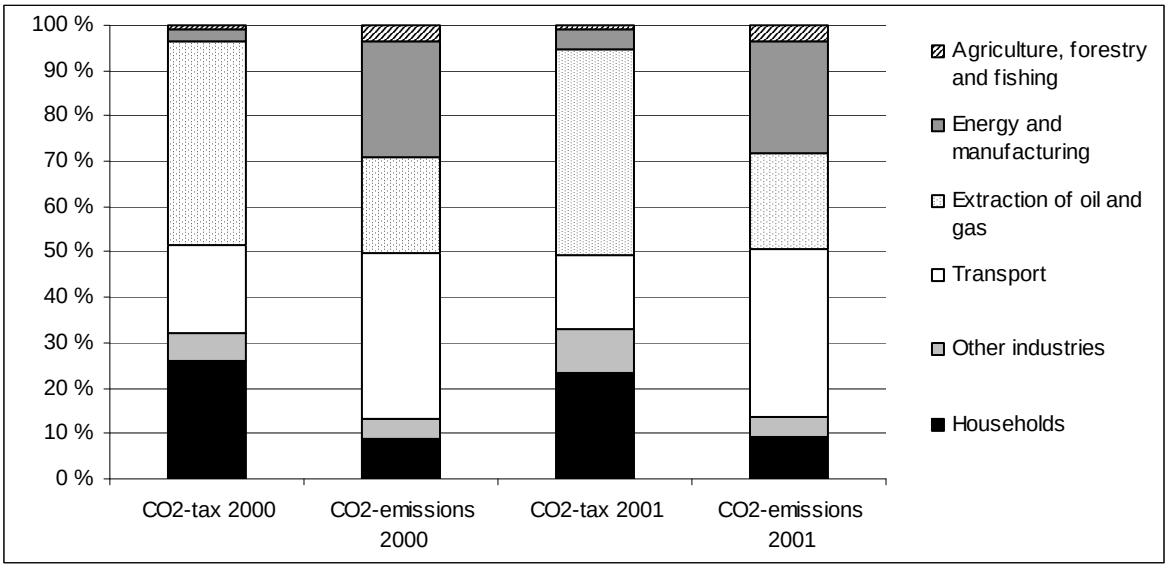
The CO_2 tax is levied on the use of mineral oil, petrol, coal and coke. In the national accounts, the taxation of mineral oils comprises the use of fuel oils, auto diesel, jet fuel, kerosene, heavy distillates and marine oil. The tax rates for mineral oils are the same for all products, but differ according to industry. The CO_2-tax on petrol is charged with a tax rate twice the amount of the one put on mineral oils. The CO_2-tax on coal and coke exempts large parts of the manufacturing industry, so that only 10 per cent of the total CO_2 emissions from the use of coal and coke are being levied with the CO_2-tax (St. prp. nr. 1 2000 -2001 (FIN) page 75).

The specified CO_2-tax on the petroleum activity on the continental shelf comprises CO_2 emissions connected to the production of petroleum and to flaring. Double taxation of the activities on the continental shelf is avoided by exempting CO_2-tax on mineral oils and petrol when these products are charged with the specified CO_2-tax on the petroleum activity.

In 2001, the revenue from the CO_2 tax was 6 436 million NOK. This includes the 2 887 million NOK paid for the CO_2 emissions by the petroleum activity on the continental shelf. The total revenues from the CO_2-tax in 2001 is lower than the revenues paid in 2000, although the total CO_2 emissions increased from 54 887 million tones in 2000 to 56 631 million tones in 2001. This might be seen as a consequence of an increase in emissions by all the major CO2-emitting industries. Both NACE 611 (Ocean transport) and NACE 279 (Aluminium production, casting of metals and other non-ferrous metal production) are among the major emitters of CO_2. Ocean transport had an increase in their CO_2 emissions by 3.2 per cent from 2000 to 2001. Aluminium etc had an increase of 3.1 per cent. Both these industries are facing extensive exemptions from paying the CO_2-tax.

Figure 4.4 shows the shares of CO_2 emissions and the shares of CO_2-tax revenues in Norway in 2000 and 2001. In 2001, 45.4 per cent of the revenues from the CO_2-taxes were allocated to the extraction of crude petroleum and gas, while this industry was responsible for 20.9 per cent of the total CO_2 emissions to air. The energy/manufacturing industries and the transport industries respectively paid 4.5 per cent and 16.0 per cent of the total CO_2 tax, while they were responsible for 24.7 per cent and 37.2 per cent of the total CO_2 emissions to air. Norwegian households paid 23.2 per cent of the total CO_2 tax, while they were only directly responsible for 9.2 per cent of the total CO_2 emissions to air. This inequality between who emits CO_2 and who pays the CO_2 tax is partly explained by the favourable CO_2-tax policy for parts of the Norwegian industry and also by the fact that ocean going vessels do not pay taxes in Norway when they purchase fuel outside of Norway. As Figure 4.4 shows, there are no major differences between the situation in 2000 as compared to 2001 at an aggregate industry level.

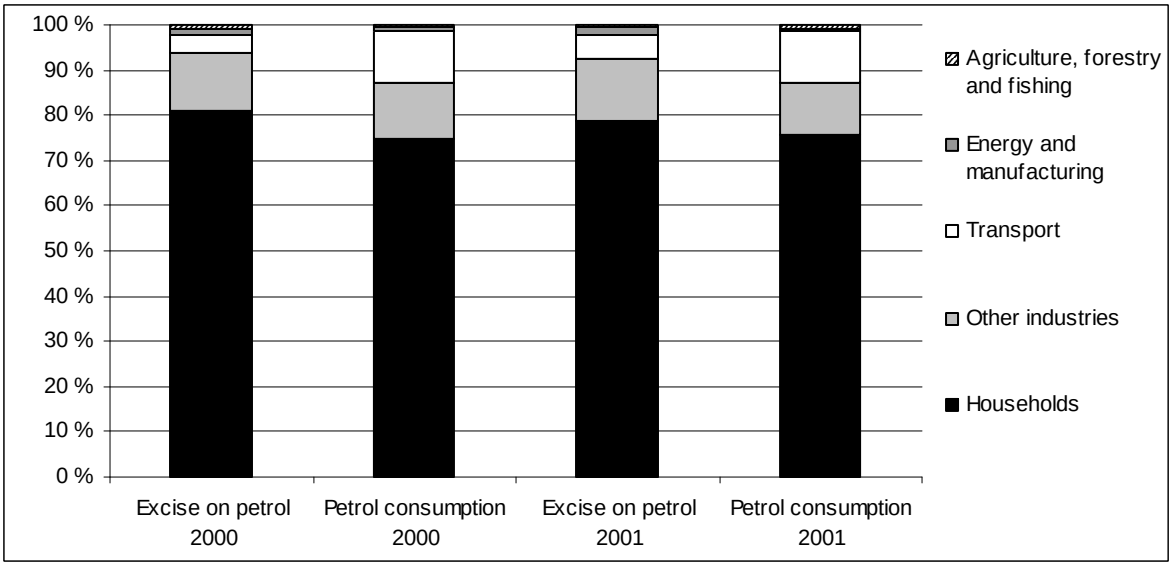
Figure 4.4. CO_2-tax revenues and CO_2-emissions by industry, 2000 and 2001. Per cent.



4.4.3 Excise duty on petrol

In 2001, 32 per cent of the total energy taxes paid was from the excise on petrol. The total revenues in current values from the excise on petrol increased annually until 1998, while from 1999 onwards it has decreased. This is due to the removal of the part of the excise covering CO_2 emissions on petrol, which since 1999 was included in the CO_2-tax. With these changes, the excise on petrol was only covering the external costs of accidents and the deterioration of roads and the environment and not CO_2 emissions. The excise on petrol has different rates according to the contents of lead in the petrol. But, nearly all petrol sold in the Norwegian market today is lead-free so this differentiation by lead content is not very relevant any longer. The real tax-rates of the excise on petrol were relatively stable until 2000, but since then they have decreased. This also explains the decreasing revenues from the excise on petrol from 1999 onwards. The total consumption of petrol has increased annually. Figure 4.5 shows the revenues from the excise on petrol by industry, compared with data showing these industries' use of petrol.

Figure 4.5. Excise duty on petrol and consumption of petrol by industry, 2000 and 2001. Per cent.



In the case of petrol, there is reasonably good correspondence between the users of the petrol and the payment of taxes. This is the case for both households and other industries in 2000 and 2001. The main exception is the transportation industry. In 2001 it was responsible for 11.3 per cent of total petrol consumption but paid only 5.3 per cent of the tax revenue. One reason for the deviation from the polluter pays principle in this case is the exemption from CO_2 tax by ocean sea transport, and the reduced CO_2 tax-rates in domestic air transport and freight transportation in inland water transport. Although the transport industry pays less than it should for the costs related to its consumption of petrol, the excise on petrol appears to be a good example of having the polluter pay.

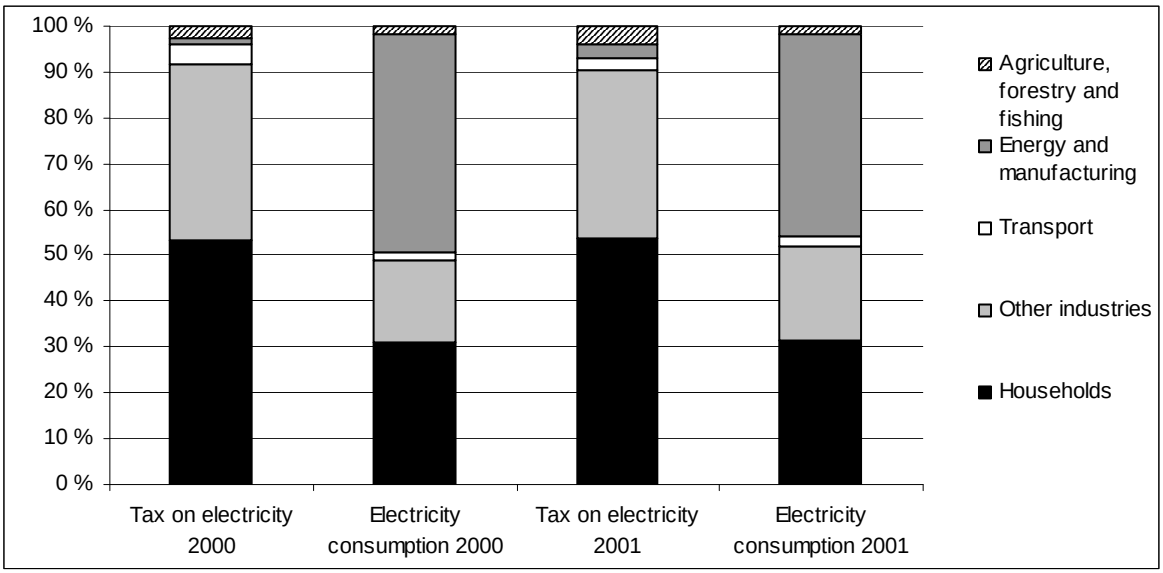
4.4.4 Tax on consumption of electricity

From 1999 onwards, the taxation of electricity only consists of a tax on the consumption of electricity. The consumers in the northern parts of Norway, as well as parts of the Norwegian industry, are exempted from paying this tax. Between 1993 and 1997, there was also a tax on the production of electricity. To include the tax on production of electricity as an environmental tax is, however, a controversial issue in Norway. Although there are no air emissions from electricity production in Norway, there are major effects on biodiversity and landscape as a result of hydroelectric power infrastructure. It can be argued that the tax on production of electricity has an element of capturing the resource rent and starting in 1998, the tax on production of electricity actually was converted into a new tax on resource rent which is why this is no longer considered an environmental tax and there are no values reported in Table 4.1 from 1998 onwards.

The revenues from the tax on electricity consumption increased 40.4 per cent from 2000 (4 993 mill NOK) to 2001 (7 015 mill NOK), while the total consumption of electricity only increased by 2.5 per cent in the same period. The increase in total revenues is due to a heavy increase in the tax rates related to the consumption of electricity in 2001.

When comparing data on the use of electricity with data covering who pays the electricity tax, it is noticeable that the tax on consumption of electricity does not follow the polluter pays principle. Figure 4.6 shows that the manufacturing industries in 2001 used 44.0 per cent of the total electricity consumption and only paid 3.0 per cent of the tax revenues. Other industries and households used 20.6 per cent and 31.3 per cent respectively of the electricity consumption, while being responsible for 36.5 per cent and 53.7 per cent of the tax burden.

Figure 4.6. Tax on consumption of electricity and consumption of electricity, 2000 and 2001. Per cent.



4.4.5 Pollution taxes by industries

The taxes on beverage containers compose the largest group of taxes within the group of pollution taxes, both in terms of different types of taxes and the revenues raised. The structure of the taxes on beverage containers changed in 2000. Through the 1990s the taxation of beverage containers was linked to the content of the containers, i.e. tax on beer containers, soft drink containers etc. From 2000 onwards, the taxation is linked to the type of material from which the container is made. The total amount of tax revenues from beverage containers in 2000 was 27.2 per cent higher than the previous year (514 mill NOK in 2000 compared to 404 mill NOK in 1999). Due to lack of comparable statistics for these two years, it is hard to state the exact reasons for this increase in revenues from taxes charged on beverage containers. However, what can be seen in the data material is that the revenue from the basic tax on non-refillable beverage containers has increased by 25.5 per cent and the revenue from the new tax on metal beverage containers is very high compared to the other taxes introduced on beverage containers.

The high level of revenue from the tax on metal beverage containers might be connected with the increase in soft drinks and beer sold in metal beverage containers. In 1997 0.9 per cent of the total sale of beer was beer in metal beverage containers. In 1999 the share had increased to 16.6 per cent, and in 2000 the share was 30.5 per cent (BROM, 2001). In addition to increased sale of metal beverage containers, the tax rate for these kinds of beverage containers have also increased.

In 1999 there was a new tax on delivering waste to landfills. This type of tax did not exist before 1999, and this is the major reason for the doubling of the total revenues from pollution taxes from 1998 to 1999.

In 2001, the total revenues from the pollution taxes were 1150 mill. NOK, which approximately was the same level as in 2000. Table 4.3 shows the revenues from the different pollution taxes by aggregate industries.

Table 4.3. Revenues of the different pollution taxes by industries. 2000 and 2001 Mill. NOK.

	Basic tax on non-refillable beverage containers		Tax on plastic beverage containers		Tax on metal beverage containers		Tax on glass beverage containers		Tax on paper beverage containers	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Agriculture, forestry and fishing	0	0	0	0	0	0	0	0	0	0
Energy and manufacturing	0	0	0	0	0	0	0	0	0	0
Transport	0	0	0	0	0	0	0	0	0	0
Other industries	39	42	0	0	19	18	7	6	0	1
Households	286	321	15	22	81	84	41	39	12	14
Total	325	363	15	22	100	102	48	45	12	15

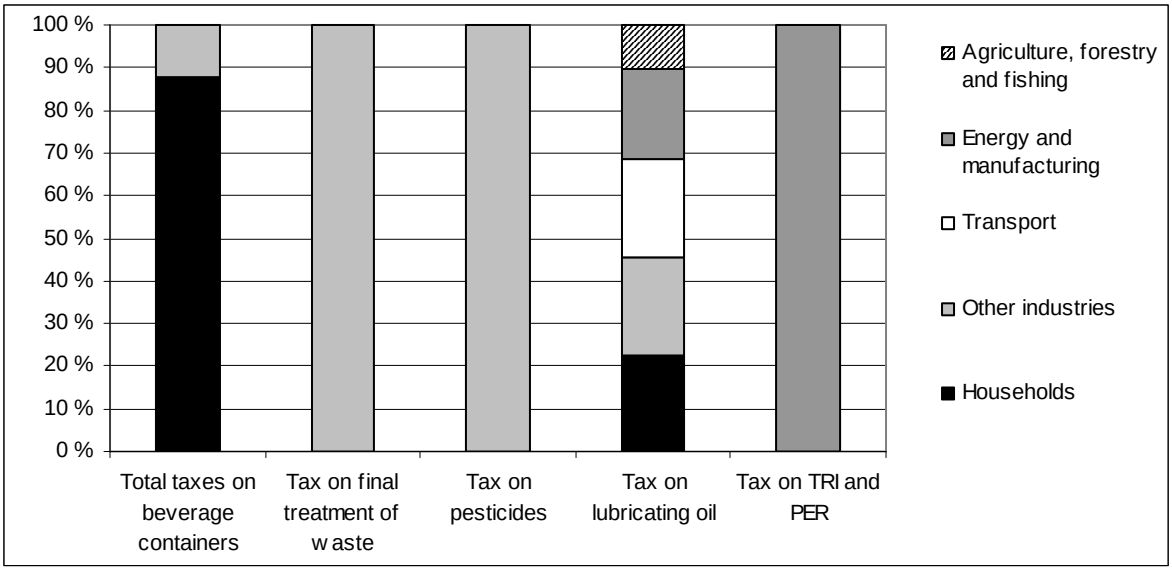
	Tax on final treatment of waste		Tax on lubricating oil		Tax on pesticides		Tax on trichloroethane (TRI)		Tax on tetrachloroethane (PER)	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Agriculture, forestry and fishing	0	0	12	9	0	0	0	0	0	0
Energy and manufacturing	0	0	13	18	0	0	4	7	1	2
Transport	0	0	31	20	0	0	0	0	0	0
Other industries	483	473	8	20	53	35	0	0	0	0
Households	0	0	24	19	0	0	0	0	0	0
Total	483	473	88	86	53	35	4	7	1	2

We do not have any comparable data on, for example, waste by industry that can be used to look at the relationships between producers of waste and those who pay the pollution taxes related to waste.

Table 4.3 and Figure 4.7 show that the major parts of the taxes on beverage containers are paid by the households. When a tax is put on a product, theoretically there are two possibilities of what can happen. The producer can keep the prices at the same level and pay the taxes from the profit, or alternatively, they can forward the increased tax burden to the consumers of the manufactured goods or services. The tax on the beverage containers appears to be an example of the latter alternative.

Some of the pollution taxes are taxes on production and are only levied on a few industries. The tax on pesticides is paid only by NACE 50 - 52 (Wholesale/retail trade, repair of motor vehicles etc) , the taxes on trichlorethane and tetrachlorethane are paid by NACE 24 (Manufacturing of chemicals and chemical products), and the tax on final treatment of waste is paid by NACE 90 (Sewage and refuse disposal, sanitation and similar activities). The taxes on trichlorethane, tetrachlorethane and the tax on final treatment of waste are actually taxes on products, but there are in the Norwegian national accounts no proper products to charge with these taxes, and they are therefore treated as taxes on production.

Figure 4.7. Pollution taxes by industry, 2001. Per cent



4.4.6 Transport taxes by industries

The transport taxes are primarily fiscal taxes and are dominated by the taxes on ownership of motor vehicles.

The structure of the import tax on motor vehicles was changed after 1996. The tax was previously calculated on the basis of weight and value, but has been changed to a system where the weight, the effect of the motor and the cylinder displacement form the basis of the calculations. As seen in Table 4.1, there was a 10.9 per cent decrease in the charges from the import tax on motor vehicles from 1998 to 1999. This reduction can be seen in connection to the decrease of 12.2 per cent in the registration of cars imported to Norway from 1998 to 1999. The noticeable decrease can probably be related to the modernisation of the stock of vehicles in 1996 and 1997, which followed after the special 1996 increase in the amount of subsidy received for cars that were delivered to an authorized wrecking facility.

The tax per driven km for diesel vehicles was officially brought to an end in 1995, but in the General Government fiscal accounts there have been registered some minor income from this tax in the years 1995 - 2000.

The tax on aircraft has been changed various times through the 1990s. With an exception of a one-year period from 1998 to 1999, the tax on aircraft has always been linked to the number of passengers transported. The tax on aircraft was only levied on charter traffic from 1991 to 1993, and in 1994 a special tax was included only on some specific inland airliner distances. From 1995 to 2000 the tax is changed to a tax levied on both international flights and most of the inland flights. There have been ongoing discussions as to whether this tax is legal under the EEA treaty and the tax ended as of April 2002.

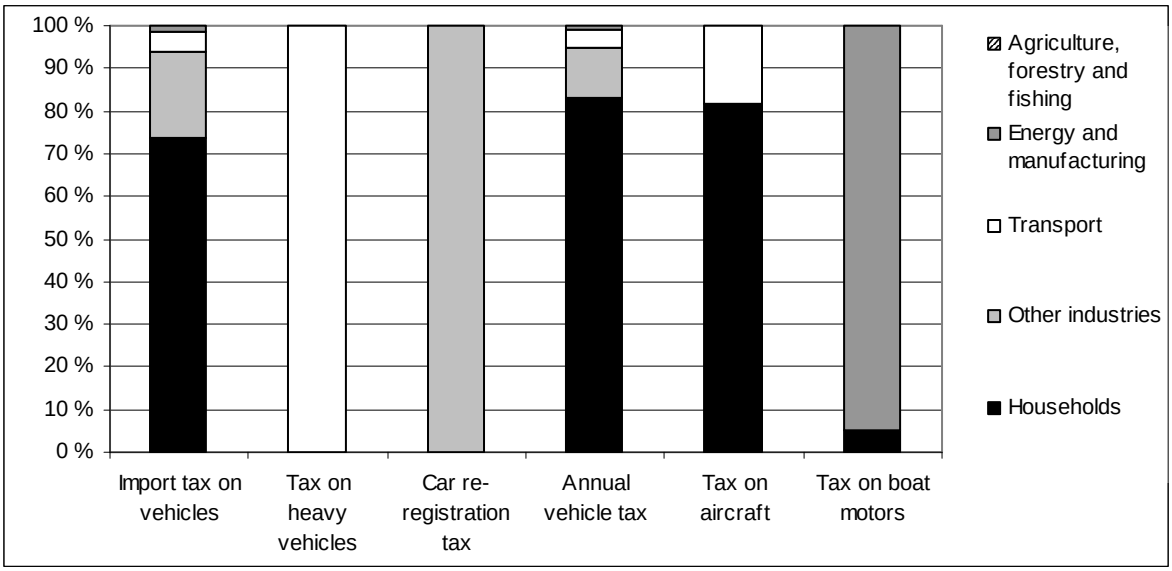
The tax on car ownership and the annual car tax are responsible for the majority of the tax revenues from the transport taxes category. The total tax revenues from the transport taxes have steadily increased annually from the beginning of the 1990s until the present time. The relatively high increase of 7.5 per cent in total transport taxes from 2000 (17 308 mill NOK) to 2001 (18 601 mill NOK) can be seen as a consequence of the increase in the total revenues from the annual car tax from 2000 to 2001. This increase in the total revenues from the annual car tax might be due to the increase of 13.1 per cent in the tax rates from 2000 – 2001 (St.prp nr. 1 2000-2001 (FIN) page 53).

Table 4.4 shows the revenues from the different transport taxes by industry. The revenues from the import tax and the annual vehicle tax are distributed among a wide range of industries, but the major share of the tax revenues from these two taxes are paid by the households. The tax on heavy vehicles is as a whole paid by NACE 602 (Other scheduled passenger land transport), while the re-registration tax is paid by NACE 50 - 52 (wholesale/retail trade, repair of vehicles etc). Figure 4.8 illustrates the values given in Table 4.4.

Table 4.4. Revenues from the different transport taxes by industries, 2000 and 2001 (mill NOK).

	Import tax on vehicles		Tax on heavy vehicles		Car re-registration tax		Annual vehicle tax		Tax on boat motors		Aircraft tax	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Agriculture, forestry and fishing	22	19	0	0	0	0	3	4	0	0	0	0
Energy and manufacturing	135	130	0	0	0	0	43	50	105	102	0	0
Transport	377	456	273	342	0	0	194	224	0	0	333	256
Other industries	1673	1984	0	0	1410	1595	545	628	0	0	1	1
Households	7349	7232	0	0	0	0	3861	4442	6	5	986	1132
Total	**9557**	**9820**	**273**	**342**	**1410**	**1595**	**4646**	**5348**	**111**	**107**	**1320**	**1389**

Figure 4.8. Transport taxes by industries, 2001. Per cent



4.5 Integrating environmental tax data into the NAMEA-framework

A proposal for the production of environmental tax revenue data by industries/final user was submitted to the NAMEA air Task Force group for its meeting of 16-17 June 2003.
The proposal includes the following suggestions on how to report environmental tax revenue data by industries/final user:

1. Application of the Eurostat/OECD/IEA classification of environmental taxes taxes. Revenues from environmental taxes should at least be collected on an aggregate level, referring to the four environmental groups (energy taxes, transport taxes, pollution taxes and resource taxes). For deeper analysis, information about individual environmental taxes is desirable. The countries are therefore invited to explore whether they can produce environmental tax data at a level of individual tax data.
→ As the result of this project, Statistics Norway is now able to report environmental tax data at a level of individual tax data in accordance to the EUROSTAT/OECD/IEA classifications.

2. Use of tax revenues according to the accrual level and to the National Account/SNA definitions of taxes.
→ The total individual environmental tax data reported by Statistics Norway will be in accordance with the Norwegian national accounts. The actual calculations of total individual taxes by industries are done outside the national account system. Although the total values that are presented equal what are published in the national accounts, there could be small differences between the shares of the individual environmental tax levied on detailed industries in the national accounts and what is levied on detailed industries in the environmental tax statistics.

3. The breakdown by industries should be on a level of industry breakdown following the NACE 2-digit level, complemented by households.
→ Statistics Norway is able to report environmental tax data at a NACE 2-digit level with some detail available at the NACE 3-digit level. In this presentation of the Norwegian environmental taxes taxes, the taxes paid by the households are added together. But, environmental taxes paid by the households can be divided into the categories of “transport”, “heating” and “other”, as suggested by the Task Force.

4. Possibilities of linking environmental tax data to physical data like emissions to air, energy use data and waste statistics.

→ Statistics Norway is able to report emissions to air data and energy use data at the same industry level as the reporting of environmental tax data. The energy use data does not equal the NAMEA definition of “only reporting energy use that cause emissions to air”

4.6 References

BROM, 2001: Norwegian Brewers and Soft Drink Producers, Annual Statistics 2001, www.brom.no

Eurostat, 2001: Environmental taxes - A statistical guide

St.prp nr. 1 2000-2001 (FIN) pages 53 and 75: The Ministry of Finance, St.prp. nr.1 (2000-2001) Skatte-, avgifts- og tollvedtak

4.7 Annexes for chapter 4

Annex 1: Environmentally relevant tax bases
The main categories of environmentally relevant tax bases that are listed here is based on the list presented in "Environmental taxes – A statistical guide" (page 10), published by Eurostat in 2001. The following tax bases included in the environmentally tax statistics framework:

Measured or estimated to air
- Measured or estimated NOx-emissions
- SO_2 content of fossil fuels
- Other measured or estimated emissions to air

Ozone depleting substances (e.g. CFC or halon)
Measured or estimated effluents to water
- Measured or estimated effluents of oxydizeable matters (BOD, COD)
- Other measured or estimated effluents to water
- Effluent collection and treatment, fixed annual taxes

Certain non-point sources of water pollution
- Pesticides (Based on e.g. chemical content, price or volume)
- Artificial fertilisers (Based e.g. on phosphorus or nitrogen content or price)
- Manure

Waste management
- Waste management in general (e.g. collection or treatment taxes)
- Waste management, individual products (e.g. packaging, beverage containers)

Noise (e.g. aircraft take-off and landing)
Energy products
- Energy products used for transport purposes
  - Unleaded petrol
  - Leaded petrol
  - Diesel
  - Other energy products for transport purposes (e.g. LPG or natural gas)
- Energy products used for stationary purposes
  - Light fuel oil
  - Heavy fuel oil
  - Natural gas
  - Coal
  - Coke
  - Biofuels
  - Other fuels for stationary use
  - Electricity consumption
  - Electricity production
  - District heat consumption
  - District heat production

Transport
- Motor vehicles, one-off import or sales taxes
- Registration or use of motor vehicles, recurrent (e.g. yearly) taxes

Resources
- Water abstraction
- Extraction of raw materials (except oil and gas)
- Other resources (e.g. forest)

The relationship between taxes and tax bases is sometimes one-to-one, but there may be several taxes on one-base. One tax can also be levied on several tax bases.

Annex 2: Data used in figures in chapter 4

Figure 4.1. Revenues from environmental taxes, current values, mill NOK, 1991-2001.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Energy taxes in Norway	14665	16424	16904	20133	21410	22199	23741	23303	24888	26935	27212
Transport taxes in Norway	8308	9843	10080	12581	12601	15559	15350	16950	16326	17308	18601
Pollution taxes in Norway	216	357	365	533	458	491	548	529	1058	1144	1150
Resource taxes in Norway	0	0	0	0	0	0	0	0	0	0	0
Total environment taxes in Norway	**23189**	**26624**	**27349**	**33247**	**34469**	**38249**	**39639**	**40782**	**42272**	**45387**	**46963**

Figure 4.2. Revenues from environmental related taxes in per cent of total taxes and social contributions, 1991- 2001. Per cent

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Energy taxes in Norway	4.6	5.0	4.9	5.5	5.4	5.0	5.0	4.8	4.7	4.2	4.1
Transport taxes in Norway	2.6	3.0	2.9	3.4	3.2	3.5	3.2	3.5	3.1	2.7	2.8
Pollution taxes in Norway	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Resource taxes in Norway	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total environment taxes in Norway	**7.2**	**8.1**	**8.0**	**9.0**	**8.6**	**8.7**	**8.4**	**8.4**	**8.0**	**7.2**	**7.1**

Figure 4.3. Revenues from the various types of energy taxes, 2000 – 2001. Mill. NOK

	2000	2001
Basic tax on fuel oil	372	754
Tax on consumption of electricity	4993	7015
Auto fuel tax	4814	4067
Excise on petrol	9756	8821
Tax on SO2	138	119
Tax on CO2	6862	6436
Total	**26935**	**27212**

Figure 4.4. CO_2-tax revenues and CO_2-emissions by industry, 2000 and 2001. Per cent.

	CO_2 -tax 2000	CO_2 -emissions 2000	CO_2 -tax 2001	CO_2 -emissions 2001
Agriculture, forestry and fishing	0.9	3.6	0.9	3.7
Energy and manufacturing	2.6	25.7	4.5	24.7
Transport	19.4	36.7	16.0	37.2
Extraction of oil and gas	44.9	20.9	45.4	20.9
Other industries	6.3	4.2	10.0	4.4
Households	25.9	8.9	23.2	9.2
Total	100.0	100.0	100.0	100.0

Figure 4.5. Excise duty on petrol and consumption of petrol by industry, 2000 and 2001. Per cent.

	Excise on petrol 2000	Petrol consumption 2000	Excise on petrol 2001	Petrol consumption 2001
Agriculture, forestry and fishing	0.7	0.6	0.6	0.7
Energy and manufacturing	1.4	0.7	1.5	0.7
Transport	4.2	11.2	5.3	11.3
Other industries	12.8	11.6	14.0	11.7
Households	80.8	72.3	78.6	75.6
Total	100.0	96.4	100.0	100.0

Figure 4.6. Tax on consumption of electricity and consumption of electricity, 2000 and 2001. Per cent.

	Tax on electricity 2000	Electricity consumption 2000	Tax on electricity 2001	Electricity consumption 2001
Agriculture. forestry and fishing	2.7	1.9	3.8	1.9
Energy and manufacturing	1.3	47.3	3.0	44.0
Transport	4.2	1.8	3.0	2.1
Other industries	38.5	18.1	36.5	20.6
Households	53.2	31.0	53.7	31.3
Total	100.0	100.0	100.0	100.0

Figure 4.7. Pollution taxes by industry, 2001. Per cent

	Total taxes on beverage containers	Tax on final treatment of waste	Tax on pesticides	Tax on lubricating oil	Tax on TRI and PER
Agriculture. forestry and fishing	0.0	0.0	0.0	10.2	0.0
Energy and manufacturing	0.1	0.0	0.0	21.0	100.0
Transport	0.0	0.0	0.0	23.0	0.0
Other industries	12.2	100.0	100.0	23.4	0.0
Households	87.7	0.0	0.0	22.3	0.0
Total	100.0	100.0	100.0	100.0	100.0

Figure 4.8. Transport taxes by industries, 2001. Per cent

	Import tax on vehicles	Tax on heavy vehicles	car re-registration tax	Annual vehicle tax	Tax on aircraft	Tax on boat motors
Agriculture. forestry and fishing	73.6	0.0	0.0	83.0	81.5	0.0
Energy and manufacturing	20.2	0.0	100.0	11.7	0.0	95.3
Transport	4.6	100.0	0.0	4.2	18.4	0.0
Other industries	1.3	0.0	0.0	0.9	0.0	0.0
Households	0.2	0.0	0.0	0.1	0.0	4.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Annex 3: NACE Classification

NACE		Text
A-B 01-05		Agriculture, hunting & forestry and fishing
A 01-02		Agriculture, hunting and forestry
01		Agriculture, hunting and related service activities
02		Forestry, logging and related service activities
B 05		Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing
C 10-14		Mining and quarrying
10		Mining of coal and lignite; extraction of peat
11		Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying
12-14		Mining of uranium, thorium, metals ores, and other mining and quarrying
12		Mining of uranium and thorium ores
13		Mining of metal ores
14		Other mining and quarrying
D 15-37		Manufacturing
15-16		Manufacture of food, beverages and tobacco products
15		Manufacture of food products and beverages
16		Manufacture of tobacco products
17-19		Manufacture of textiles, wearing apparel, tanning and leather products
17		Manufacture of textiles
18		Manufacture of wearing apparel; dressing and dyeing of fur
19		Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
20		Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
21-22		Manufacture of paper, publishing and printing
21		Manufacture of pulp, paper and paper products
22		Publishing, printing and reproduction of recorded media
23-24		Manufacture of coke, petroleum, nuclear fuel and chemical products
23		Manufacture of coke, refined petroleum products and nuclear fuel
of which	**23,1**	Manufacture of coke oven products
	23,2	Manufacture of refined petroleum products
	23,3	Processing of nuclear fuel
24		Manufacture of chemicals and chemical products
of which	**24,14**	Manufacture of other organic basic chemicals
	24,15	Manufacture of fertilisers and nitrogen compounds
25		Manufacture of rubber and plastic products
26		Manufacture of other non-metallic mineral products
of which	**26,1**	Manufacture of glass and glass products
	26,2	Manufacture of non-refractory ceramic goods other than construction purpose; manufacture of refractory ceramic
	26,3	Manufacture of ceramic tiles and flags
	26,4	Manufacture of bricks, tiles and construction products and baked clay
	26,5	Manufacture of cement, lime and plaster
	26,6	Manufacture of article of concrete, plaster and cement
	26,7	Cutting, shaping and finishing of stone
	26,8	Manufacture of other non-metallic mineral products and n.e.c.
27		Manufacture of basic metals
of which	**27.1-3**	Manufacture of basic iron and steel
	27,4	Manufacture of basic precious and non-ferrous metals
	27,5	Casting of metals
28		Manufacture of fabricated metal products, except machinery and equipment
29		Manufacture of machinery and equipment n.e.c.
30-33		Manufacture of office and electrical machinery, communication equipment, medical instruments and clocks

NACE		Text
30		Manufacture of office machinery and computers
31		Manufacture of electrical machinery and apparatus n.e.c.
32		Manufacture of radio, television and communication equipment and apparatus
33		Manufacture of medical, precision and optical instruments, watches and clocks
34-35		Manufacture of motor vehicles and other transport equipment
34		Manufacture of motor vehicles, trailers and semi-trailers
35		Manufacture of other transport equipment
36		Manufacture of furniture; manufacturing n.e.c.
37		Recycling
E 40-41		Electricity, gas and water supply
40		Electricity, gas, steam and hot water supply
of which	**40,1**	Production and distribution of electricity
	40,2	Manufacture of gas; distribution of gaseous fuels through mains
	40,3	Steam and hot water supply
41		Collection, purification and distribution of water
F 45		Construction
G 50-52		Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
H 55		Hotels and restaurants
I 60-64		Transport, storage and communication
60-63		Land and water transport, auxiliary transport and travel agencies activities
60		Land transport; transport via pipelines
of which	**60,1**	Transport via railways
	60,2	Other land transport
of which	**60,24**	Freight transport by road
	60,3	Transport via pipelines
61		Water transport
of which	**61,1**	Sea and coastal water transport
	61,2	Inland water transport
62		Air transport
63		Supporting and auxiliary transport activities; activities of travel agencies
64		Post and telecommunications
J 65-67		Financial intermediation
K-Q 70-99		Real estate, public administration, education, health and other social services activities
K 70-74		Real estate, renting and business activities
L 75		Public administration and defence; compulsory social security
of which	**75,22**	Defence activities
M 80		Education
N 85		Health and social work
O 90-93		Other community, social and personal service activities
90		Sewage and refuse disposal, sanitation and similar activities
91		Activities of membership organization n.e.c.
92		Recreational, cultural and sporting activities
93		Other service activities
P 95		Private households with employed persons
H		Private households (consumption)
Q 99		Extra-territorial organizations and bodies

Annex 4: Energy taxes by industries and final user, 2000. NAMEA-format. (Mill NOK)

		Energy taxes total	CO_2-tax in the petroleum activity on the continental shelf	CO_2 tax #	Sulphur tax #	Basic tax on fuel oil	Excise on petrol #	Auto fuel tax #	Tax on consumption of electricity #
Total sum		**26935**	**3047**	**3815**	**138**	**372**	**9756**	**4814**	**4993**
Industry classification									
A-B 01-05									
A 01-02									
01		**208**		31	6	11	34	0	125
02		**74**		12	0	1	21	39	1
B 05		**46**		20	1	0	14	0	10
C 10-14									
10		**3**		0	0	0	0	2	0
11		**3157**	3047	34	2	0	0	0	74
12-14									
12									
13		**8**		2	0	0	0	5	0
14		**74**		11	0	1	0	60	0
D 15-37									
15-16									
15		**127**		26	3	15	11	73	0
16		**2**		0	0	0	1	0	0
17-19									
17		**4**		1	0	1	1	1	0
18		**2**		0	0	0	1	0	0
19		**0**		0	0	0	0	0	0
20		**32**		5	0	1	3	22	0
21-22									
21		**29**		14	3	5	2	5	0
22		**13**		2	0	0	8	2	0
23-24									
23		**84**		41	10	20	12	0	0
of which	***23,1***								
	23,2								
	23,3								
24		**34**		13	3	9	3	7	0
of which	***24,14***								
	24,15								
25		**8**		1	0	1	1	4	0

		Energy taxes total	CO_2-tax in the petroleum activity on the continental shelf	CO_2 tax #	Sulphur tax #	Basic tax on fuel oil	Excise on petrol #	Auto fuel tax #	Tax on consumption of electricity #
26									
of which	***26,1***	**2**		0	0	0	0	1	0
	26,2	**58**		12	18	5	1	22	0
	26,3								
	26,4								
	26,5								
	26,6								
	26,7								
	26,8								
27									
of which	***27.1-3***	**12**		3	2	3	1	4	0
	27,4	**26**		8	6	7	0	5	0
	27,5								
28		**22**		3	0	2	8	9	0
29		**19**		3	0	1	5	9	0
30-33									
30		**0**		0	0	0	0	0	0
31		**6**		1	0	0	3	1	0
32		**0**		0	0	0	0	0	0
33		**2**		0	0	0	1	0	0
34-35									
34		**5**		1	0	0	1	2	0
35		**17**		6	0	1	3	7	0
36		**8**		1	0	1	2	3	0
37		**26**		4	0	0	4	17	0
E 40-41									
40									
of which	***40,1***	**154**		18	0	0	61	15	60
	40,2	**0**							
	40,3	**20**		1	8	5	0	0	7
41		**2**		1	0	0	0	0	0
F 45		**798**		121	9	5	104	526	33
G 50-52		**1288**		145	2	20	608	74	439
H 55		**144**		7	1	10	29	0	97
I 60-64									
60-63									
60		**0**							
of which	***60,1***	**59**		4	0	1	1	20	33
	60,2	**3624**		563	0	0	232	2820	10
of which	***60,24***								

		Energy taxes total	CO_2-tax in the petroleum activity on the continental shelf	CO_2 tax #	Sulphur tax #	Basic tax on fuel oil	Excise on petrol #	Auto fuel tax #	Tax on consumption of electricity #
	60,3	**0**		0	0	0	0	0	0
61									
of which	***61,1***	**0**		0					
	61,2	**46**		22	7	17	0	0	0
62		**173**		169	0	0	0	1	3
63		**1169**		534	30	36	91	454	23
64		**286**		36	0	1	89	96	64
J 65-67		**309**		28	3	40	109	4	125
K-Q 70-99									
K 70-74		**511**		59	2	29	248	24	149
L 75		**343**		34	3	6	16	0	284
of which	***75,22***								
M 80		**320**		10	1	11	39	0	258
N 85		**286**		10	1	10	26	1	238
O 90-93									
90		**42**		6	0	2	15	17	3
91		**124**		3	0	1	16	0	104
92		**154**		5	0	1	19	2	127
93		**97**		5	0	3	22	0	67
P 95									
H		**11857**		1601	12	87	7044	454	2658
Q 99									
Not allocated		**1022**		174			842	6	

# indicates time adjusted taxes

Not allocated refers to consumption by foreign households. The taxes allocated to this final user are in the presentation (figures and tables) included in the category households.

Annex 5 : Pollution taxes by industries and final user, 2000. NAMEA-format. (Mill NOK)

		Pollution taxes total	Basic tax on non-refillable beverage containers	Tax on plastic beverage containers	Tax on metal beverage containers	Tax on glass beverage containers	Tax on paper beverage containers	Tax on final treatment of waste	Tax on pesticides	Tax on lubricating oil	Tax on trichloro-ethane	Tax on tetrachloro-ethane
Total sum		**1129**	**325**	**15**	**100**	**48**	**12**	**483**	**53**	**88**	**4**	**1**
Industry classification												
A-B 01-05												
A 01-02												
01		**6**	0	0	0	0	0	0	0	6	0	0
02		**5**	0	0	0	0	0	0	0	5	0	0
B 05		**1**	0	0	0	0	0	0	0	1	0	0
C 10-14												
10		**0**	0	0	0	0	0	0	0	0	0	0
11		**0**	0	0	0	0	0	0	0	0	0	0
12-14												
12												
13		**0**	0	0	0	0	0	0	0	0	0	0
14		**2**	0	0	0	0	0	0	0	2	0	0
D 15-37												
15-16												
15		**2**	0	0	0	0	0	0	0	2	0	0
16		**0**	0	0	0	0	0	0	0	0	0	0
17-19												
17		**0**	0	0	0	0	0	0	0	0	0	0
18		**0**	0	0	0	0	0	0	0	0	0	0
19		**0**	0	0	0	0	0	0	0	0	0	0
20		**2**	0	0	0	0	0	0	0	2	0	0
21-22												
21		**0**	0	0	0	0	0	0	0	0	0	0
22		**1**	0	0	0	0	0	0	0	1	0	0
23-24												
23		**0**	0	0	0	0	0	0	0	0	0	0
of which	***23,1***											
	23,2											
	23,3											
24		**5**	0	0	0	0	0	0	0	1	4	1
of which	***24,14***											
	24,15											
25		**0**	0	0	0	0	0	0	0	0	0	0
26												

		Pollution taxes total	Basic tax on non-refillable beverage containers	Tax on plastic beverage containers	Tax on metal beverage containers	Tax on glass beverage containers	Tax on paper beverage containers	Tax on final treatment of waste	Tax on pesticides	Tax on lubricating oil	Tax on trichloro-ethane	Tax on tetrachloro-ethane
of which	*26,1*	**0**	0	0	0	0	0	0	0	0	0	0
	26,2	**1**	0	0	0	0	0	0	0	1	0	0
	26,3											
	26,4											
	26,5											
	26,6											
	26,7											
	26,8											
27												
of which	*27.1-3*	**1**	0	0	0	0	0	0	0	1	0	0
	27,4	**0**	0	0	0	0	0	0	0	0	0	0
	27,5											
28		**1**	0	0	0	0	0	0	0	1	0	0
29		**1**	0	0	0	0	0	0	0	1	0	0
30-33												
30		**0**	0	0	0	0	0	0	0	0	0	0
31		**0**	0	0	0	0	0	0	0	0	0	0
32		**0**	0	0	0	0	0	0	0	0	0	0
33		**0**	0	0	0	0	0	0	0	0	0	0
34-35												
34		**0**	0	0	0	0	0	0	0	0	0	0
35		**2**	0	0	0	0	0	0	0	2	0	0
36		**0**	0	0	0	0	0	0	0	0	0	0
37		**0**	0	0	0	0	0	0	0	0	0	0
E 40-41												
40												
of which	*40,1*	**0**	0	0	0	0	0	0	0	0	0	0
	40,2	**0**	0	0	0	0	0	0	0	0	0	0
	40,3	**0**										
41		**1**	0	0	0	0	0	0	0	1	0	0
F 45		**4**	0	0	0	0	0	0	0	4	0	0
G 50-52		**54**	0	0	0	0	0	0	53	1	0	0
H 55		**65**	39	0	19	7	0	0	0	0	0	0
I 60-64												
60-63												
60		**0**										
of which	*60,1*	**4**	0	0	0	0	0	0	0	4	0	0
	60,2	**18**	0	0	0	0	0	0	0	18	0	0
of which	*60,24*											
	60,3	**0**	0	0	0	0	0	0	0	0	0	0
61												

		Pollution taxes total	Basic tax on non-refillable beverage containers	Tax on plastic beverage containers	Tax on metal beverage containers	Tax on glass beverage containers	Tax on paper beverage containers	Tax on final treatment of waste	Tax on pesticides	Tax on lubricating oil	Tax on trichloro-ethane	Tax on tetrachloro-ethane
of which	*61,1*	**7**	0	0	0	0	0	0	0	7	0	0
	61,2	**0**	0	0	0	0	0	0	0	0	0	0
62		**0**	0	0	0	0	0	0	0	0	0	0
63		**0**	0	0	0	0	0	0	0	0	0	0
64		**1**	0	0	0	0	0	0	0	1	0	0
J 65-67		**0**	0	0	0	0	0	0	0	0	0	0
K-Q 70-99												
K 70-74		**0**	0	0	0	0	0	0	0	0	0	0
L 75		**2**	0	0	0	0	0	0	0	2	0	0
of which	*75,22*											
M 80		**0**	0	0	0	0	0	0	0	0	0	0
N 85		**0**	0	0	0	0	0	0	0	0	0	0
O 90-93												
90		**483**	0	0	0	0	0	483	0	0	0	0
91		**0**	0	0	0	0	0	0	0	0	0	0
92		**0**	0	0	0	0	0	0	0	0	0	0
93		**0**	0	0	0	0	0	0	0	0	0	0
P 95												
H		**437**	272	15	78	40	11	0	0	22	0	0
Q 99												
Not allocated		**22**	14	0	4	1	1			2		

# indicates time adjusted taxes

Not allocated refers to consumption by foreign households. The taxes allocated to this final user are in the presentation (figures and tables) included in the category households.

Annex 6 : Transport taxes by industries and final user, 2000. NAMEA-format. (Mill NOK)

		Transport taxes total	Import tax vehicles	Tax on heavy vehicles	Car re-registration tax	Annual vehicle tax	Tax on boat motors	Tax on aircrafts #
Total sum		**17307**	**9557**	**273**	**1410**	**4636**	**111**	**1320**
Industry classification								
A-B 01-05								
A 01-02								
01		**15**	11	0	0	3	0	0
02		**1**	1	0	0	0	0	0
B 05		**9**	9	0	0	0	0	0
C 10-14								
10		**2**	2	0	0	0	0	0
11		**1**	1	0	0	0	0	0
12-14								
12								
13		**0**	0	0	0	0	0	0
14		**4**	4	0	0	0	0	0
D 15-37								
15-16								
15		**58**	39	0	0	19	0	0
16		**1**	1	0	0	0	0	0
17-19								
17		**1**	1	0	0	0	0	0
18		**0**	0	0	0	0	0	0
19		**0**	0	0	0	0	0	0
20		**4**	4	0	0	0	0	0
21-22								
21		**1**	1	0	0	0	0	0
22		**10**	3	0	0	7	0	0
23-24								
23		**0**	0	0	0	0	0	0
of which	***23,1***							
	23,2							
	23,3							
24		**6**	4	0	0	2	0	0
of which	***24,14***							
	24,15							
25		**1**	1	0	0	0	0	0
26								
of which	***26,1***	**1**	1	0	0	0	0	0
	26,2	**10**	7	0	0	3	0	0
	26,3							

		Transport taxes total	Import tax vehicles	Tax on heavy vehicles	Car re-registration tax	Annual vehicle tax	Tax on boat motors	Tax on aircrafts #
	26,4							
	26,5							
	26,6							
	26,7							
	26,8							
27								
of which	***27.1-3***	**1**	1	0	0	0	0	0
	27,4	**13**	13	0	0	0	0	0
	27,5							
28		**6**	6	0	0	0	0	0
29		**16**	6	0	0	2	8	0
30-33								
30		**0**	0	0	0	0	0	0
31		**1**	1	0	0	0	0	0
32		**0**	0	0	0	0	0	0
33		**1**	1	0	0	0	0	0
34-35								
34		**0**	0	0	0	0	0	0
35		**100**	3	0	0	0	97	0
36		**3**	3	0	0	0	0	0
37		**12**	12	0	0	0	0	0
E 40-41								
40								
of which	***40,1***	**29**	19	0	0	10	0	0
	40,2	**1**	1	0	0	0	0	0
	40,3	**0**						
41		**1**	1	0	0	0	0	0
F 45		**225**	191	0	0	34	0	0
G 50-52		**2049**	374	0	1410	265	0	0
H 55		**94**	83	0	0	11	0	0
I 60-64								
60-63								
60		**0**						
of which	***60,1***	**13**	13	0	0	0	0	0
	60,2	**713**	296	270	0	147	0	0
of which	***60,24***							
	60,3	**0**	0	0	0	0	0	0
61								
of which	***61,1***	**0**	0	0	0	0	0	0
	61,2	**6**	0	0	0	0	0	6
62		**16**	16	0	0	0	0	0
63		**405**	41	3	0	34	0	327
64		**25**	12	0	0	14	0	0
J 65-67		**361**	340	0	0	21	0	0

		Transport taxes total	Import tax vehicles	Tax on heavy vehicles	Car re-registration tax	Annual vehicle tax	Tax on boat motors	Tax on aircrafts #
K-Q 70-99								
K 70-74		**682**	480	0	0	201	0	1
L 75		**48**	48	0	0	0	0	0
of which	***75,22***							
M 80		**17**	17	0	0	0	0	0
N 85		**13**	13	0	0	0	0	0
O 90-93								
90		**41**	37	0	0	3	0	0
91		**0**	0	0	0	0	0	0
92		**2**	2	0	0	0	0	0
93		**97**	87	0	0	10	0	0
P 95								
H		**12127**	7349	0	0	3851	6	920
Q 99								
Not allocated		**66**						66

# indicates time adjusted taxes

Not allocated refers to consumption by foreign households. The taxes allocated to this final user are in the presentation (figures and tables) included in the category households.

Annex 7 : Energy taxes by industries and final user, 2001. NAMEA-format. (Mill NOK)

		Energy taxes total	CO_2 tax in the petroleum activity on the continental shelf	CO_2 tax on mineral products #	Sulphur tax #	Basic tax on fuel oil	Excise on petrol #	Auto fuel tax #	Tax on consumption of electricity #
Total sum		**27212**	**2862**	**3574**	**119**	**754**	**8821**	**4067**	**7015**
Industry classification									
A-B 01-05									
A 01-02									
01		**347**		48	3	12	30	0	254
02		**25**		4	0	0	8	11	2
B 05		**33**		5	2	0	13	0	13
C 10-14									
10		**9**		3	0	3	0	4	0
11		**3021**	2862	58	21	37	0	2	41
12-14									
12									
13		**4**		1	0	1	0	1	0
14		**59**		12	0	2	1	44	0
D 15-37									
15-16									
15		**122**		32	3	18	9	61	0
16		**2**		0	0	0	1	0	0
17-19									
17		**4**		1	0	1	1	1	0
18		**1**		0	0	0	1	0	0
19		**0**		0	0	0	0	0	0
20		**33**		7	0	2	3	22	0
21-22									
21		**21**		8	4	4	2	4	0
22		**31**		11	1	13	6	1	0
23-24									
23		**130**		52	17	52	9	0	0
of which	***23,1***								
	23,2								
	23,3								
24		**35**		13	2	11	2	7	0
of which	***24,14***								
	24,15								
25		**9**		3	0	3	0	3	0

		Energy taxes total	CO_2 tax in the petroleum activity on the continental shelf	CO_2 tax on mineral products #	Sulphur tax #	Basic tax on fuel oil	Excise on petrol #	Auto fuel tax #	Tax on consumption of electricity #
26									
of which	***26,1***	**19**		17	0	0	1	1	0
	26,2	**85**		54	2	7	0	22	0
	26,3								
	26,4								
	26,5								
	26,6								
	26,7								
	26,8								
27									
of which	***27.1-3***	**13**		4	0	5	1	3	0
	27,4	**28**		13	1	8	0	5	0
	27,5								
28		**19**		4	0	3	4	7	0
29		**21**		5	0	3	5	8	0
30-33									
30		**0**		0	0	0	0	0	0
31		**3**		1	0	0	1	1	0
32		**1**		0	0	0	1	0	0
33		**6**		2	0	2	1	1	0
34-35									
34		**0**		0	0	0	0	0	0
35		**17**		5	0	2	3	6	0
36		**11**		3	0	2	3	3	0
37		**15**		3	0	0	3	10	0
E 40-41									
40									
of which	***40,1***	**309**		20	0	1	77	24	188
	40,2	**0**							
	40,3	**17**		12	0	5	0	0	0
41		**45**		7	0	8	4	4	22
F 45		**704**		130	0	11	89	422	52
G 50-52		**1530**		158	3	57	512	88	713
H 55		**236**		27	1	30	28	0	149
I 60-64									
60-63									
60		**0**							
of which	***60,1***	**72**		3	0	1	1	11	56
	60,2	**3038**		539	0	0	194	2292	13
of which	***60,24***								

		Energy taxes total	CO_2 tax in the petroleum activity on the continental shelf	CO_2 tax on mineral products #	Sulphur tax #	Basic tax on fuel oil	Excise on petrol #	Auto fuel tax #	Tax on consumption of electricity #
	60,3	**3**		0	0	0	0	3	0
61									
of which	***61,1***	**0**		0	0	0	0	0	0
	61,2	**139**		111	18	10	0	0	0
62		**37**		30	0	0	0	1	6
63		**911**		292	23	60	83	421	33
64		**386**		54	0	2	189	80	61
J 65-67		**198**		22	1	15	61	0	99
K-Q 70-99									
K 70-74		**769**		140	5	129	226	23	246
L 75		**449**		48	2	6	52	24	318
of which	***75,22***								
M 80		**419**		23	1	23	35	0	337
N 85		**587**		71	1	36	162	66	250
O 90-93									
90		**129**		11	0	8	27	4	79
91		**130**		3	0	0	14	0	113
92		**136**		6	0	5	13	1	110
93		**129**		8	0	6	19	0	96
P 95									
H		**11910**		1366	4	149	6257	371	3764
Q 99									
Not allocated		**802**		125			673	4	

# indicates time adjusted taxes

Not allocated refers to consumption by foreign households. The taxes allocated to this final user are in the presentation (figures and tables) included in the category households.

Annex 8 : Pollution taxes by industries and final user, 2001. NAMEA-format. (Mill NOK)

		Pollution taxes total	Basic tax on non-refillable beverage containers	Tax on plastic beverage containers	Tax on metal beverage containers	Tax on glass beverage containers	Tax on paper beverage containers	Tax on final treatment of waste	Tax on pesticides	Tax on lubricating oil	Tax on trichloro-ethane	Tax on tetrachloro-ethane
Total sum		**1150**	**363**	**22**	**102**	**45**	**15**	**473**	**35**	**86**	**7**	**2**
Industry classification												
A-B 01-05												
A 01-02												
01		**5**	0	0	0	0	0	0	0	5	0	0
02		**3**	0	0	0	0	0	0	0	3	0	0
B 05		**1**	0	0	0	0	0	0	0	1	0	0
C 10-14												
10		**0**	0	0	0	0	0	0	0	0	0	0
11		**0**	0	0	0	0	0	0	0	0	0	0
12-14												
12												
13		**0**	0	0	0	0	0	0	0	0	0	0
14		**1**	0	0	0	0	0	0	0	1	0	0
D 15-37												
15-16												
15		**2**	0	0	0	0	0	0	0	1	0	0
16		**0**	0	0	0	0	0	0	0	0	0	0
17-19												
17		**0**	0	0	0	0	0	0	0	0	0	0
18		**0**	0	0	0	0	0	0	0	0	0	0
19		**0**	0	0	0	0	0	0	0	0	0	0
20		**1**	0	0	0	0	0	0	0	1	0	0
21-22												
21		**0**	0	0	0	0	0	0	0	0	0	0
22		**8**	0	0	0	0	0	0	0	8	0	0
23-24												
23		**0**	0	0	0	0	0	0	0	0	0	0
of which	***23,1***											
	23,2											
	23,3											
24		**9**	0	0	0	0	0	0	0	0	7	2
of which	***24,14***											
	24,15											
25		**0**	0	0	0	0	0	0	0	0	0	0
26												

		Pollution taxes total	Basic tax on non-refillable beverage containers	Tax on plastic beverage containers	Tax on metal beverage containers	Tax on glass beverage containers	Tax on paper beverage containers	Tax on final treatment of waste	Tax on pesticides	Tax on lubricating oil	Tax on trichloro-ethane	Tax on tetrachloro-ethane
of which	*26,1*	**0**	0	0	0	0	0	0	0	0	0	0
	26,2	**0**	0	0	0	0	0	0	0	0	0	0
	26,3											
	26,4											
	26,5											
	26,6											
	26,7											
	26,8											
27												
of which	*27.1-3*	**0**	0	0	0	0	0	0	0	0	0	0
	27,4	**0**	0	0	0	0	0	0	0	0	0	0
	27,5											
28		**0**	0	0	0	0	0	0	0	0	0	0
29		**1**	0	0	0	0	0	0	0	1	0	0
30-33												
30		**0**	0	0	0	0	0	0	0	0	0	0
31		**0**	0	0	0	0	0	0	0	0	0	0
32		**0**	0	0	0	0	0	0	0	0	0	0
33		**0**	0	0	0	0	0	0	0	0	0	0
34-35												
34		**0**	0	0	0	0	0	0	0	0	0	0
35		**2**	0	0	0	0	0	0	0	2	0	0
36		**0**	0	0	0	0	0	0	0	0	0	0
37		**0**	0	0	0	0	0	0	0	0	0	0
E 40-41												
40												
of which	*40,1*	**0**	0	0	0	0	0	0	0	0	0	0
	40,2	**0**	0	0	0	0	0	0	0	0	0	0
	40,3	**0**										
41		**0**	0	0	0	0	0	0	0	0	0	0
F 45		**2**	0	0	0	0	0	0	0	2	0	0
G 50-52		**36**	0	0	0	0	0	0	35	1	0	0
H 55		**67**	42	0	18	6	1	0	0	0	0	0
I 60-64												
60-63												
60		**0**										
of which	*60,1*	**2**	0	0	0	0	0	0	0	2	0	0
	60,2	**11**	0	0	0	0	0	0	0	11	0	0
of which	*60,24*											
	60,3	**0**	0	0	0	0	0	0	0	0	0	0
61												

		Pollution taxes total	Basic tax on non-refillable beverage containers	Tax on plastic beverage containers	Tax on metal beverage containers	Tax on glass beverage containers	Tax on paper beverage containers	Tax on final treatment of waste	Tax on pesticides	Tax on lubricating oil	Tax on trichloro-ethane	Tax on tetrachloro-ethane
of which	*61,1*	**6**	0	0	0	0	0	0	0	6	0	0
	61,2	**0**	0	0	0	0	0	0	0	0	0	0
62		**0**	0	0	0	0	0	0	0	0	0	0
63		**0**	0	0	0	0	0	0	0	0	0	0
64		**1**	0	0	0	0	0	0	0	1	0	0
J 65-67		**0**	0	0	0	0	0	0	0	0	0	0
K-Q 70-99												
K 70-74		**0**	0	0	0	0	0	0	0	0	0	0
L 75		**3**	0	0	0	0	0	0	0	3	0	0
of which	*75,22*											
M 80		**0**	0	0	0	0	0	0	0	0	0	0
N 85		**1**	0	0	0	0	0	0	0	1	0	0
O 90-93												
90		**473**	0	0	0	0	0	473	0	0	0	0
91		**0**	0	0	0	0	0	0	0	0	0	0
92		**13**	0	0	0	0	0	0	0	13	0	0
93		**0**	0	0	0	0	0	0	0	0	0	0
P 95												
H		**476**	306	21	80	38	14	0	0	18	0	0
Q 99												
Not allocated		**22**	15	1	4	1	1			1		

# indicates time adjusted taxes

Not allocated refers to consumption by foreign households. The taxes allocated to this final user are in the presentation (figures and tables) included in the category households.

Annex 9 : Transport taxes by industries and final user, 2001. NAMEA-format. (Mill NOK)

		Transport taxes total	Import tax vehicles	Tax on heavy vehicles	Car re-registration tax	Annual vehicle tax	Tax on boat motors	Tax on aircrafts #
Total sum		**18601**	**9820**	**342**	**1595**	**5348**	**107**	**1389**
Industry classification								
A-B 01-05								
A 01-02								
01		**13**	10	0	0	4	0	0
02		**1**	1	0	0	0	0	0
B 05		**9**	9	0	0	0	0	0
C 10-14								
10		**0**	0	0	0	0	0	0
11		**1**	1	0	0	0	0	0
12-14								
12								
13		**0**	0	0	0	0	0	0
14		**3**	3	0	0	0	0	0
D 15-37								
15-16								
15		**56**	34	0	0	22	0	0
16		**1**	1	0	0	0	0	0
17-19								
17		**1**	1	0	0	0	0	0
18		**0**	0	0	0	0	0	0
19		**0**	0	0	0	0	0	0
20		**5**	5	0	0	0	0	0
21-22								
21		**2**	2	0	0	0	0	0
22		**12**	4	0	0	8	0	0
23-24								
23		**0**	0	0	0	0	0	0
of which	***23,1***							
	23,2							
	23,3							
24		**5**	3	0	0	2	0	0
of which	***24,14***							
	24,15							
25		**2**	2	0	0	0	0	0
26								
of which	***26,1***	**1**	1	0	0	0	0	0
	26,2	**16**	12	0	0	4	0	0
	26,3							

		Transport taxes total	Import tax vehicles	Tax on heavy vehicles	Car re-registration tax	Annual vehicle tax	Tax on boat motors	Tax on aircrafts #
	26,4							
	26,5							
	26,6							
	26,7							
	26,8							
27								
of which	***27.1-3***	**2**	2	0	0	0	0	0
	27,4	**7**	7	0	0	0	0	0
	27,5							
28		**5**	5	0	0	0	0	0
29		**17**	6	0	0	2	9	0
30-33								
30		**0**	0	0	0	0	0	0
31		**1**	1	0	0	0	0	0
32		**0**	0	0	0	0	0	0
33		**1**	1	0	0	0	0	0
34-35								
34		**0**	0	0	0	0	0	0
35		**93**	0	0	0	0	93	0
36		**3**	3	0	0	0	0	0
37		**13**	13	0	0	0	0	0
E 40-41								
40								
of which	***40,1***	**34**	22	0	0	12	0	0
	40,2	**1**	1	0	0	0	0	0
	40,3	**0**						
41		**1**	1	0	0	0	0	0
F 45		**143**	104	0	0	39	0	0
G 50-52		**2588**	688	0	1595	305	0	0
H 55		**76**	63	0	0	13	0	0
I 60-64								
60-63								
60		**0**						
of which	***60,1***	**19**	19	0	0	0	0	0
	60,2	**702**	194	339	0	169	0	0
of which	***60,24***							
	60,3	**0**	0	0	0	0	0	0
61								
of which	***61,1***	**163**	163	0	0	0	0	0
	61,2	**6**	0	0	0	0	0	6
62		**16**	16	0	0	0	0	0
63		**320**	27	3	0	39	0	250
64		**53**	37	0	0	16	0	0
J 65-67		**180**	126	0	0	54	0	0

		Transport taxes total	Import tax vehicles	Tax on heavy vehicles	Car re-registration tax	Annual vehicle tax	Tax on boat motors	Tax on aircrafts #
K-Q 70-99								
K 70-74		**422**	220	0	0	202	0	1
L 75		**630**	630	0	0	0	0	0
of which	***75,22***							
M 80		**17**	17	0	0	0	0	0
N 85		**14**	14	0	0	0	0	0
O 90-93								
90		**38**	34	0	0	4	0	0
91		**0**	0	0	0	0	0	0
92		**2**	2	0	0	0	0	0
93		**98**	87	0	0	11	0	0
P 95								
H		**12738**	7232	0	0	4442	5	1060
Q 99								
Not allocated		**72**						72

# indicates time adjusted taxes

Not allocated refers to consumption by foreign households. The taxes allocated to this final user are in the presentation (figures and tables) included in the category households.

5 Work related to "Environmental expenditure accounts" for Joint Questionnaire (JQ) reporting in 2004

5.1 Presentation of recent improvements to the environmental protection expenditure data in Norway

Major improvements to a number of different statistical systems (municipal and county accounts, NACE rev.1.1, manufacturing industry statistics, R&D statistics), as well as improvements in the analysis of central government budgets, have enabled us to develop a system to provide a more complete reporting to the Environmental Protection Expenditure and Revenues (EPER) JQ. We can now report completely for table 1 (public sector) and for expenditure I in table 2C, as well as more data to the other tables than earlier.

The improvements that provide better environmental protection expenditure data in Norway are described in the following sub-chapters.

5.1.1 KOSTRA

Local government sector
Since 2002 all municipalities in Norway have reported their financial accounts according to new definitions and through a new electronic reporting system. The new accounts definitions correspond quite well with the environmental domains of CEPA (Classification of Environmental Protection Activities).

In our earlier work related to reporting to the joint questionnaire, we defined the different economic variables necessary for reporting to the JQ (joint questionnaire), and made trial calculations for these for the environmental domains "wastewater" and "waste". We have now developed this calculation methodology even further and included most of the environmental expenditures that can be identified using the municipal accounts. There are separate categories in the municipal accounts for "physical planning" (function 300), "recreation in urban areas" (function 335) and "administration of nature and outdoor recreation" (function 360), and in the county accounts for "local and regional planning" (function 715) and "environment and recreation" (function 716).

All these accounts have been included in the calculations of EPE for the trial completion of JQ2004. "Administration of nature and outdoor recreation" was categorized under the environmental domain "Biodiversity and landscape" and the rest under "other". Only 50 per cent of the expenditures and incomes of functions 300 and 335 were included, because these functions are quite broad, and include quite a lot of non-environmental activities (such as maps and map registers, and maintenance of public toilets). Functions 715 and 716 have been handled the same way, only 50 per cent of the expenditures and incomes are included as EPE.

There might still be some environmental expenditure in the municipal accounts that we have not been able to identify. Costs related to the collection and treatment of industrial waste is found in the accounts under function 320 together with other forms of Public non-financial corporations of local government. We have not done any further work to identify how large the waste-part of this function could be, so at this point we do not know if we are excluding important figures here. We guess however, that these figures are of minor importance, since most of this activity probably is carried out by the public specialised producers.

There are also functions (334: "Municipal roads, environment and security measures"/721: "County roads, environment and security measures") both in the municipal and the county accounts that include

expenditure for noise reduction. We have not identified the size of the environmental expenditure of these totals either, but we guess they are quite insignificant, at least in the municipal accounts since these accounts primarily cover costs related to the maintenance of local roads. Local roads generally speaking do not have measures for noise reduction. The larger roads are the ones that have noise reduction measures. Investments for those roads are the responsibility of both the county administrative level and the Ministry of Transportation. In excluding function 721 (county level), we therefore might miss some important investment in noise reduction. This will need to be investigated in the future.

The definitions of the economic variables had to be slightly modified for calculation of these environmental domains, in comparison with the waste and wastewater domains, because the types of income are different from waste and wastewater, and therefore are entered into the accounts differently. For waste and wastewater the main income is from fees collected however, for these other types of environmental domains the income is not primarily fee-based. Where there is fee income, this fee is considered of a different type and is therefore entered into the accounts differently.

Public specialised producers

In cooperation with the Division for Public Finances the current population coverage of the public specialised producers was made. Most of the public specialised producers are required to report their accounts through the KOSTRA system. Depending on the judicial form of organisation, some enterprises should have started this reporting already for the year 2001 and some shall start for the year 2004. The publicly owned liability corporations however, are not required to report according to the KOSTRA accounting regime.

As more and more services, that were traditionally carried out by the municipalities, have been outsourced to private and semi-private and semi-public enterprises, an evaluation of the exhaustiveness of the current reporting requirements and systems was necessary in order to figure out if our statistics were describing enough of this population.

The waste sector was used specifically as an example. The results show that our previous assumptions regarding the reporting through the KOSTRA system, especially for this sector, are not very good. We had assumed that most of the entities that we needed to cover would be already reporting to this new KOSTRA system. Table 5.1 shows the discrepancies in the current reporting situation. Only in 63 out of 434 municipalities are the main household waste service defined as public sector, according to the JQ definitions. The rest of the municipalities waste activities should have been reported as public specialised producers (table 4A), but the data are currently not available (not yet reported).

Table 5.1. Population coverage of main waste sector establishments and enterprises in charge of municipalities' household waste, 2002.

Sector	**Entity** (number of municipalities)	**Financial reporting via KOSTRA**
Public sector (municipal sector)	Municipal entity / establishments (63)	Municipal financial accounts reported via the KOSTRA system
	Inter-municipal co-operation with financial accounts included in the host municipality's financial accounts (0)	
	Inter-municipal co-operation with separate financial accounts (58)	The separate financial accounts should be reported through KOSTRA (but in practice they are rarely so)
	Municipal enterprises (4)	
	Inter-municipal corporations (144)	
	Publicly owned limited liability corporations (74)	Not included in the financial reporting requirements to the municipal KOSTRA system.
	Publicly owned foundations etc. (92)	
Private sector	Private limited liability corporations, group, foundation etc. (0)	

These results show that there is a need to focus more on these semi-public enterprises in order to increase their reporting levels to the municipal reporting systems. Currently the number of the reporting entities compared with the total population of units is rather low. In fact it is much slower than we had originally assumed. The Division for Public Finance's statistics has the responsibility for including the semi-public enterprises into the municipal reporting systems. We will therefore have to work in close cooperation with this division in order to increase the coverage of the population in order to improve statistics for the local government environmental protection expenditure. Plans are currently being made for increasing the reporting from these enterprises. Unfortunately this will take another year or two before we will see significant results and improvements that can improve the quality of our statistics.

This evaluation has focused the attention of the management in Statistics Norway on this problem of increased privatisation and increased semi-public establishments in the development of statistics of various types that are based on the municipal reporting systems. By showing how important these entities are with respect to environmental statistics we have shown that this is also an increasing problem that will need to be dealt with on a broader basis with another types of statistics as well. A separate report in Norwegian has been produced after this evaluation (Bjørkli, E. et al. (forthcoming)).

Before the reporting law changed with regard to the reporting of data from the municipalities, there was a separate statistical reporting system for the municipal wastewater sector. This separate reporting made it much easier to develop statistics for reporting to the JQ for wastewater since we did not have to integrate data from so many different data sources. On the other hand, we could not split the data into public sector and public specialised producer income and expenditure. Currently we only have reporting for a very narrowly defined municipal sector from the KOSTRA municipal accounts reporting system. According to the definitions for reporting to tables 1 and 4 we have decided that the information we currently receive through the KOSTRA system fits well the definitions for reporting to Table 1 and the public specialised producers are those that are not reporting to the KOSTRA system yet.

5.1.2 Implementation of NACE Rev 1.1

Another reporting channel that needs to be included in the reporting to the EPER-JQ is the business register. The implementation of NACE rev. 1.1 has been completed for NACE 90. It is now possible to identify establishments and enterprises as belonging to 90.010 or 90.020 or 90.030, which was not possible before 2002. This now provides us with a better overview of the total population of units that we need to be covering. Unfortunately it provides only a limited amount of information.

It is a bit of a puzzle to figure out exactly which data source we can use in order to be sure to cover the whole population of units. Some entities will be reporting data through the municipal reporting systems and for the other units our data source will be the business register. Exactly how we will be able to use these two different data sources is not yet clear due to the lack of reporting in the municipal system (see previous section) and the only limited statistics available for NACE 90. Currently only turnover and employment are available for NACE 90. We are hoping that NACE 90 will be included in the structural business statistics regulation so that the full structural business statistics will become available for this industry. Only when this data is available will we be able to go further with the reporting to the joint questionnaire. Currently this means that we can only report receipts (closest definition to turnover in the JQ) from NACE 90 for filling out table 4.

5.1.3 Central government EPE

Last year we developed a methodology for a budget analysis to be able to calculate the environmental expenditures for the central government sector. We found that the COFOG coding, as it has been implemented until now, did not function very well for our use since only the Ministry of Environment had been included in the environmental COFOG codes. However, our parallel coding in this project might improve the COFOG coding so that in the future COFOG reporting to Eurostat will be more consistent with our reporting to the JQ.

In 2001 we calculated the total environmental expenditures for each ministry. In this way we could compare our EPE figures with the figures that the ministries themselves have reported (budget figures) to the Ministry of Environment. We hoped in this way to be able to start a discussion with those responsible for these figures in each ministry as a kind of quality check of our methodology. For some ministries the differences were quite large. However, we found that there was not a big interest in discussing why and how the CEPA-definitions on environment give other figures then the environmental domains used by the Norwegian central government. In this regard the contact with the ministries was not as efficient or fruitful as it was hoped to be regarding strengthening our methodology work.

In our previous work, we did not have time to do much research before deciding on a percentage for the expenditure items that we evaluated as to cover only partly environmental expenditure. We therefore had to go through this more thoroughly this year. We had again hoped to get some more information from the contact with the ministries, but they do not have such detailed numbers readily accessible. We were able to improve the percentages slightly, but there is still work to be carried out in this field. The major question, however, is how much work we need to put into this process in order to obtain markedly better results. At this point we could easily be in a situation that a great deal of work will be needed to simply obtain marginal improvements.

The figures produced this year are produced in such a way as to be consistent with the national accounts statistics. As shown in table 5.3, the EPE of the government sector in 2001 amounted to NOK 3 678 million, which equals 0.5 per cent of the Central government's total expenses.

Environment protection expenditures amounted to 1.2 per cent of Central government final consumption. However, there is a problem in calculating this percentage, since the consumption of fixed capital is included in the total of Central government's final consumption, while the EPE part of this cost has not been identified. Using JQ-terminology instead, EPE internal current expenditure of the government sector equalled 1.4 per cent of Central government's total internal current expenditure.

The data are taken from the printed Government account, with extra details as reported to Statistics Norway. These printed accounts include summary information on public financial and non-financial corporations that are completely owned by central government. The data for these public corporations are not included here since they do not belong to the general government sector.

There is only summary information available for some institutions that do belong to the central government sector. In these cases, usually only a transfer covering the costs of the institutions are entered into the accounts reported for central government. For such institutions, Statistics Norway collects supplementary accounting data. There are also separate accounts for general government activities in Svalbard, which are then referred to in a summary way in the main published accounts. We have generally not considered these supplementary detailed accounts. This decision was taken after having studied closely which institutions that are covered in this way. The only relevant institutions are research institutes, including the universities, and the Research council. These institutions deserve a more detailed follow-up in the future. For the JQ tables, the summary data proves to be sufficient. Transfers to support the research programmes for the Research council are grouped as subsidies, as this is the way such expenditures or the council are treated in the National Accounts. Transfer items that are meant to support the activities of these institutions, including the transfer for the general budget covering Research council operations are included in "government final consumption that can not be distributed by type", of which an appropriate percentage is classified as environmental protection expenditures.

In the work, we discovered an inconsistency in the National Accounts and the statistics for Government accounts in the case of some research institutes that are specialised in environmental research. In the present table part of their relevant activity is included in government consumption, but the general transfer of research funds are coded as subsidies, implying that the these institutes belong

to the public non-financial corporations sector. So far, it seems that these institutes are general government institutions, but this conclusion is not yet finally established. In general, some of the receivers of Research council grants are units in the government sector, in which case the grant should not be classified as a subsidy. Any refinements of this issue would have to await improvements in the National Accounts procedures.

For using the NA figures in the JQ, the following conversion table (5.2) was used:

Table 5.2. Conversion table between government accounts and government expenditure in the JQ.

JQ variables	**NA variables**
A Investment expenditure	Gross fixed capital formation Acquisitions less disposals of non-produced capital (land)
B1 Internal current expenditure	Final consumption that can not be distributed by type Compensation of employees Intermediate consumption
B2 Fees/Purchases	Equal to 0
C Receipts from by-products	Equal to 0
D Subsidies/Transfers	
Transfers to local government	Transfers to local government
Transfers to private households and companies and rest of the world	Transfers to private households and companies and rest of the world
Subsidies on production Capital transfers	Subsidies on production Capital transfers
E Revenues	Sales
= *Expenditure I (A+B1-C)*	
= *Expenditure II (EXP I+B2+D-F)*	

For the JQ reporting in June 2004 we will attempt to use the per cent and CEPA coding of the 2001 state accounts on the 2002 accounts.

Table 5.3. EPEA and total National account figures, according to CEPA-categories, 2001. mill. NOK

			Environmental Domains (CEPA)									
			01	02	03	04	05	06	07	08	09	
	Total, Central government	Of this, Environmental protection expenditure	Protection of ambient air and climate	Wastewater management	Waste mgmnt	Protection and remediation of soil and water	Noise and vibra-tion abate-ment	Protection of biodiversity and landscapes	Protection against radiation	Research and development	Other environmental protection activities	Unallocated to CEPA categories
Total expenditures, Central government	**771 718**	**3 678.4**	**267.4**	**129.6**	**289.7**	**364.9**	**0.0**	**526.7**	**268.9**	**534.6**	**1294.5**	**2.1**
Total current expenditures	*763 686*	*3 512.9*	*256.9*	*129.6*	*289.7*	*323.1*	*0.0*	*458.4*	*265.5*	*527.1*	*1260.7*	*1.9*
Central government final consumption expenditures	122 218	1 444.4	146.5	0.0	0.0	213.9	0.0	245.0	88.7	152.8	595.6	1.9
Final consumption expenditures, unknown sub-item		84.4								51.4	33.0	
Compensation of employees	55 082	620.2	106.0	0.0	0.0	18.1	0.0	97.1	36.5	74.6	286.6	1.3
Intermediate consumption expend.	55 113	874.0	41.9	0.0	0.0	195.8	0.0	159.1	52.2	97.2	327.2	0.6
Consumption of fixed capital	12 518	0.0										
Taxes on production	6	0.0										
-Sales	-19 537	-134.2	-1.4	0.0	0.0	0.0	0.0	-11.2	0.0	-70.4	-51.2	0.0
Direct purchases from market producers that are supplied to households	19 036	0.0										
Property income payable	18 839	0.0										
Subsidies on production	28 753	819.4	26.2	0.0	289.6	2.1	0.0	14.4	1.0	369.0	117.1	0.0
Social transfers	201 212	0.0										
Current transfers	392 664	1 249.1	84.2	129.6	0.1	107.1	0.0	199.0	175.8	5.3	548.0	0.0
Transfers to other central government units	277 932	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transfers to local government	96 519	188.2	0.0	129.6	0.1	3.2	0.0	53.8	0.0	0.0	1.5	0.0
Transfers to other private units and rest of the world	18 213	1 060.9	84.2	0.0	0.0	103.9	0.0	145.2	175.8	5.3	546.5	0.0
Capital expenditures	*8 032*	*165.5*	*10.5*	*0.0*	*0.0*	*41.8*	*0.0*	*68.3*	*3.4*	*7.5*	*33.8*	*0.2*
Gross fixed capital formation	14 648	99.6	10.5	0.0	0.0	41.8	0.0	21.4	3.4	7.5	14.8	0.2
Acquisition less disposal of land	-424	46.9	0.0	0.0	0.0	0.0	0.0	46.9	0.0	0.0	0.0	0.0
Adjustment item: Consumption of fixed capital	-12 518											
Capital transfers	6 326	19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0	0.0

	Total, Central government	Of this, Environmental protection expenditure	Environmental Domains (CEPA) 01 Protection of ambient air and climate	02 Wastewater management	03 Waste mgmnt	04 Protection and remediation of soil and water	05 Noise and vibra-tion abate-ment	06 Protection of biodiversity and landscapes	07 Protection against radiation	08 Research and development	09 Other environmental protection activities	Unallocated to CEPA categories
Total incomes of Central government	**988 565**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Current incomes	*987 237*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Property income receivable	65 717											
Social contributions	141 679											
Taxes, receivable	412 084											
Environmental taxes	46 859											
Other taxes receivable	365 225											
Other current transfers receivable	291 105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transfers within central government	277 930											
Transfers from local government	1 084											
Other transfers	12 091											
Withdrawals of income from central government enterprises	76 652											
Capital transfers receivable	*1 328*											
Capital taxes	1 328	0.0										
Net lending	216 847	-3 678	-267	-130	-290	-365	0	-527	-269	-535	-1295	-2
Other financial transactions etc		2.5	0	0	0	0	0	0	0	0	2.5	0

5.1.4 Expansion of EPE statistics for the manufacturing industry

For 2001 and 2000 the only variable that can be reported for the manufacturing industry is "end-of-pipe investments." However the reporting for the manufacturing industry's EPE was enlarged for the reporting year 2002 to include the variables "end-of-pipe investments," "investments in integrated technologies," "internal current expenditure" and "fees/purchases." The 2002-figures will however not be ready until September 2004. We plan to make a second reporting of the joint questionnaire in order to cover these new statistics for the manufacturing industry for 2002.

In the sample survey conducted in the manufacturing industry, current costs were requested in the following way:

> "Did your establishment have current costs connected to (a specified environmental domain) in 2002?"

The possible answer alternatives were: “yes,” “no,” or “I don’t know.” If the answer was yes, we then asked for the amount, exclusive of VAT. Of the amount reported we then asked for an estimate of the percentage of the reported amount that was purchased from other actors including payment of fees to local authorities. If no percentage was reported, we used 100 per cent of the reported amount as purchases from others since many smaller companies would buy these services from others. It was also assumed that in the accounts of many businesses, it is usually only purchases from others that are reported. This may need to be reconsidered as we gain experience with the reporting of this data from the surveys of the manufacturing industry in the future.

The data collected for 2002 will cover all the environmental domains specified in the JQ tables ("noise" is grouped together with "other"). While table 2C: total manufacturing is covered fully, the table 2B: mining, quarrying (NACE 11 is missing) and table 2D: electricity, gas, water (includes only NACE 40.300) is only partly covered. A separate project is being carried out to estimate the NACE 11 figures. The results from this project will be ready by January 2005.

5.1.5 Research and development expenditure for environmental technology

We have a separate sample survey on research and development, which includes the category "environmental technology". The figures from these statistics are included in the JQ (under the category “other”) even though this might lead to some double counting. We figure that the reporting of the environmental technology research and development in an enterprise will be better reported in the separate R&D survey than in the more general environmental protection expenditure survey where this is simply one part of the category “other” reported in the current costs section of the survey.

This survey covers all NACE categories and not only the manufacturing industry so this provides some values for Tables 2A, 2D and 2E for the economic variable "internal current expenditure, other".

5.2 Data collection and calculation methodology

5.2.1 Methodology for Table 1

As the Division for Environmental Statistics was quite familiar with the new reporting system from the municipalities, we started to build our EPE for public sector directly on these, aggregating municipal data to make county and national figures, and assuring correspondence between PAC/EPER-JQ (pollution abatement and control /environmental protection expenditures and revenues) and JQ-REG (regional questionnaire – NUTS 2 level).

After our work regarding public specialised producers (se section 5.1.1) and our understanding of the instructions for tables 4, 4A and 1, we have concluded that in our previous reporting (JQ-2002, JQ-2000) we incorrectly included the municipal figures in table 4A - Public Specialized Producers. This

has been changed in the trial completion of the JQ this year. For the wastewater figures 1995-2000 we cannot split the public sector data from the public specialised producers data, so the total of these has to be reported in table 1. From 2001 we can do this split, but unfortunately we do not yet have the data for table 4A (because of lack of reporting and poor quality for the existing reporting). These data will become available in the next year or two. Once the public specialised producers start to report to the municipal reporting system we will be able to fill out the public specialized producers on table 4A. We will still, however, be lacking data on publicly owned liability corporations.

In order to fill in the public sector table (table 1) in the JQ-2004 (EPER/PAC) we have to integrate the KOSTRA figures and the national government EPE figures in a way that helps us avoid double counting. We have therefore established another public sector table where calculations are done before entering the figures into JQ table 1. Table 5.4 shows how this is done. The data from KOSTRA and the budget analysis are put together in such a way as to produce all the necessary data to completely fill in Table 1 in the JQ!

In the table we present transfers at the most detailed level we have been able to identify. Transactions between different levels of public sector are not to be taken into account in the aggregated public sector figures, and are therefore excluded in table 1. Some transactions cannot be split into public sector and others, which means that transactions to other sectors are slightly overestimated.

Table 5.4. Pre-calculation table for combining municipal, county and national public sector statistics for reporting to JQ-EPER, mio NOK, 2001

Expenditure	Government level	Transfers to/from	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	TOTAL
Investment expenditures A	**Total**		**11**	**1 724**	**108**	**42**	**0**	**189**	**-231**	**1 843**
Sum of end-of-pipe and integrated	municipality1)		0	1 724	108	0	0	121	-260	1 693
	county1)		0	0	0	0	0	0	3	3
	central gov		11	0	0	42	0	68	26	147
Internal Current expenditures B	**Total**		**148**	**1 725**	**827**	**214**	**0**	**503**	**2 000**	**5 417**
Excluding all payments for bought services	municipality		0	1 725	827	0	0	247	986	3 785
	county		0	0	0	0	0	0	53	53
	central gov		148	0	0	214	0	256	961	1 579
Receipts from by-products C	**Total**		**0**	**-157**	**-201**	**0**	**0**	**-13**	**-33**	**-404**
	municipality		0	-157	-201	0	0	-13	-33	-404
	county		0	0	0	0	0	0	0	0
	central gov		0	0	0	0	0	0	0	0
Expenditure I (= A + B - C)	**Total**		**158**	**3 292**	**734**	**256**	**0**	**680**	**1 736**	**6 855**
	municipality		0	3 292	734	0	0	355	693	5 074
	county		0	0	0	0	0	0	56	56
	central gov		158	0	0	256	0	325	987	1 725
Subsidies/Transfers D	**Total**	**other sectors3)**	**110**	**-21**	**280**	**106**	**0**	**168**	**1 244**	**1 886**
Paid to other sectors (or received)	municipality	***public spec prod***	***0***	***2***	***-5***	***0***	***0***	***0***	***-4***	***-7***
		county	0	-5	0	0	0	-16	-4	-25
		central gov	0	-85	8	0	0	-89	-40	-206
		private	***0***	***-23***	***-5***	***0***	***0***	***8***	***-4***	***-24***
	county	municipality	0	0	0	0	0	0	31	31
		central gov	0	0	0	0	0	0	-97	-97
		public spec prod	***0***	***0***	***0***	***0***	***0***	***0***	***1***	***1***
		private	***0***	***0***	***0***	***0***	***0***	***0***	***17***	***17***
	central gov	local gov	0	130	0	3	0	54	2	188
		not split trans	***26***	***0***	***290***	***2***	***0***	***14***	***506***	***838***
		private & foreign countries	***84***	***0***	***0***	***104***	***0***	***145***	***728***	***1 061***
Fees/Purchases E	**Total**	**other sectors3)**	**0**	**638**	**1 824**	**0**	**0**	**20**	**31**	**2 513**
Paid to other sectors. Includes all payments for bought services	municipality	other muni2)	0	440	1 112	0	0	3	2	1 557
		public spec prod	***0***	***49***	***66***	***0***	***0***	***1***	***1***	***117***
		county	0	0	0	0	0	0	0	0
		central gov	0	0	2	0	0	1	1	4

		private	***0***	***149***	***646***	***0***	***0***	***16***	***7***	***818***
	county	municipality	0	0	0	0	0	0	1	1
		public spec prod	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
		other counties	0	0	0	0	0	0	0	0
		central gov	0	0	0	0	0	0	1	1
		private	***0***	***0***	***0***	***0***	***0***	***0***	***21***	***21***
	central gov	***not split trans***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
Revenues F	**Total**	**other sectors3)**	**-1**	**-4 099**	**-2 741**	**0**	**0**	**-42**	**-481**	**-7 364**
Received from other sectors	municipal	other munipality	0	-19	-9	0	0	-3	-2	-33
		private	***0***	***-4 099***	***-2 741***	***0***	***0***	***-31***	***-358***	***-7 229***
	county	other counties	0	0	0	0	0	0	0	0
		private	***0***	***0***	***0***	***0***	***0***	***0***	***-1***	***-1***
	central gov	***not split trans***	***-1***	***0***	***0***	***0***	***0***	***-11***	***-122***	***-134***
Expenditure II (= EXP I + D + E - F)	**Total**		**267**	**-190**	**97**	**362**	**0**	**825**	**2 530**	**3 890**

1) Defined as net investment

2) Probably mostly transactions to public specialised producers

3) The figures to be included in the JQ, are only the transactions to other sectors (tables). The figures included in the total are shown in bold and italic.

5.2.2 Data collection and co-ordination

The data used to do the trial completion of the JQ2004 are collected from different divisions at Statistics Norway. Establishing routines on which data to collect from which division, at what time and in what format, has been an important part of the work in this project. Table 5.5 shows all the data sources used or potential ones, the contact person and division responsible and the publishing date of each statistics.

Table 5.5. Data sources for reporting to the EPER JQ- 2004

Sector	Sub-sector	Data source	Responsible division/person	Date for final data (JQ 2004)	Date for final data (JQ 2006)
Public sector (NACE 75)	Central government	National accounts	Division for national accounts (210)/K Sørensen	Jan. n+3	Jan. n+3
		Central government accounts for the budget analysis	Division for public finances (280)/PM Vinghøg	May n+1	-
	County	KOSTRA - counties' financial accounts	Division for public finances (280)/AB Thorud	June 15. n+1	-
		alternatively National accounts	Division for national accounts (210)/K Sørensen	-	-
	Municipality	KOSTRA - municipalities' financial accounts	Division for public finances (280)/AB Thorud	June 15. n+1	-
		alternatively National accounts	Division for national accounts (210)/K Sørensen	-	Jan n+3
Specialised producers (NACE 90, 37, 51.57+ environmental consulting, environmental organisations etc.)	Public specialised producers (NACE 90)	KOSTRA - separate financial accounts reporting	Division for public finances (280)/T Schjerven	June 15. n+1	June 15. n+1
		Inter-municipal companies will start reporting in 2005 for the year 2004	Division for public finances (280)/T Schjerven	June 15. n+1	June 15. n+1
		Municipally owned limited companies	No separate data available	-	-
	NACE 90	Statistics on turnover (no structural statistics yet)	Division for service and construction statistics (460)/IT Holmen	May n+1	May n+1
	NACE 37	Separate reporting on industry's EPE (SBS)	Division for industrial statistics (230)/MQ Andersen	Sept n+2	May n+2?
Industry (NACE 1-99 minus 37, 51.57, 75, 90)	R&D NACE 05-99*	R&D-statistics	Division for industrial statistics (230)/Geir Petterson (ev. Frans Grundersen)	Des n+1, every 2. year	Des n+1, every 2. year
	NACE 11	Eurostat-project	Division for environmental statistics (220)/J Hass	Des n+3?	-
	NACE 10, 12-36	Separate reporting on industry's EPE (SBS)	Division for industrial statistics (230)/MQ Andersen	Sept n+2	May n+2?
	NACE 40.300	Separate reporting on EPE in SBS questionnaire	Division for industrial statistics (230)/Pål Marius Bergh	Des n+1, every 2. year	Des n+1, every 2. year
	NACE 01-04, 40-74, 80-85, 91-99	No data (except from 40.300)	-	-	-
Household sector	Households	-	-	-	-

*NACE 75-99 cannot be split. However, R&D for these NACE groups adds up to 0.

5.3 Trial completion of the JQ2004

The following tables (5.6-5.15) show for which variables and years we will report in the 2004 joint questionnaire for environmental protection expenditures and revenues. There will be no reporting to JQ table 2 (business sector total) or 4B (private specialised producers). For all other tables there will be at least some data reported. There has been a large increase in reporting for the public sector, which is now complete for the year 2001 (and will be for 2002 by June 2004). There is also much more data and more detail available for the manufacturing industry and the mining and quarrying industries. The Excel spreadsheet with the actual reporting to the joint questionnaire is included as an annex (annex A) to this report. These data should be interpreted as a preliminary submission of data. The 2002 figures for the manufacturing industry will need to be reported in September 2004 after they have been officially published.

Table 5.6. Reporting to the 2004 JQ-EPER Table 1: Public sector (complete reporting for 2001 and 2002)

1	**Public sector**	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	Total
A	Investment expenditure	2001 2002	1995-2000 2001 2002	1996 2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002
B	Total current expenditures	2001 2002	1995-2000 2001 2002	1996 2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002
B1	Internal current expenditures	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002
B2	Fees / purchases	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002
C	Receipts from by-products	2001 2002	2001 2002	1996 2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002
D	Subsidies / transfers	2001 2002	2001 2002	1996 2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002
E	Revenues	2001 2002	1995-2000 2001 2002	1996 2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002
Exp1	Expenditure 1 (=A+B1+C)	2001 2002	1995-2000 2001 2002	1996 2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002
Exp2	Expenditure 2 (=EXP1+B2+D-E)	2001 2002	1995-2000 2001 2002	1996 2001 2002	2001 2002	2001 2002	2001 2002	2001 2002	2001 2002

Table 5.7. Reporting to the 2004 JQ-EPER Table 2A: Agriculture, hunting, fishing, forestry

2A	**Agriculture, hunting, fishing, forestry**	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	Total
A	Investment expenditure								
A1	End - of - pipe investment								
A2	Integrated investments								
B	Total current expenditures								
B1	Internal current expenditures							1997 1999 2001	
B2	Fees / purchases								
C	Receipts from by-products								
D	Subsidies / transfers								
E	Revenues								
Exp1	Expenditure 1 (=A+B1+C)								
Exp2	Expenditure 2 (=EXP1+B2+D-E)								

Internal current expenditures for 1997, 1999 and 2001 include only R&D for environmental technology and are only for NACE 05

Table 5.8. Reporting to the 2004 JQ-EPER Table 2B: Mining, quarrying

2B	**Mining, quarrying**	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	Total
A	Investment expenditure	2002	2002	2002	2002		2002	2002	2002
A1	End - of - pipe investment	2000 2001 2002	2000 2001 2002	2000 2001 2002	2001 2002	2000	2001 2002	2000 2001 2002	2000 2001 2002
A2	Integrated investments	2002	2002	2002	2002		2002	2002	2002
B	Total current expenditures	2002	2002	2002	2002		2002	2002	2002
B1	Internal current expenditures	2002	2002	2002	2002		2002	1997 1999 2001 2002	2002
B2	Fees / purchases	2002	2002	2002	2002		2002	2002	2002
C	Receipts from by-products								
D	Subsidies / transfers								
E	Revenues								
Exp1	Expenditure 1 (=A+B1+C)	2002	2002	2002	2002	2002	2002	2002	2002
Exp2	Expenditure 2 (=EXP1+B2+D-E)								

Includes NACE 10 and 12-14 only.
Internal current expenditures for 1997, 1999 and 2001 include only R&D for environmental technology.

Table 5.9. Reporting to the 2004 JQ-EPER Table 2C: Total manufacturing (expenditure I complete for 2002)

2C	**Total manufacturing**	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	Total
A	Investment expenditure	2002	2002	2002	2002		2002	2002	2002
A1	End - of - pipe investment	2000 2001 2002	2000 2001 2002	2000 2001 2002	 2001 2002	2000	 2001 2002	2000 2001 2002	2000 2001 2002
A2	Integrated investments	2002	2002	2002	2002		2002	2002	2002
B	Total current expenditures	2002	2002	2002	2002		2002	2002	2002
B1	Internal current expenditures	2002	2002	2002	2002		2002	1997 1999 2001 2002	2002
B2	Fees / purchases	2002	2002	2002	2002		2002	2002	2002
C	Receipts from by-products								
D	Subsidies / transfers								
E	Revenues								
Exp1	Expenditure 1 (=A+B1+C)	2002	2002	2002	2002		2002	2002	2002
Exp2	Expenditure 2 (=EXP1+B2+D-E)								

Internal current expenditures for 1997, 1999 and 2001 include only R&D for environmental technology. The 1997 and 1999 figures includes NACE 37

Table 5.10. Reporting to the 2004 JQ-EPER Table 2C_add: Detailed manufacturing industries (expenditure I complete for 2002)

2C_add	**Detailed manufacturing industries**	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	Total
A	Investment expenditure	2002	2002	2002	2002		2002	2002	2002
A1	End - of - pipe investment	2000 2001 2002	2000 2001 2002	2000 2001 2002	 2001 2002	2000	 2001 2002	2000 2001 2002	2000 2001 2002
A2	Integrated investments	2002	2002	2002	2002		2002	2002	2002
B	Total current expenditures	2002	2002	2002	2002		2002	2002	2002
B1	Internal current expenditures	2002	2002	2002	2002		2002	1997 1999 2001 2002	2002
B2	Fees / purchases	2002	2002	2002	2002		2002	2002	2002
C	Receipts from by-products								
D	Subsidies / transfers								
E	Revenues								
Exp1	Expenditure 1 (=A+B1+C)	2002	2002	2002	2002		2002	2002	2002
Exp2	Expenditure 2 (=EXP1+B2+D-E)								

Internal current expenditures for 1997, 1999 and 2001 include only R&D for environmental technology.

Table 5.11. Reporting to the 2004 JQ-EPER Table 2D: Electricity, gas, water

2A	**Agriculture, hunting, fishing, forestry**	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	Total
A	Investment expenditure								
A1	End - of - pipe investment	2001 2002	2001 2002	2001 2002	2001 2002		2001 2002	2001 2002	2001 2002
A2	Integrated investments								
B	Total current expenditures								
B1	Internal current expenditures							1997 1999 2001	
B2	Fees / purchases								
C	Receipts from by-products								
D	Subsidies / transfers								
E	Revenues								
Exp1	Expenditure 1 (=A+B1+C)								
Exp2	Expenditure 2 (=EXP1+B2+D-E)								

End-of-pipe investment figures include NACE 40.300 only.
Internal current expenditures for 1997, 1999 and 2001 include only R&D for environmental technology

Table 5.12. Reporting to the 2004 JQ-EPER Table 2E: Other business

2A	**Agriculture, hunting, fishing, forestry**	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	Total
A	Investment expenditure								
A1	End - of - pipe investment								
A2	Integrated investments								
B	Total current expenditures								
B1	Internal current expenditures							1997 1999 2001	
B2	Fees / purchases								
C	Receipts from by-products								
D	Subsidies / transfers								
E	Revenues								
Exp1	Expenditure 1 (=A+B1+C)								
Exp2	Expenditure 2 (=EXP1+B2+D-E)								

Internal current expenditures for 1997, 1999 and 2001 include only R&D for environmental technology

Table 5.13. Reporting to the 2004 JQ-EPER Table 3: Households

4B	Private specialized producers of EP services	Wastewater	Waste	Soil & Groundwater	Other	Total
A	Investment expenditure					
B	Total current expenditures					
B1	Internal current expenditures					
B2	Fees / purchases		2001 2002			
C	Receipts from by-products					
D	Subsidies / transfers					
E	Revenues					
Exp1	Expenditure 1 (=A+B1+C)					
Exp2	Expenditure 2 (=EXP1+B2+D-E)					

Table 5.14. Reporting to the 2004 JQ-EPER Table 4: Specialized producers of EP services

4B	Private specialized producers of EP services	Wastewater	Waste	Soil & Groundwater	Other	Total
A	Investment expenditure	2000 2001 2002	2000 2001 2002	2000 2001 2002	2000 2001 2002	2000 2001 2002
B	Total current expenditures	2002	2002	2002	2002	2002
B1	Internal current expenditures	2002	2002	2002	2001 2002	2002
B2	Fees / purchases	2002	2002	2002	2002	2002
C	Receipts from by-products					
D	Subsidies / transfers					
E	Revenues	2002	2002	2002		2002
Exp1	Expenditure 1 (=A+B1+C)					
Exp2	Expenditure 2 (=EXP1+B2+D-E)					

Investment figures for 2000 and 2001 are for end-of-pipe investments for NACE 37 only.
Investment, current expenditure, fees and revenues for 2002 are for NACE 37 only.
Internal current expenditures for 2001 include only R&D for environmental technology
Can only report total turnover for NACE 90.010, 90.020 and 90.030 for 2002

Table 5.15. Reporting to the 2004 JQ-EPER Table 4A: Public specialized producers of EP services

4A	Public specialized producers of EP services	Wastewater	Waste	Soil & Groundwater	Other	Total
A	Investment expenditure					
B	Total current expenditures					
B1	Internal current expenditures					
B2	Fees / purchases					
C	Receipts from by-products					
D	subsidies / transfers					
E	Revenues	2001 2002	2001 2002			
Exp1	Expenditure 1 (=A+B1-C)	2001 2002	2001 2002			
Exp2	Expenditure 2 (=EXP1+B2+D-E)					

The data cover only revenues from services sold to municipalities for household waste and wastewater services.

5.4 Outline of a new strategy for the production of Environmental Protection Expenditure Accounts

5.4.1 Choice of data source

We need to decide upon a strategy for the EPE statistics in Statistics Norway. During the last years, there have been several different attempts at producing EPE statistics for the government sector. Strengths and weaknesses have been discovered, and the labour needed for detailed statistics have been identified.

Before producing the methodology description needed for the JQ2006 and for the production of EPE accounts in general, a decision has to be made on which "road to take".

We have in the last couple of years developed a methodology to calculate EPE-statistics for the local government sector based primarily on national definitions. These statistics have been developed to be consistent with the KOSTRA-data, both with the individual data on the municipal level and to estimate county and national figures that are aggregates of the municipal data. These statistics are consistent with the definitions for cost-coverage (as defined by the Ministry of Environment and the Ministry of Local Government and Regional Development) for the water, wastewater and waste sector. We have been publishing these statistics for several years and have used them to report to the JQ although the definitions were not exactly the same. We had hoped it would be possible to make our new total government statistics consistent with our traditional publishing and also consistent with the national accounts. We have, however, realised that this consistency will take time because of all the different reporting channels and divisions involved in assembling these data.

Slowly, we have come to realise that starting from the national accounts statistics might give a better platform for these statistics and provide better reporting to the PAC-JQ, especially since the Division for National Accounts have done a great deal of work to correct weaknesses in the uses of the transaction posts in the new municipal accounts (KOSTRA set up). However, there might be other necessary details that we are able to accomplish at the detailed KOSTRA-accounts level that are not possible to do after the values have been aggregated for use by the Division for National Accounts.

The SERIEE-system is also based on an approach consistent with the national accounts. The problem is then that we lose the link from the regional to the national level data. Producing the statistics necessary for reporting to the Regional JQ and to the Water Directive will therefore have to be based on another data source, and will not be fully consistent with the national figures from the PAC-JQ that would be produced by the Division for National Accounts. With regard to our traditionally published municipal-based statistics and the KOSTRA indicators, the consistency question is not of utmost importance since the economic variables used in these publications are slightly different.

Based on this year's experiences, we need to consider another approach to producing the public sector data for filling out the JQ 2006. By basing the whole of Table 1 on the national accounts system, the production of these data could also be done much more easily and more automatically. We need to be sure, however, that the necessary detail is available in the national accounts databases.

The drawbacks to be considered are:

- the division between the municipal sector and the public specialised producers is not done in the national accounts, but is easy to do from the KOSTRA raw data.
- the statistics will be ready at a later stage. Basing the calculation system directly on the KOSTRA raw data, gives us the possibility to produce statistics already by June year n+1. Using national accounts data, we have to wait until January year n+3, to get the final figures. On the other hand, the preliminary data are ready by January year n+2, which means only half a year extra to get the full local government statistics.

5.4.2 COFOG

As part of the strategy for future production of public sector EPE, we also need to decide how we can best mainstream the production of the government sector EPE. By using the results from the budget analysis to improve the new COFOG-coding, we might use the COFOG codes in the future to identify the main part of the governments EPE. Of course, this method does not provide us the opportunity to identify activities which are only partly EPE because it is currently not possible to double code the posts in the state accounts. If we use the 2001 budget analysis to evaluate this situation, i.e. by using the COFOG coding to identify the EPE, we would have "lost" 1 228 out of 3 678 million NOK, which equals 33 per cent of the total EPE identified for the government sector this year.

Another drawback by using COFOG is that it is less detailed concerning environmental domains. On the other hand, we might have the possibility to expand the COFOG and add some national details.

5.4.3 General solution

By using a method based directly on the national accounts system as it is today to produce the JQ-data, we would need to develop a factor system to split the figures that are not currently split in the national accounts statistics. We will have to split:

- public specialised producers from public sector
- detailed CEPA-categories from the aggregate COFOG-category "other"
- EPE from non-homogeneous expenditure in the national accounts

Our work on public sector EPER this year has helped us to evaluate the different concrete approaches to calculating these statistics and now we need to consider the different approaches and find an appropriate work plan for these statistics in the future so that they can be established as part of the regular statistical production portfolio as Statistics Norway.

5.5 References

Bjørkli, E.S., K. Loe Hansen, G.M. Pilskog, T.H. Schjerven and T. Smith (forthcoming): *Fristilling og konkurranseutsetting i KOSTRA - bedring av sammenlignbarheten i nøkkeltallene.* Rapporter 2004/?, Statistics Norway

5.6 Annex for chapter 5: EPER JQ-2004 trial completion