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**Norwegian Economic and
Environment Accounts (NOREEA)**
Project Report 2002

Documents

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Abstract:

This is the final report for the 2002 Eurostat co-financed project. It presents the work done on the NOREEA project during 2002. The NOREEA project is a cooperative project between the Divisions of National accounts and Environmental statistics. This year's work includes: extending the NAMEA (National accounts matrix including environment accounts) air emissions matrices to include dioxins and PAH-4 and updating the entire time series for 1991-2000, establishing the NAMEA-air data as an official statistics and publishing short articles in both Norwegian and English, update and publishing of the solid waste NAMEA (1993-2000), including 11 waste fractions and divided into 7 economic groupings, developing a methodology and making trial calculations for municipal government's expenditure for water, wastewater and solid waste based on data from the new electronic reporting system for municipalities' accounts, developing statistics for government sector's environmental expenditure based on the budget analysis method.

Keywords:

Environmental accounts, NAMEA, air emissions, solid waste, environmental protection expenditure, public sector, budget analysis

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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 January 2002 until 15 December 2002.

The project objectives for this year include:

1. Continue to extend and update the Norwegian air emissions NAMEA
2. Publication and publicity of the NAMEA-air data
3. Continue to extend and update the Norwegian solid waste NAMEA
4. Trial calculations based on the newly established electronic reporting system for municipal government financial reporting for water and waste water
5. Continued work on expenditures for solid waste by municipal government
6. Developing statistics for public sector environmental protection expenditure

The following provides a brief summary of the work performed for the NOREEA project in 2002.

Extend and update the Norwegian air emissions NAMEA

The NAMEA-air tables have been extended to include dioxins and PAH-4 and the entire time series from 1991 - 2000 has been updated. The values for the year 2000 are preliminary. In order to publish preliminary data the breakdown by industries had to correspond to the same breakdown used by the quarterly national accounts. This required setting up a whole new set of tables and routines. In addition, EMEP transboundary pollution flow data were obtained from the EMEP websites and publications. This data can be evaluated for inclusion in the tables planned for publication in 2003. In the most recent NAMEA-air reporting to Eurostat, these values were not requested for reporting. It is unclear at this time exactly if or how these values will be incorporated into the annual reporting.

Publication and publicity of the NAMEA-air data

The necessary steps in establishing the NAMEA-air data as an official statistics have been taken culminating with the publication of the NOREEA data and a short article on 30 July 2002 on the Statistics Norway website (http://www.ssb.no/english/subjects/09/01/nrmiljo_en/). The entire publication was in both Norwegian and English. The timing of the publication was coordinated with the Johannesburg World Summit on Sustainable Development. The publication of the statistics resulted in a TV interview and report on the main national news program as well as two articles in the major financial newspaper. In December a seminar was held with 27 participants. Mr. Svein Longva, Director General of Statistics Norway, held the introductory presentation regarding environmental accounts. The seminar was well received and provided a forum for discussion and feedback from the participants that will help improve the NAMEA-air data in the future. Specifically, there was a wish for 1990 data to be included since this is the basis year for the Kyoto agreement.

Extend and update the Norwegian solid waste NAMEA

The Norwegian solid waste accounts have been updated and newly published on July 15th (http://www.ssb.no/vis/english/subjects/01/05/40/avfregno_en/art-2002-07-15-01-en.html) and include a time series from 1993 - 2000 for the following fractions: paper/paperboard and drinking cartons, metals, plastic, glass, wood waste, textiles, biodegradable waste, concrete, hazardous waste, sludge, and other. Data for 1990-1992 are available for a reduced number of fractions. The economic sector breakdown is more consistent than before and includes seven groupings: households, agriculture / forestry and fishing, mining and quarrying, manufacturing, electricity / gas and water supply, construction, service industries, and other / unspecified for all fractions. Tables including all fractions for the 1993-2000 time series have been developed and are presented in this report.

Trial calculations for municipal government's expenditure for water and waste water

This year was the first year that all municipalities were required to submit their annual accounts electronically to Statistics Norway. In addition, the municipalities also had to adapt their accounting system to comply with the new accounting definitions and regulations.

Methodology work was the focus in the spring and we have developed a calculation methodology with respect to which expenses and income data we will combine from the municipal accounts in order to make the calculations. Our methodology has been reviewed by other divisions in Statistics Norway to try to make sure that there will be consistent use of the raw data in calculations made by different divisions (notably the division for public finance statistics and the division for national accounts).

The municipalities' own production in the waste water sector totalled 3.2 billion NOK in 2001, purchases totalled 0.6 billion and there were revenues of 4.1 billion. In the water sector, the municipalities' own production totalled 2.7 billion NOK in 2001, purchases totalled 0.4 billion and there were revenues of 3.1 billion. The estimate of the municipalities' own production is under-estimated since several types of inter-municipal enterprises are not yet required to report. By 2005 all of the non-reporting entities will be required to report to the new electronic reporting system. Until then our calculations using this approach will be under-estimated. A method for including the non-KOSTRA reporting enterprises will need to be investigated. These trial calculations for the waste water sector will be used as a basis for reporting to the EPER Joint Questionnaire in 2004 and the water sector will be used as a basis for reporting to the next regional questionnaire.

Expenditures for solid waste by municipal governments

The solid waste sector is more complicated than the water and wastewater sectors due to privatisation and to a large number of quasi-public operators. So far the work has focused on mapping the data flows from the different actors and trying to determine how to assemble the information in order to avoid double counting and to try to figure out what part of the picture we are capturing with our calculations. The trial calculations that we had planned to make would include all the actors in the waste sector that report according to the municipal government accounting system and definitions. This will include all municipalities, inter-municipal co-operations, inter-municipal corporations and municipal separate establishments that are required to report according to the municipal accounting principles.

Unfortunately the data quality and availability is poor or nearly non-existent for some of these actors, for example, the inter-municipal corporations will not be reporting according to the municipality-to-state (KOSTRA) reporting system until 2005 (for 2004 data). In addition, the quality of the data for inter-municipal cooperation establishments is very poor so these data are not included in the trial calculations. Given the poor data quality and availability, the trial calculations we have made are an underestimation.

An estimate of the municipalities' demand for services from the private sector and from other municipal entities has also been made based on the municipal accounts. The municipalities' own production in the waste sector totalled 734 million NOK in 2001, purchases totalled 1.83 billion and there were revenues of 2.75 billion.

Again, the estimate of the municipalities' own production is under-estimated since several types of inter-municipal enterprises are not included. There were purchases of 1.10 billion NOK from other municipalities and inter-municipal enterprises. This gives a rough estimate of the under-estimation although it is not the total picture since combining this with the municipalities' own production would be an over-estimation due to some double counting of municipal to/from municipal purchases.

Developing statistics for public sector environmental protection expenditure

It was necessary to gain familiarity with the structure of the state budget and accounts system in general and also to learn about the data collection and archiving system and to obtain access to the databases that contain the state accounts data in Statistics Norway. Once we had learned about these

different systems we used especially the Italian Istat methodology and the Danish system to help structure the next steps. A 4-digit coding system has been devised that allows coding according to CEPA, Norwegian, and natural resource management categories. The 5100 records of the 2001 central government accounts have been evaluated and 842 have been identified as having environmental relevance. Based on the coding system and an estimate of the per cent of each record to include, trial calculations were made and presented according to the different Ministries.

The total central government expenditure in 2001 was 912 billion NOK. Of this, it was estimated that environmental protection expenditure according to CEPA categories totalled 3.9 billion or 0.43 per cent of the total central government expenditure. These figures were then compared with those published by the Ministry of the Environment (10.9 billion NOK) to see the degree of agreement between the two sets of figures. It was expected that the total from the Ministry would be higher however; a difference of 66 per cent, or 2.8 times higher, was more than was anticipated. In some cases there are large differences that need to be investigated further before these calculations can be used with any level of confidence. Some of the differences can be due to a different understanding of what comprises environmental protection expenditure since the Norwegian Ministry of the Environment includes categories that are not part of the CEPA, notably outdoor recreation and preservation of cultural heritage.

2 Extend and update the Norwegian air emissions NAMEA

2.1 Extending and updating the NAMEA-air matrices

The Norwegian NAMEA-air matrices need to stay updated with respect to the air emission components that are included in the national air emissions model. The two data sets need to be updated in coordination so that there are not two different sets of data. Since the air emissions time series data are updated annually this means that the NAMEA-air tables must also be totally updated for all years.

This year the NAMEA-air tables have been extended to include dioxins and PAH-4 and the entire air emissions time series from 1991 - 2000 has been updated. The values for the year 2000 are preliminary and are not usually published by the air emissions group. However, with the improved data quality in the preliminary data and based on the desire of the Ministry of the Environment to have the most current values by industry we have been allowed to publish these data.

The revision of the national accounts was completed in June with new data being published on June 16th (see <http://www.ssb.no/vis/emner/09/01/nr/art-2002-06-14-01.html>). All the economic and employment data included in the NAMEA matrices were also revised for all years.

In order to publish the preliminary data, the breakdown by industries had to correspond to the same breakdown used by the quarterly national accounts since this is the detail available for the economic and employment data. This alternative industry breakdown required setting up a whole new set of tables and data extractions routines since the quarterly national accounts is not 2-digit NACE groups but a more aggregated level of industry groupings. Our original work has been done using 2-digit (and some 3-digit) NACE groups since this has been the level of detail required for reporting to Eurostat. The industry groupings from the quarterly national accounts will now be the standard publication detail for the NAMEA-air tables in the future since this allows for the most current figures (preliminary data) to be published. Reporting to the Eurostat NAMEA-air tables will then require special data handling procedures and therefore only final data (n-3 years) will be reported and not preliminary data. It is only possible to provide preliminary national accounts data according to the categories published for the quarterly national accounts and not according to 2-digit NACE categories. It may be possible to provide preliminary emissions data (n-2 years) according to 2-digit NACE categories, although according to the higher aggregated quarterly national accounts would be more likely.

Extending and updating the NAMEA-air matrices was the major focus of the work especially since this was necessary for establishing this as official statistics and also in preparation for the NAMEA-air reporting to Eurostat that was made in the fall of 2002.

2.2 Exploring EMEP transboundary pollution flow data

In addition to the extension and updating of the NAMEA-air matrices, some additional work was done with respect to transboundary pollution flows. The latest reporting of NAMEA-air data to Eurostat did not include any transboundary data and our publication in 2002 of NAMEA-air tables also did not include any transboundary data.

In the first NAMEA matrices that were developed in Norway, the import-export budgets for three components were included: SO₂, NO₂, and NH₃. These data were not used subsequently and have not been included in later tables. Exactly if and how these data will be included in the future needs to be considered carefully and in consultation with Statistics Norway's air emissions experts.

The current work focused primarily on updating our knowledge regarding the modelling work under the Convention on Long-range Transboundary Air Pollution and collecting data from various publications that could be used in the NAMEA-air tables.

2.2.1 Components reported to LRTAP by Statistics Norway for 2000

The components that Statistics Norway has reported to the Convention on Long-range Transboundary Air Pollution for 2000 included the following components:

Main Pollutants:

1. Oxidised sulphur, as SO₂
2. Oxidised nitrogen, as NO₂
3. Reduced nitrogen, as NH₃
4. Non-methane volatile organics, NMVOCs
5. Carbon monoxide, CO

Priority Metals:

6. Lead, Pb
7. Cadmium, Cd
8. Mercury, Hg

Persistent organic pollutants (POPs) (Annex III)

9. PAHs
10. Dioxins and furans

The following are the pollutants that are requested for reporting but which Norway did not report values for in last year's reporting.

| | |
|---------------------|--|
| Particulate matter: | TSP, PM ₁₀ , PM _{2.5} |
| Other metals: | As, Cr, Cu, Ni, Se, Zn |
| Annex I: | Aldrin, Chlordane, Chlordecone, Dieldrin, Endrin, Heptachlor, Mirex, Toxapene, Hexabromobiphenyl |
| Annex II: | HCH, DDT, PCBs |
| Annex III: | HCB |
| Other: | PCP, SCCP |

The data reported according to the LRTAP Convention are then used in various models to calculate the transboundary flows of the different pollutants. These models are part of the Co-operative Programme for Monitoring and Evaluation of the Long Range Transmission of Air Pollutants in Europe (EMEP). There can be several years before the calculations from the models are published and the results can be different depending on which model (Eulerian or Lagrangian) is used for the calculations.

In the past year the various EMEP models have been combined into a unified and harmonised system. The unified model is of the Eulerian type.

2.2.2 Import-export estimates

The following table presents the EMEP the import-export budgets for the various components that have been identified from various EMEP publications and websites. Not all of the components reported by Norway have deposition models that provide data that can be easily incorporated into the NAMEA matrices. Some of the deposition data are reported as part of precipitation, for example ozone, and not as a total value. For heavy metals there are four years for which calculations have been made (1997-2000). There is a longer time series available for the acidifying emissions (oxidised sulfur, oxidised nitrogen and reduced nitrogen). There does appear to be a significant time lag before the import-export estimates are calculated and published. If it is decided to try to include these data in

the regular publication of the NAMEA-air tables, this time-lag problem will need to be investigated further.

From the country-to-country deposition matrices, the total of the row is the 'imports' and the total of the columns is the 'exports'. In the matrix there is a Norway-Norway cell that is the own country emissions that are then deposited in the country itself. These definitions of 'import' and 'export' are not the same as those used in the national accounts. In order to have the EMEP definitions be closer to the national accounts definition, the amount reported in the Norway-Norway cell has been subtracted from the row and column totals. When import-export budgets are available then this adjustment is not needed.

Table 3.1. Import-export calculations from EMEP models for components reported by Norway. 1990-1998.

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 Eulerian | 1996 Lagrangian | 1997 | 1998 | 1999 | 2000 |
|--|-------|-------|-------|------|------|------|---------------------|--------------------|----------------------|----------------------|----------------------|----------------------|
| SO _x as SO ₂ 100 tons sulphur | (a) | (a) | (a) | (a) | (a) | .. | (b) Table A4 | (b) Table A1 | .. | (c) Table A4 | .. | .. |
| <i>Imported</i> | 1 400 | 1 183 | 1 032 | 841 | 914 | .. | 1077 ⁽¹⁾ | 876 ⁽¹⁾ | .. | 949 | .. | .. |
| <i>Exported</i> | 218 | 180 | 148 | 149 | 144 | .. | 107 ⁽¹⁾ | 80 ⁽¹⁾ | .. | 98 | .. | .. |
| <i>Own emissions</i> | .. | .. | .. | .. | .. | .. | 55 | 33 | .. | .. | .. | .. |
| NO _x as NO ₂ 100 tons nitrogen | (a) | (a) | (a) | (a) | (a) | .. | (b) Table A5 | (b) Table A2 | .. | (c) Table A4 | .. | .. |
| <i>Imported</i> | 827 | 706 | 652 | 530 | 584 | .. | 552 ⁽¹⁾ | 652 ⁽¹⁾ | .. | 481 | .. | .. |
| <i>Exported</i> | 636 | 600 | 598 | 626 | 617 | .. | 377 ⁽¹⁾ | 305 ⁽¹⁾ | .. | 599 | .. | .. |
| <i>Own emissions</i> | .. | .. | .. | .. | .. | .. | 82 | 85 | .. | .. | .. | .. |
| NH _x as NH ₃ 100 tons nitrogen | (a) | (a) | (a) | (a) | (a) | .. | (b) Table A6 | (b) Table A3 | .. | (c) Table A4 | .. | .. |
| <i>Imported</i> | 391 | 324 | 300 | 247 | 298 | .. | 207 ⁽¹⁾ | 310 ⁽¹⁾ | .. | 148 | .. | .. |
| <i>Exported</i> | 151 | 154 | 152 | 166 | 171 | .. | 107 ⁽¹⁾ | 76 ⁽¹⁾ | .. | 104 | .. | .. |
| <i>Own emissions</i> | .. | .. | .. | .. | .. | .. | 114 | 118 | .. | .. | .. | .. |
| Pb, tons | .. | .. | .. | .. | .. | .. | .. | .. | (d) | (d) | (e) | (f) |
| <i>Imported</i> | .. | .. | .. | .. | .. | .. | .. | .. | 127.5 ⁽¹⁾ | 76.5 ⁽¹⁾ | 147 ⁽¹⁾ | 165.5 ⁽¹⁾ |
| <i>Exported</i> | .. | .. | .. | .. | .. | .. | .. | .. | 2.5 ⁽¹⁾ | 2.5 ⁽¹⁾ | 3 ⁽¹⁾ | 2.5 ⁽¹⁾ |
| <i>Own emissions</i> | .. | .. | .. | .. | .. | .. | .. | .. | 2.5 ⁽¹⁾ | 2.5 ⁽¹⁾ | 2 ⁽¹⁾ | 2.5 ⁽¹⁾ |
| Cd, kg | .. | .. | .. | .. | .. | .. | .. | .. | (d) | (d) | (e) | (f) |
| <i>Imported</i> | .. | .. | .. | .. | .. | .. | .. | .. | 2 835 ⁽¹⁾ | 1 956 ⁽¹⁾ | 6 263 ⁽¹⁾ | 6 202 ⁽¹⁾ |
| <i>Exported</i> | .. | .. | .. | .. | .. | .. | .. | .. | 254 ⁽¹⁾ | 272 ⁽¹⁾ | 564 ⁽¹⁾ | 359 ⁽¹⁾ |
| <i>Own emissions</i> | .. | .. | .. | .. | .. | .. | .. | .. | 291 ⁽¹⁾ | 319 ⁽¹⁾ | 437 ⁽¹⁾ | 298 ⁽¹⁾ |
| Hg, kg | .. | .. | .. | .. | .. | .. | .. | .. | (d) | (d) | (e) | (f) |
| <i>Imported</i> | .. | .. | .. | .. | .. | .. | .. | .. | 7 309 ⁽¹⁾ | 6 155 ⁽¹⁾ | 5 405 ⁽¹⁾ | 2 448 ⁽¹⁾ |
| <i>Exported</i> | .. | .. | .. | .. | .. | .. | .. | .. | 101 ⁽¹⁾ | 97 ⁽¹⁾ | 188 ⁽¹⁾ | 134 ⁽¹⁾ |
| <i>Own emissions</i> | .. | .. | .. | .. | .. | .. | .. | .. | 111 ⁽¹⁾ | 111 ⁽¹⁾ | 184 ⁽¹⁾ | 148 ⁽¹⁾ |

(a) Barrett, K. and E. Berge, editors (1996): Transboundary Air Pollution in Europe, Part Two: Numerical Addendum. EMEP MSC-W Status Report 1996. Oslo: DNMI.

(b) EMEP Summary Report 1/2001 Transboundary Acidification, Eutrophication and ground level ozone in Europe. Tables A1-3 (Lagrangian model) and Tables A4-6 (Eulerian model).

(c) EMEP Summary Report 1/2000. Transboundary Acidification and Eutrophication in Europe. Table A4 (Eulerian model).

(d) EMEP report 3/2000. Heavy Metal Transboundary Pollution in Europe: Monitoring and Modelling Results for 1997 and 1998. pages 120-131.

(e) EMEP Report 3/2001. Evaluation of Transboundary Transport of Heavy Metals in 1999. Trend Analysis. Annex J.

(f) EMEP MSC-E/CCC Technical Report 5/2002: Lead, Cadmium and Mercury Transboundary Pollution in 2000. Annex C. Country-to-country deposition matrices for 2000.

⁽¹⁾Import-export budgets were not available for these years. The import and export values were calculated by taking the total receiver or emitter values and subtracting the values listed as "own emissions" in the receiver-emitter matrices or country-to-country deposition matrices (row totals were used as 'imports' and column totals were used as 'exports').

Although the EMEP models include other components such as ground level ozone, non-methane volatile organics, PAHs, dioxins and furans, country-to-country deposition matrices or import-export

budgets were not located for these components. If it is decided to try to include the EMEP modelling results into the Norwegian NAMEA-air matrices it will be necessary to look more carefully into these data.

For 1996 there were two different sets of data identified. One set was based on the Eulerian-based EMEP models and the other used a Lagrangian-based model. As can be seen from the results presented in Table 3.1 these two different models produce different results. This model-based variation needs also to be considered if these data are to be incorporated into the NAMEA-air tables.

2.2.3 EMEP's definitions of "import" and "export"

See EMEP's website (http://www.emep.int/sou-rec/eudm_budg98.html) for the following definitions:

Export of the pollutant from each country is defined as the mass or fraction of the emission that is transported beyond the country of concern. Here Q is the emission from the country, DL is the indigenous (country-to-itself) deposition.

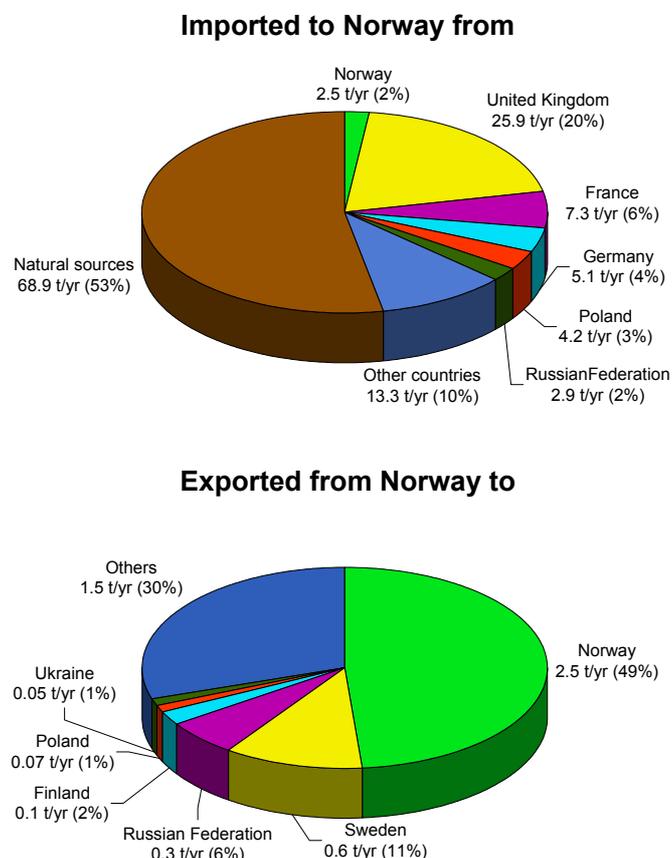
- **Mass exported** = $Q - DL$ (in 100 tonnes of S or N)
- **Emission Fraction Exported** = $[(Q - DL) / Q] * 100$ (in %)

Import of the pollutant to the country, i.e. deposition to the country arising from the emissions beyond the national borders, is the difference between the total deposition in the country (DT) and its indigenous deposition. Imported deposition can also be expressed as a fraction of the total deposition.

- **Mass imported** = $DT - DL$ (in 100 tonnes of S or N)
- **Emission fraction imported** = $[(DT - DL) / DT] * 100$ (in %)

Examples of how EMEP use these terms is illustrated in the following two figures that show Norway's lead deposition for 1997:

Figure 3.1 Budget of lead deposition for Norway in 1997:



Source: EMEP

In both figures there are portions of the pie charts that correspond to the EMEP concept of "imported to Norway from Norway" and "exported from Norway to Norway." This is not considered standard use of these terms from a national accounts perspective so these "own emissions" need to be subtracted from the EMEP "import" and "export" totals to obtain a definition that is closer to the one used in the national accounts if these results from the EMEP models are to be included in the NAMEA-air matrices. This has been done in Table 3.1 when the import-export budgets were not available and only the country-to-country deposition matrices were identified.

2.2.4 Use of the EMEP import-export budget data - converting to correct units

The import-export calculations for acidifying components present estimates in mass units of 100 tonnes of sulphur or nitrogen for oxidised sulphur, oxidised nitrogen and reduced nitrogen. Before these values can be included in the NAMEA-matrices these values need to be converted back into mass units of SO₂, NO_x, and NH₃ and converted from units of 100 tons to tons. If these values will be included in the Norwegian NAMEA-air tables, this unit change will by definition reduce the precision of the totals from tons to 100 tons.

The following molecular weight conversion calculations are needed to use the EMEP values and convert them into values that can be incorporated into the Norwegian NAMEA-air tables:

Molecular weights in amu (atomic mass units):

| | |
|-------------------|--------|
| N = | 14.007 |
| S = | 32.065 |
| H = | 1.008 |
| O = | 15.999 |
| SO ₂ = | 64.063 |
| NO ₂ = | 46.005 |
| NH ₃ = | 17.031 |

Conversion calculation formulas:

| | | | | | | |
|--|---|--|---|-----|---|----------------------|
| EMEP 100 tons of oxidized sulphur | * | $\frac{64.063 \text{ amu SO}_2}{32.065 \text{ amu S}}$ | * | 100 | = | tons SO ₂ |
| EMEP 100 tons of oxidized nitrogen | * | $\frac{46.005 \text{ amu NO}_2}{14.007 \text{ amu N}}$ | * | 100 | = | tons NO ₂ |
| EMEP 100 tons of reduced nitrogen | * | $\frac{17.031 \text{ amu NH}_3}{14.007 \text{ amu N}}$ | * | 100 | = | tons NH ₃ |

These types of conversion calculations are not necessary for the three heavy metals, Pb, Hg and Cd since the units that the EMEP models present are the same as those used in the NAMEA-air tables (i.e. tons for Pb emissions and kilograms for Hg and Cd emissions).

2.3 Conclusions

The import-export budgets and deposition data do provide additional information that would be helpful when trying to understand whether the problem of acidification is a problem that can be considered as a solely national problem or whether it is a regional problem where imports of these components is a major part of the problem. Emissions of SO₂ for 1998 for Norway were 89.5 thousand

tons of which 59.9 thousand tons were from ocean transport. If these are eliminated, since these emissions are not made within national borders, the emissions were 29.6 thousand tons. When the EMEP data for imported emissions for sulfur are converted to tons SO₂ the value is 189.6 thousand tons. This EMEP information then shows that the problem of these emissions is only to a small extent originating in Norway since the imports are so much higher than the emissions that occur from national source. For this reason, it may be useful to include these EMEP data.

2.4 Further questions to be considered

The focus of the NAMEA-tables needs to be considered. The current focus is on the emissions arising from national economic activity. In this case the imports and exports are not included as a separate entry in the tables. If the focus is changed to the state of the Norwegian environment then the import and export data would need to be included. A major complicating factor is how to include emissions from natural sources and then the emissions from Norwegian ocean transport are excluded since the focus would be a geographically based perspective.

If the focus is on the environmental consequences of national economic activity then the EMEP data *should not* be included since the EMEP data are estimates of imports to Norway from other countries and exports from Norway to other countries. Of course it is not that easy since the economic activity of Norway also includes ocean transport and international air traffic. These activities should also be considered part of the air emission exports.

If the focus is on the state of the Norwegian environment then the EMEP data *should* be included, but then the emissions arising from ocean transport and international air traffic should perhaps be excluded since the focus is a geographically based view of Norway. It is possible to isolate the emissions from the Norwegian units emitting outside of Norwegian territory, however, it is not possible to do this for the national accounts data.

The quality of the EMEP model calculations also needs to be considered as well. The precision of the modeling is a factor of 100 less than the Norwegian air emissions data. Combining these two sets of values may not be prudent.

3 Publication and publicity of the NAMEA-air data

3.1 Establishing and release of NAMEA-air statistics

In order to establish a new statistical area at Statistics Norway, the information needs to have certain prescribed documentation and go through an approval process. The necessary documentation needs to be in both Norwegian and English and the approval process includes all management levels at Statistics Norway.

The necessary steps in establishing the NAMEA-air data as official statistics have now been taken which will mean that subsequent publication of data from this statistical area will be much easier and go more quickly in the future. The publication of the NOREEA-air data tables and a short article took place on 30 July 2002 on the Statistics Norway website. The publication was in both Norwegian and English. The English version article follows and can also be viewed at the following website: http://www.ssb.no/english/subjects/09/01/nrmiljo_en/. The timing of the publication was coordinated with the revision of the national accounts and with the Johannesburg World Summit on Sustainable Development.

The release of these statistics resulted in a TV interview on the main national news on July 30th and two articles in the major business newspaper, Dagens Næringsliv. The focus of the TV interview was on the contribution of technology towards helping to reduce air emissions due to economic activity. The first figure showing economic and air emission trends for Norway (total) was presented illustrating that there is some evidence of decoupling of emissions from economic growth.

In addition, these statistics generated interest at the Ministry of Environment and at a number of business interest organisations. The following is the English article published on 30.07.02 on Statistics Norway's website.

Higher growth in economy than in air emissions

The economic growth in Norway in the 1990s was greater than the increase in most types of air emissions. This is explained by the introduction of new technology but also by the growth in the services industries that has low air emissions. Detailed values show that the developments in oil and natural gas extraction and manufacturing industry are different from the national trends.

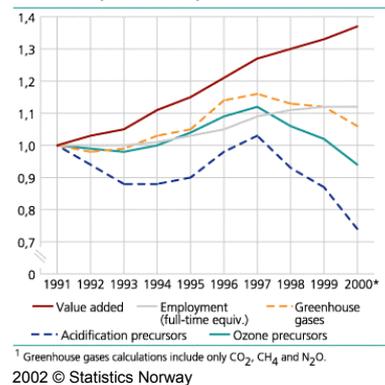
Household consumption and solid waste amounts are increasing steadily, whereas air emission types that contribute to acidification and ozone precursors are declining.

New statistics based on national accounts and environmental statistics are presented. These statistics can be used for benchmarking and comparing the development in economic growth and air emissions in the manufacturing industry and other branches.

Apparent weak connection between economic growth and emissions

Data for Norway as a whole indicate that the economic growth for the years 1991-2000 (measured by value added) was larger than the growth in most types of air emissions. The figure shows that value added and employment have developed in the opposite direction from the development in air emissions in the later years. From 1991 until 1996 the development was to a large extent in the same direction, but since 1997 the development for the economy and for air emissions have gone in separate directions.

Economic and air emission trends for Norway (total). 1991-2000*. (Index: 1991=1)¹

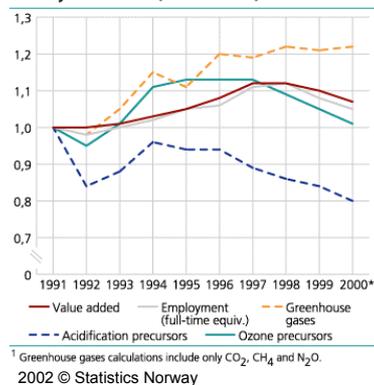


Comparing industries

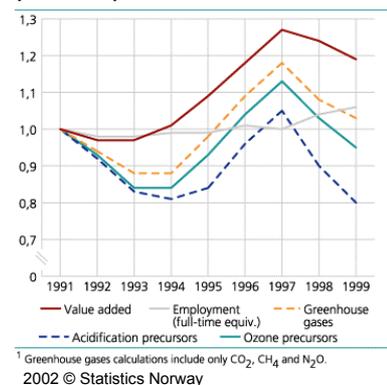
Although the economic growth is larger than the increase in emissions at the national level, examining trends at the industry level show that the economic growth in several important industries has resulted in increased pressures on the environment.

For the manufacturing industry and the transportation industry, the trends for acidification emissions are declining but the emissions of greenhouse gases continue to increase in relation to value added. For the extraction of crude oil and natural gas, that is responsible for 13 percent of Norway's value added in 2000, there is a small decrease in greenhouse gas emissions in relation to value added, while other types of air emission types show almost no change in relationship to the increase in value added.

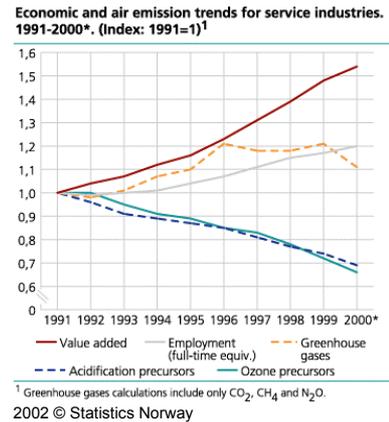
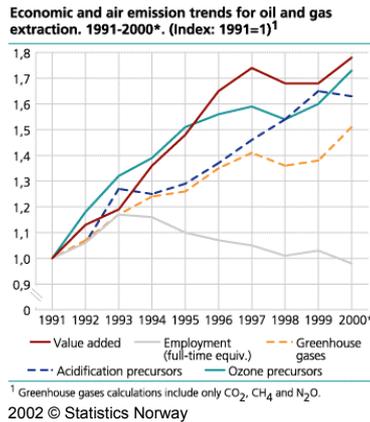
Economic and air emission trends for manufacturing industry. 1991-2000*. (Index: 1991=1)¹



Economic and air emission trends for transportation industry (includes ocean transport). 1991-1999. (Index: 1991=1)¹

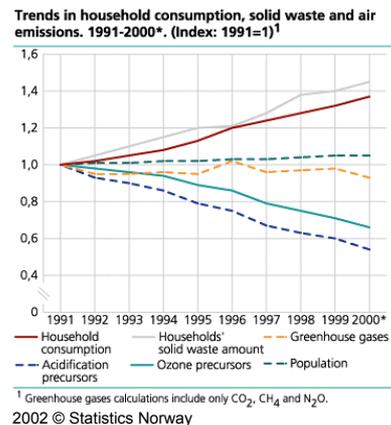


There are two major explanations to Norway's improvements in emissions in relation to value added. The first is technological development and investment in new technology and in equipment that treats pollution. The other explanation is the increase in industries that are not pollution intensive. The figure to the right shows the trends in the services industry from 1991 to 2000. The services industries' proportion of total value added has increased from 38 to 43 percent, without an equivalent increase in the industry's air emissions levels.



Households: Higher consumption, less acid rain and ozone

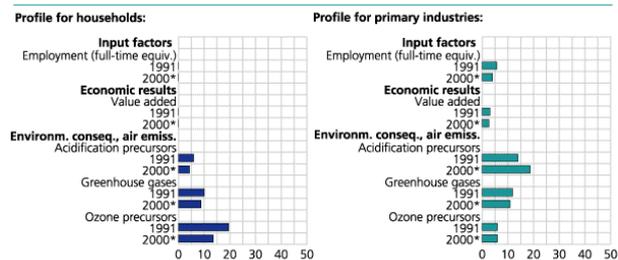
For households the data from 1991 to 2000 show that consumption has increased over the entire period. The production of household solid waste per person also increased over the entire period but at a slightly lower rate than in the early years. The trends for emissions of components that contribute to acid rain and that are ozone precursors are decreasing. Emissions of greenhouse gases are relatively stable and do not follow the increase in consumption. Since the population development has increased less than consumption, the emissions per unit consumption show a larger decrease than the emissions per person.



Economic and environmental profiles

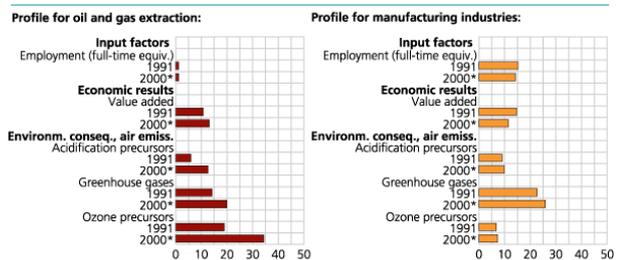
The Norwegian economy has been aggregated into eight industries. Economic - environmental profiles have been developed for each industry. These profiles show the percent of contribution by that portion of the economy to the economic results (value added), employment and air emissions for 1991 and 2000.

Input factors, economic result and air emissions. Portion of total for Norway, 1991 and 2000*. Per cent¹



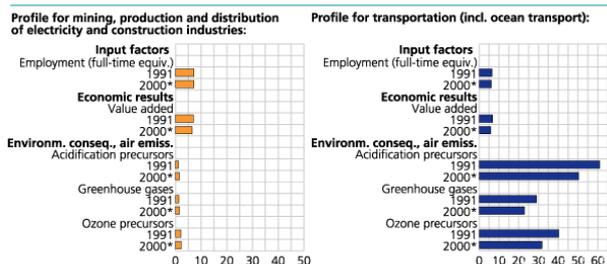
¹ Greenhouse gases calculations include only CO₂, CH₄ and N₂O.
2002 © Statistics Norway

Input factors, economic result and air emissions. Portion of total for Norway, 1991 and 2000*. Per cent¹



¹ Greenhouse gases calculations include only CO₂, CH₄ and N₂O.
2002 © Statistics Norway

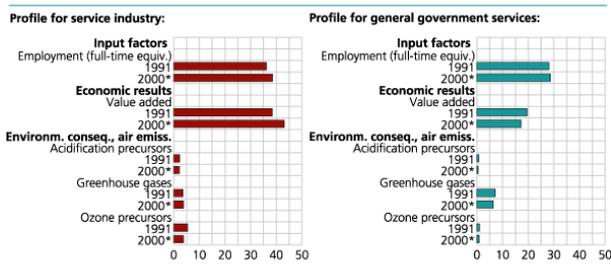
Input factors, economic result and air emissions. Portion of total for Norway. 1991 and 2000*. Per cent¹



¹ Greenhouse gases calculations include only CO₂, CH₄ and N₂O.

2002 © Statistics Norway

Input factors, economic result and air emissions. Portion of total for Norway. 1991 and 2000*. Per cent¹



¹ Greenhouse gases calculations include only CO₂, CH₄ and N₂O.

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Environmental Accounts: Different definitions

There are major differences between these Norwegian National Accounts and Environment (NOREEA) air emissions data and the air emissions data that are published for Norway by Statistics Norway and the Norwegian Pollution Control Authorities (SFT). The NOREEA-data uses an economic definition of Norway whereas the official air emissions for Norway uses a geographic-based definition. The major difference between these data sets is the inclusion of air emissions from ocean transport and other international transportation activities in the NOREEA-data.

Emissions from Norwegian activity

Combining data from the national accounts and the air emissions accounts provides information about the environmental consequences of Norway's economic activity.

Results from the Norwegian Economic and Environment Accounts (NOREEA) will be published annually on Statistics Norway's website, usually in the late spring when the most recent estimates for both the air emissions data and the national accounts become available. The data tables being published now include a time series from 1991 - 2000 for economic, employment and air emissions data. The data for 2000 are only preliminary figures, and the data are published using the same industry categories as used for publishing the quarterly national accounts.

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Tables

- [Table 1 Gross value added by industry and household consumption in constant 1995-prices. Million NOK \(basic prices\)](#)
- [Table 2 Employment, full-time equivalent persons. Employees and self-employed. 1 000](#)
- [Table 3 NOREEA - Emissions to air of carbon dioxide, \(CO₂\). Tonnes](#)
- [Table 4 NOREEA - Emissions to air of methane \(CH₄\). Tonnes](#)
- [Table 5 NOREEA - Emissions to air of nitrous oxide \(N₂O\). Tonnes](#)
- [Table 6 NOREEA - Emissions to air of sulfur dioxide \(SO₂\). Tonnes](#)
- [Table 7 NOREEA - Emissions to air of nitrogen oxides \(NO_x\). Tonnes](#)
- [Table 8 NOREEA - Emissions to air of ammonia \(NH₃\). Tonnes](#)
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- [Table 10 NOREEA - Emissions of cadmium \(Cd\). Kilograms](#)
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- [Table 12 NOREEA - Emissions of PAH-4. Tonnes](#)
- [Table 13 NOREEA - Emissions of carbon monoxide \(CO\). Tonnes](#)
- [Table 14 NOREEA - Emissions of particulates. Tonnes](#)
- [Table 15 NOREEA - Emissions of non-methane volatile organic carbons \(NMVOC\). Tonnes](#)
- [Table 16 NOREEA - Emissions of dioxins. Grams](#)

Published 30 July 2002 © [Statistics Norway](#)

3.2 NOREEA-seminar 6th December 2002

In addition to the publication of the NAMEA-air tables, a morning seminar was held on 6.des.02. There were 27 participants from a variety of organisations, including the Ministry of the Environment, the Norwegian Pollution Control Authority (SFT), the Foundation for sustainable production and consumption (GRIP), the Federation of Norwegian Process Industries (PIL), the PROSUS research institute, the Norwegian Shipowners' Association, BI Norwegian School of Management, the Norwegian General Standardizing Body and 2 environmental groups (NGOs).

An attempt was made to tailor the presentation to show data relevant to sectors from which there were participants, such as the manufacturing industry and international shipping, in order to show the relevance of the dataset. Dr. Svein Longva, Director General of Statistics Norway, held an introductory presentation regarding environmental accounts. This helped to set a positive and constructive dialog with the participants. Different uses of the data were shown, including a variety of time series, similar to those published in the July article, and figures for decoupling indicators. The participants asked questions throughout the seminar. Although the focus was primarily on the NAMEA-air emissions data, there was also a presentation of the other portions of the project such as the waste accounts, environmental protection expenditure (EPE) in the manufacturing industry and EPE in the government sector (municipal, county and state).

We received some very good feedback that will help us improve the NOREEA-system to meet the needs of user groups. There was a particular request to extend the time series backwards to include 1990 since this is the basis year for the Kyoto agreement. With the recent major revision of the national accounts this should be possible, however, we still need to examine the air emissions data since this may still be according to the old NACE groupings. We will look into this for the next scheduled publishing in the late spring of 2003. Another weakness that needs improvement involves the CO₂ emissions from biofuels. At this time these emissions are not included in the values presented but it is desirable that these values should be included since it can be easier to identify a shift in the use of biofuels away from fossil fuels.

After the seminar, we were contacted by one of the participants from the Ministry of the Environment and were requested to make a similar presentation at the Ministry in January 2003. The NOREEA-project has also received financing from the Ministry for a number of years and the division providing this support requested an update regarding the NOREEA-project. A presentation was held at the Ministry and a good discuss developed.

3.3 Future activities

The NOREEA-air tables will require annual updating of the time series and annual publishing will be continued. Some changes in the presentation of the data in the figures may be considered. Figures, similar to those developed by EEA that present value added, emissions and an efficiency ratio, such as emissions per value added, all in one figure to give some indication of the de-coupling of economic growth and air emissions may be developed. The industry profiles may also be replaced by pie-charts that show the relative contribution of the various industries to the emissions or economic variable.

4 Extend and update the Norwegian solid waste NAMEA

4.1 Improvements made to the waste accounts

The Norwegian solid waste accounts have been updated and newly published on July 15th (http://www.ssb.no/vis/english/subjects/01/05/40/avfregno_en/art-2002-07-15-01-en.html) and include a time series from 1993 - 2000 for total waste and for the year 2000 data for the following fractions were published: paper/paperboard and drinking cartons, metals, plastic, glass, wood waste, textiles, biodegradable waste, concrete, hazardous waste, sludge, and other. The time series for total waste by fractions is shown in Table 4.1.

Table 4.1. Total waste by fractions. 1990 - 2000. 1 000 tons

| Year | Total ¹ | Paper, cardboard and pasteboard | Metals | Plastic ² | Glass | Wood waste | Textiles ² | Biodegradable waste ³ | Concrete | Other | Hazardous ⁴ |
|------|--------------------|---------------------------------|--------|----------------------|-------|------------|-----------------------|----------------------------------|----------|-------|------------------------|
| 1990 | .. | .. | .. | 271 | .. | 1 263 | 82 | .. | .. | .. | 610 |
| 1991 | .. | .. | .. | 295 | .. | 1 160 | 83 | .. | .. | .. | 613 |
| 1992 | .. | 1 049 | 1 223 | 285 | .. | 1 092 | 83 | .. | .. | .. | 617 |
| 1993 | 7 386 | 1 055 | 1 301 | 324 | 158 | 1 105 | 87 | 878 | 610 | 1 247 | 621 |
| 1994 | 7 407 | 1 040 | 1 348 | 339 | 157 | 1 095 | 90 | 906 | 638 | 1 156 | 640 |
| 1995 | 7 451 | 1 011 | 1 370 | 351 | 159 | 1 103 | 94 | 964 | 661 | 1 109 | 628 |
| 1996 | 7 529 | 1 032 | 1 498 | 366 | 155 | 1 068 | 99 | 1 005 | 665 | 1 032 | 608 |
| 1997 | 7 887 | 1 120 | 1 523 | 367 | 148 | 1 037 | 103 | 1 057 | 726 | 1 211 | 596 |
| 1998 | 8 257 | 1 131 | 1 541 | 380 | 145 | 1 030 | 108 | 1 076 | 751 | 1 386 | 709 |
| 1999 | 8 284 | 1 102 | 1 554 | 381 | 146 | 982 | 109 | 1 091 | 735 | 1 553 | 631 |
| 2000 | 8 510 | 1 334 | 1 563 | 376 | 146 | 993 | 110 | 1 102 | 715 | 1 540 | 630 |

¹ Excludes: Waste that is directly transferred back to natural cycles, e.g. fish waste dumped in the ocean, waste from scrapped off-shore installations, waste from dismantling of ships larger than 100 brt, infectious waste, nuclear waste and explosive waste.

² Packaging waste from synthetic textiles is included in figures for plastic, not for textiles.

³ Includes food waste and park and garden waste, etc.

⁴ Figures for hazardous waste refer to 1999.

The major improvement made to the waste accounts include a more consistent economic sector/industry breakdown especially for the more recent years and an extension of the time series for all fractions to 2000. The sector/industries included in the waste accounts are:

- Households,
- Agriculture, forestry and fishing,
- Mining and quarrying,
- Manufacturing,
- Electricity, gas and water supply,
- Construction,
- Service industries, and
- Other / unspecified for all fractions.

Although the breakdown is not at the NACE 2-digit level, the calculations are more consistent than previous calculations although some of the time series are better than others.

Tables for all waste fractions by sector were developed. There are now 11 different types of waste plus a total estimate that have been developed in a time series from 1993 - 2000 (see Tables 4.2 - 4.12). The estimates for more current years are better than those in the earlier years.

There are still some inconsistencies in the time series that result in some relatively major jumps from one year to the next. Sometimes these are real differences and sometimes these are artefacts of the data used in the calculations. For example, the jump between 1996 and 1997 for the mining and quarrying industry seen in the total waste table (Table 4.2) and in the hazardous waste table (Table 4.12) is due primarily to a change in the detail of the industry level breakdown available for hazardous waste.

Before 1997 there was a much larger amount registered in the category "unspecified", whereas after 1997 it has been possible to reduce the amount in that category and increase the amount in from the mining and quarrying industry.

Whether it will be possible to make a more consistent time series for the early years for hazardous waste will have to be investigated. At this point there has not been an attempt to make better estimates before 1997 since the best detail available for this type of waste is from 1999 so the 1997 values are already estimates. Since the statistics for special waste have not been finalized for 2000, the estimates reported for 2000 in these tables are nearly the same as those for 1999.

On the other hand, the doubling observed for households in 1996 for the metals waste fraction can be explained by the one-time increase in the return-deposit fee paid for turning in old cars to registered automobile waste stations in 1996. This increase in 1996 also resulted in a slightly lower level of scrapping of automobiles in 1997. The effect of this one-time increased deposit is also seen in the national accounts.

The variation seen in the biodegradable waste fraction for agriculture, forestry and fishing stems primarily from the amount of the fish catch that was dumped in the sea before reaching land. The increase in 1999 is due mostly to the decrease in the dumping before reaching land. The decrease in 2000 is due primarily to a reduction in the overall fish catch.

4.2 Tables for waste fractions by industry

Table 4.2. Total waste by industry, 1993-2000, tons

| Total waste | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Total | 7 385 767 | 7 407 178 | 7 450 715 | 7 528 770 | 7 887 498 | 8 264 632 | 8 291 234 | 8 516 950 |
| Households | 1 142 493 | 1 198 081 | 1 249 214 | 1 435 171 | 1 337 140 | 1 461 028 | 1 500 016 | 1 560 225 |
| Agriculture, forestry & fishing | 38 737 | 41 301 | 72 826 | 101 547 | 107 057 | 85 987 | 123 073 | 97 278 |
| Mining and quarrying | 33 881 | 38 933 | 41 405 | 45 189 | 122 647 | 137 200 | 126 794 | 125 954 |
| Manufacturing | 3 373 724 | 3 273 092 | 3 139 215 | 3 026 150 | 3 151 387 | 3 286 580 | 3 361 151 | 3 338 587 |
| Electricity, gas, water supply | 21 225 | 20 452 | 22 051 | 19 091 | 20 670 | 21 471 | 21 384 | 20 809 |
| Construction | 624 305 | 661 912 | 697 839 | 701 742 | 754 258 | 793 226 | 765 419 | 751 647 |
| Service industries | 697 925 | 726 266 | 770 736 | 801 559 | 853 423 | 910 060 | 879 611 | 897 441 |
| Other or unspecified | 1 453 227 | 1 447 459 | 1 457 103 | 1 397 863 | 1 540 857 | 1 569 100 | 1 513 884 | 1 725 008 |

Table 4.3. Paper, cardboard and pasteboard by industry. 1993-2000. tons

| Paper, cardboard & pasteboard | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Total | 1 055 212 | 1 039 820 | 1 010 808 | 1 031 735 | 1 120 020 | 1 130 911 | 1 102 038 | 1 333 558 |
| Households | 357 022 | 370 727 | 385 139 | 390 787 | 407 044 | 438 282 | 448 398 | 466 327 |
| Agriculture, forestry & fishing | 4 314 | 4 261 | 4 330 | 4 437 | 4 502 | 4 484 | 4 443 | 4 443 |
| Mining and quarrying | 2 330 | 2 665 | 2 906 | 3 325 | 3 363 | 3 217 | 3 257 | 3 298 |
| Manufacturing | 206 756 | 195 467 | 184 179 | 172 890 | 171 949 | 171 008 | 170 067 | 169 126 |
| Electricity, gas, water supply | 2 050 | 1 955 | 2 139 | 1 820 | 1 939 | 2 032 | 2 128 | 2 228 |
| Construction | 17 934 | 18 749 | 19 436 | 20 529 | 22 273 | 23 008 | 22 502 | 22 007 |
| Service industries | 255 659 | 259 073 | 264 763 | 273 107 | 280 883 | 309 332 | 314 453 | 318 625 |
| Other or unspecified | 209 146 | 186 924 | 147 916 | 164 839 | 228 066 | 179 549 | 136 790 | 347 503 |

Table 4.4. Metal waste by industry. 1993-2000. tons

| Metal | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Total | 1 301 424 | 1 347 554 | 1 370 235 | 1 498 162 | 1 522 833 | 1 540 683 | 1 553 965 | 1 562 621 |
| Households | 111 208 | 112 592 | 121 678 | 258 555 | 103 791 | 139 930 | 148 563 | 151 510 |
| Agriculture, forestry & fishing | - | - | - | - | - | - | - | - |
| Mining and quarrying | - | - | - | - | - | - | - | - |
| Manufacturing | 181 633 | 217 293 | 221 151 | 256 871 | 229 973 | 239 604 | 200 684 | 193 389 |
| Electricity, gas, water supply | - | - | - | - | - | - | - | - |
| Construction | 41 284 | 43 134 | 46 228 | 47 985 | 49 936 | 51 774 | 48 155 | 48 795 |
| Service industries | 72 444 | 79 246 | 93 347 | 114 130 | 96 251 | 102 009 | 94 253 | 95 724 |
| Other or unspecified | 894 855 | 895 290 | 887 832 | 820 622 | 1 042 882 | 1 007 365 | 1 062 308 | 1 073 204 |

Table 4.5. Plastic waste by industry. 1993-2000. tons

| Plastic | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Total | 323 782 | 338 675 | 350 870 | 365 826 | 366 651 | 379 853 | 380 613 | 375 626 |
| Households | 144 800 | 150 679 | 156 106 | 166 959 | 161 281 | 175 061 | 178 976 | 178 335 |
| Agriculture, forestry & fishing | - | - | - | - | - | - | - | - |
| Mining and quarrying | - | - | - | - | - | - | - | - |
| Manufacturing | 34 132 | 40 974 | 47 819 | 53 798 | 52 177 | 49 691 | 45 345 | 45 687 |
| Electricity, gas, water supply | - | - | - | - | - | - | - | - |
| Construction | 6 801 | 6 847 | 6 962 | 6 814 | 7 627 | 7 484 | 7 444 | 7 143 |
| Service industries | 120 335 | 122 843 | 122 770 | 122 114 | 128 749 | 130 025 | 131 351 | 127 675 |
| Other or unspecified | 17 714 | 17 331 | 17 213 | 16 141 | 16 817 | 17 593 | 17 497 | 16 788 |

Table 4.6. Glass waste by industry. 1993-2000. tons

| Glass waste | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Total | 158 436 | 157 158 | 159 392 | 155 488 | 147 565 | 145 173 | 146 309 | 146 059 |
| Households | 38 009 | 38 106 | 38 160 | 47 811 | 46 622 | 51 332 | 52 676 | 54 418 |
| Agriculture, forestry & fishing | - | - | - | - | - | - | - | - |
| Mining and quarrying | - | - | - | - | - | - | - | - |
| Manufacturing | 55 094 | 43 137 | 31 180 | 19 223 | 17 666 | 16 109 | 14 552 | 13 269 |
| Electricity, gas, water supply | - | - | - | - | - | - | - | - |
| Construction | 32 247 | 33 193 | 34 319 | 37 573 | 39 583 | 41 686 | 43 279 | 45 727 |
| Service industries | 19 446 | 25 110 | 32 757 | 29 905 | 25 681 | 21 186 | 21 043 | 19 187 |
| Other or unspecified | 13 639 | 17 612 | 22 975 | 20 975 | 18 013 | 14 860 | 14 759 | 13 458 |

Table 4.7. Wood waste by industry. 1993-2000. tons

| Wood waste | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|---------|---------|
| Total | 1 104 586 | 1 095 114 | 1 103 491 | 1 068 461 | 1 037 358 | 1 038 119 | 989 514 | 999 895 |
| Households | 22 971 | 24 570 | 23 508 | 23 941 | 25 224 | 27 319 | 27 975 | 29 075 |
| Agriculture, forestry & fishing | - | - | - | - | - | - | - | - |
| Mining and quarrying | - | - | - | - | - | - | - | - |
| Manufacturing | 878 676 | 849 383 | 820 090 | 790 797 | 751 025 | 711 252 | 671 480 | 689 551 |
| Electricity, gas, water supply | - | - | - | - | - | - | - | - |
| Construction | 97 979 | 112 731 | 127 345 | 122 657 | 127 896 | 144 532 | 131 113 | 128 807 |
| Service industries | 40 118 | 40 592 | 41 569 | 42 770 | 44 277 | 45 534 | 46 287 | 46 902 |
| Other or unspecified | 64 843 | 67 837 | 90 979 | 88 296 | 88 936 | 109 482 | 112 659 | 105 560 |

Table 4.8. Textile waste by industry. 1993-2000. tons

| Textile waste | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|--------|--------|--------|--------|---------|---------|---------|---------|
| Total | 86 854 | 90 130 | 93 865 | 98 897 | 103 132 | 107 721 | 109 268 | 110 429 |
| Households | 64 494 | 67 749 | 71 005 | 74 842 | 78 679 | 82 516 | 84 499 | 87 821 |
| Agriculture, forestry & fishing | 7 923 | 7 539 | 7 496 | 8 110 | 7 878 | 8 086 | 7 223 | 5 358 |
| Mining and quarrying | - | - | - | - | - | - | - | - |
| Manufacturing | 4 579 | 4 858 | 5 138 | 5 417 | 5 663 | 5 909 | 6 155 | 5 712 |
| Electricity, gas, water supply | - | - | - | - | - | - | - | - |
| Construction | 215 | 225 | 233 | 246 | 267 | 264 | 264 | 264 |
| Service industries | 9 638 | 9 752 | 9 987 | 10 275 | 10 637 | 10 939 | 11 120 | 11 268 |
| Other or unspecified | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 |

Table 4.9. Biodegradable waste by industry. 1993-2000. tons

| Biodegradables | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|---------|---------|---------|-----------|-----------|-----------|-----------|-----------|
| Total | 878 000 | 905 800 | 964 000 | 1 005 000 | 1 057 000 | 1 076 000 | 1 091 000 | 1 102 325 |
| Households | 311 815 | 335 180 | 359 058 | 376 067 | 408 183 | 431 014 | 441 609 | 471 174 |
| Agriculture, forestry & fishing | 26 500 | 29 500 | 61 000 | 89 000 | 93 707 | 72 261 | 110 379 | 86 450 |
| Mining and quarrying | - | - | - | - | - | - | - | - |
| Manufacturing | 446 629 | 441 732 | 436 835 | 431 937 | 438 596 | 445 254 | 451 912 | 444 785 |
| Electricity, gas, water supply | - | - | - | - | - | - | - | - |
| Construction | 777 | 798 | 847 | 882 | 910 | 987 | 1 022 | 1 029 |
| Service industries | 71 154 | 76 247 | 81 491 | 81 945 | 92 505 | 102 958 | 66 482 | 78 395 |
| Other or unspecified | 20 874 | 22 662 | 24 444 | 24 712 | 23 041 | 23 547 | 19 694 | 20 492 |

Table 4.10. Concrete waste by industry. 1993-2000. tons

| Concrete waste | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Total | 610 000 | 637 500 | 661 100 | 665 100 | 726 300 | 751 000 | 734 500 | 715 000 |
| Households | 2 491 | 2 547 | 2 700 | 2 657 | 2 967 | 3 000 | 3 000 | 3 000 |
| Agriculture, forestry & fishing | - | - | - | - | - | - | - | - |
| Mining and quarrying | - | - | - | - | - | - | - | - |
| Manufacturing | 149 572 | 156 362 | 162 102 | 163 131 | 178 089 | 184 200 | 180 100 | 177 939 |
| Electricity, gas, water supply | - | - | - | - | - | - | - | - |
| Construction | 421 892 | 440 902 | 457 235 | 459 991 | 502 329 | 519 400 | 508 000 | 494 236 |
| Service industries | - | - | - | - | - | - | - | - |
| Other or unspecified | 36 044 | 37 690 | 39 063 | 39 321 | 42 915 | 44 400 | 43 400 | 39 825 |

Table 4.11. Other materials by industry. 1993-2000. tons

| Other materials | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|---------|---------|---------|---------|---------|-----------|-----------|-----------|
| Total | 918 364 | 863 904 | 833 073 | 773 562 | 907 953 | 1 061 863 | 1 200 864 | 1 173 394 |
| Households | 88 650 | 94 827 | 90 723 | 92 395 | 97 346 | 105 430 | 107 963 | 112 208 |
| Agriculture, forestry & fishing | - | - | - | - | - | - | - | - |
| Mining and quarrying | 18 614 | 21 288 | 23 218 | 26 560 | 26 870 | 26 324 | 26 734 | 25 593 |
| Manufacturing | 756 770 | 691 579 | 626 387 | 561 196 | 699 939 | 838 682 | 977 424 | 948 102 |
| Electricity, gas, water supply | 16 380 | 15 617 | 17 087 | 14 537 | 15 490 | 15 582 | 15 825 | 15 149 |
| Construction | - | - | - | - | - | - | - | - |
| Service industries | 37 950 | 40 594 | 47 300 | 47 831 | 44 639 | 45 644 | 46 354 | 44 376 |
| Other or unspecified | - | - | 28 358 | 31 042 | 23 668 | 30 201 | 26 565 | 27 967 |

Table 4.12. Hazardous waste by industry. 1993-2000. tons

| Hazardous waste | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Total | 620 850 | 639 886 | 627 941 | 607 704 | 595 892 | 709 173 | 631 050 | 631 050 |
| Households | 1 032 | 1 104 | 1 136 | 1 157 | 6 003 | 7 144 | 6 357 | 6 357 |
| Agriculture, forestry & fishing | - | - | - | - | 970 | 1 155 | 1 027 | 1 027 |
| Mining and quarrying | 5 105 | 5 261 | 5 162 | 4 996 | 81 198 | 96 634 | 85 987 | 85 987 |
| Manufacturing | 409 705 | 422 241 | 414 324 | 400 933 | 402 633 | 404 332 | 406 032 | 406 032 |
| Electricity, gas, water supply | 2 794 | 2 880 | 2 826 | 2 734 | 3 241 | 3 857 | 3 432 | 3 432 |
| Construction | 5 176 | 5 335 | 5 235 | 5 065 | 3 437 | 4 091 | 3 640 | 3 640 |
| Service industries | 932 | 960 | 942 | 912 | 41 899 | 49 864 | 44 370 | 44 370 |
| Other or unspecified | 196 106 | 202 106 | 198 317 | 191 908 | 56 512 | 142 097 | 80 204 | 80 204 |

Table 4.13. Sludge by industry. 1993-2000. tons

| Sludge | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Total | 328 259 | 291 636 | 275 940 | 258 836 | 302 794 | 324 134 | 352 113 | 366 992 |
| Households | - | - | - | - | - | - | - | - |
| Agriculture, forestry & fishing | - | - | - | - | - | - | - | - |
| Mining and quarrying | 7 832 | 9 720 | 10 118 | 10 309 | 11 216 | 11 026 | 10 816 | 11 076 |
| Manufacturing | 250 177 | 210 067 | 190 012 | 169 956 | 203 678 | 220 538 | 237 399 | 244 996 |
| Electricity, gas, water supply | - | - | - | - | - | - | - | - |
| Construction | - | - | - | - | - | - | - | - |
| Service industries | 70 250 | 71 850 | 75 810 | 78 570 | 87 900 | 92 570 | 103 898 | 110 920 |
| Other or unspecified | - | - | - | - | - | - | - | - |

4.3 Further actions

Although these tables show a considerable extension of the waste accounts, there are still a few issues that need to be investigated more fully. In particular, the treatment of imports and exports of waste has not been in particular focus. There can be a number of specific fractions or types of waste (for example, treatment of certain hazardous wastes) that this may be important for obtaining a more complete picture of solid waste in Norway. In recent years there has been an increase in the amount of household waste sent to Sweden for incineration / energy recovery. These types of flows need to be identified and a method for including them into the estimates needs to be developed.

5 Expenditures for water and waste water by municipal governments: Trial calculations

This year was the first year that all municipalities were required to submit their annual accounts electronically to Statistics Norway. In addition, the municipalities also had to adapt their accounting system to comply with the new accounting definitions and regulations. This means, at least theoretically, that the municipalities are all using the same definitions in their accounts. Methodology work was the focus in the spring while the municipalities reported and revised their accounts. Trial calculations were made in the autumn based on the reported data. A major part of the work was to develop a calculation methodology with respect to which expenses and income data to combine from the municipal accounts in order to make the trial calculations. The second major part of the work was to make the calculations and to understand what part of the picture we have of the different sectors.

The calculations for the waste water sector can be used as the basis for reporting to the OECD/Eurostat Joint Questionnaire for environmental protection expenditure and revenues. The calculations for the water sector can be used in relation to the water directive and Eurostat's regional questionnaire.

5.1 Electronic reporting and Internet publishing

During the past five years we have been involved with a major project, known as "KOSTRA," to standardize the accounting definitions and systems used by the municipalities and to establish electronic reporting. All reporting from the municipalities to the national authorities is to be via the KOSTRA reporting system. This includes all economic and most services reporting. During the project period, the number of municipalities reporting through the KOSTRA system has increased each year. This year the project was completed and all 435 municipalities were required to report via the KOSTRA system for the year 2001. Now that the KOSTRA system is starting to stabilise, it is possible to use this data for the development of new environmental protection and resource management statistics.

KOSTRA-data are published in the form of indicators and raw data for each municipality. Until now no national figures are calculated as a part of the KOSTRA system. Developing national figures are still part of the statistical portfolio work performed by the different divisions. The KOSTRA data and indicators are available on Statistics Norway's website (<http://www.ssb.no/kostra/stt/faktaark.cgi>) but are currently only published in Norwegian.

5.2 Data quality and revision

The values reported by the municipalities are published on the website without revision to provide information about all the municipalities as soon as it can be released (in March). This allows each municipality to check its reporting and also to see what other municipalities have reported. Within one month the municipalities should report new data if they find anything to correct in the published data. In this way the quality of the data is expected to improve since poor quality in the reporting or non-reporting will be obvious to all who examine the information.

In practice, however, the revision process is still an important component in obtaining reasonable data quality. The Division of Environmental Statistics is involved in the revision of municipal accounts data for the environmental (functional) accounts, because we have more interest in the details of the accounts than does the Division for Public Finances. This was a labour intensive work, because we did not have access to the database where these data are saved while under revision. In 2003 we will have permission to read the data in this database, however corrections will need to be co-ordinated through the Division for Public Finances.

In 2002, final accounting data was not available before November, mostly due to late reporting from several municipalities, but also because of the need for revisions in the data reported. It is likely however that the time used for revision will be shorter next year when all municipalities have had the experience of reporting electronically, have become familiar with the new accounting system, and the first-year start-up and technical problems have been solved.

5.3 Data format and data archiving

When the revision is done, the data are saved as a flat file on a Unix machine (\$OFFREGN). Our starting idea was to use these data as our raw data. By choosing this solution, we wanted to make sure that our environmental protection expenditure statistics was based on the same raw data as the municipal accounts statistics, so that the two statistics are more consistent with each other. During the process we found out that this was not a practical solution, because the Unix-file is an aggregate file having data only for the municipal sector as a whole. Since the environmental protection expenditure (EPE) system we are building up should be able to calculate figures for municipal and county levels, as well as aggregate national data for JQ-reporting, we needed another more detailed data file for this use.

The solution we chose was to export data directly from an intermediate database (KOSTRA EXP), which lies between the accounts revision database (KOSTRA-komøk) and the KOSTRA-system. We can extract defined data/variables from this database into an Excel sheet, and from there, convert it into a SAS data set to use in our EPE system.

Choosing this solution means that we have to aggregate the data to national level figures. We might therefore end up with figures that are not totally consistent with other public finances and national accounts statistics due to estimations or other adjustments to the final data files. We also need to examine the potential for double-counting more carefully. It will be necessary to keep close contact with these two divisions in order to work out a plan for overcoming these weaknesses. Exactly which database and how to coordinate all of this with the other divisions needs to be discussed further before a final system can be established.

5.4 Geographical levels and economic definitions

As mentioned above, we want to establish one flexible calculation system that can be used in the future to develop information at a national level, a county level (NUTS3), a municipal level (NUTS5), and a watershed level (aggregations of NUTS5 that are not the same as NUTS3 or NUTS4). To be able to extract data according to these different geographic areas, it is necessary to have detailed data that can then be aggregated in all of these different ways. For this reason we are focusing our efforts at the most detailed data level we have available, i.e. 435 municipalities (434 from 2003), rather than using national accounts data which are already aggregated to the national level.

However, so that the statistics being developed using the detailed values will correspond as much as possible with the national accounts data, we need to use the same definitions in terms of how the municipal accounts are combined and used in the national accounts. These definitions have to be changed due to the new municipal accounting system. This work is not yet completed in the relevant divisions (i.e. national accounts and public finance), therefore, we will have to re-evaluate our current calculation models when the final definitions have been established by these other divisions. For this reason the data presented must be considered preliminary figures, however, large revisions to these calculations are not anticipated.

In addition, there is a specific definition used by the Ministry of Environment to calculate cost coverage (incl. depreciation) that is different from the standard national accounts definition that also needs to be included in the database in order to satisfy national information needs.

At this time we are using the municipal accounts and aggregating them into national level figures to provide the first tentative calculations for reporting to the JQ. Aggregating the data to NUTS2 for reporting to the Eurostat regional questionnaire will also be possible although some different estimation techniques may need to be considered if there are a large number of municipalities that are not reporting in a year.

5.5 The municipal accounts system

There are five functional accounts in the municipal accounting system that cover expenditures for water and waste water. These are:

| <u>Functional account No.</u> | <u>Description</u> |
|-------------------------------|---|
| • 340 | Production / purifying of water |
| • 345 | Distribution of water |
| • 350 | Waste water treatment |
| • 353 | Waste water network / collection of waste water |
| • 354 | Emptying of septic tanks |

In addition, the accounting system is divided into two parallel accounting systems: one for current expenditures/costs and one for investment expenditure. Both systems use the same set of accounts (posts) although some posts are not valid in both systems. The main group of accounts are:

- Salaries and social contributions (posts 010-099)
- Purchase of materials and services that are used for the municipality's own production (posts 100-290)
- Purchase of material and services that are substituted for the municipality's own production (posts 300-380)
- Transfers to others - expenses (posts 400-480)
- Financing expenses including interest expenses and depreciation (posts in the 500s)
- Income from sales and from fees for services (posts in the 600s)
- Refunds (posts in the 700s).
- Transfers from others, income including subsidies (usually from the regional or state government) (posts in the 800s)
- Financial income and transactions including sales of stock shares (posts in the 900s).

5.6 Towards an operational definition of JQ-variables

From the 2002 EPER Joint Questionnaire, Table 4A Public Specialized Producers of Environmental Protection Services, the following 6 main variables are to be reported.

- A. Investment expenditures (total investments)
- B. Internal Current expenditures (total material and labour costs)
Note: Includes total intermediate consumption and compensation of employees (excluding Purchases of EP services and depreciation/CFC)
- C. Receipts from by-products (Energy, recycled materials and revenues from non-environmental activities)
Note: Sales of by-products generated in the production of the EP service such as energy and recycled materials + revenues from non-environmental activities
- D. Subsidies/transfers received
Note: All subsidies and other transfers received which finance environmental protection in the sector minus payments of ear-marked environmental taxes.

- E. Fees/Purchases - payments of environmental services
Note: Payments for external environmental protection services
E2. Of which to the public sector
- F. Revenues - total revenues from the environmental (main) activity

Each of these variables has been examined and a calculation method is proposed based on the data available from the KOSTRA accounts.

5.6.1 Investment expenditure (A)

The definition for **Investment expenditure** from the EPER-JQ 2002 is:

4.1 Investment expenditure (A)

Investment expenditures include all outlays in a given year (purchases and own-account production) for machinery, equipment and land used for Environmental Protection purposes.

Based on that definition the calculation from the KOSTRA accounts is proposed as follows:

Investment expenditure (KOSTRA) - net investment

(from the investment expenditure account)

| | | |
|---|---|----------------|
| + | Salaries and social contributions | posts 010:099 |
| - | Refunds received for sick leave payments | post 710 |
| + | Purchase of materials and services for own production | posts 100:285 |
| + | Internal purchase | post 290 |
| + | Purchase of material/services that substitutes own production | posts 300:390 |
| + | Transfer expenses to others | posts 400:489 |
| - | Internal sale | post 690 + 790 |
| - | Deductions for sales of diverse products and services | post 600:670 |

5.6.2 Internal current expenditure (B)

The definition for **Internal current expenditure** from the EPER-JQ 2002 is:

4.2 Internal Current expenditure (B)

Internal current expenditure includes the use of energy, material, maintenance and own personnel for measures made by the sector to protect the environment. A large part of internal expenditure is related to operating environmental protection equipment. There are also other internal expenditure such as general administration, education, information, environmental management and certification, research and development.

Internal current expenditure exclude purchases of environmental protection services bought from the Public sector or Specialised producers such as waste collection, sewage treatment, environmental consultancy services, or surveillance fees. All such purchases should be reported under Fees/Purchases as they only finance EXP I in other sectors.

Based on that definition the calculation from the KOSTRA accounts is proposed as follows:

Internal current expenditure (KOSTRA)

(from the current expenditure account)

| | | |
|---|---|----------------|
| + | Salaries | posts 010:080 |
| - | Refunds received for sick leave payments | post 710 |
| + | Social contributions | posts 090:099 |
| + | Purchase of materials and services for own production | posts 100:285 |
| + | Internal purchase | post 290 |
| - | Internal sale | post 690 + 790 |

5.6.3 Receipt from by-products (C)

The definition for **Receipts from by-products** from the EPER-JQ 2002 is:

4.3 Receipts from by-products (C)

Sometimes Environmental Protection activities produce by-products that have an economic value. These could either be sold and generate revenues, or be used internally and lead to reductions in costs. Examples include energy generated or material recovered, as a result of waste treatment. There should always be a specific Environmental Protection activity (and expenditure) that these receipts stem from. Receipts from by-products is the sum of the sales value and the value of the cost-saving (if used internally) related to these by-products.

Energy or material savings due to more efficient processes and other productivity gains resulting from Environmental Protection activities are not to be included as Receipts from by-products.

For Specialised producers (Table 4), this variable should be interpreted as revenues from by-products plus revenues from non-environmental protection activities, see 3.4 above.

Based on that definition the calculation from the KOSTRA accounts is proposed as follows:

Receipts from by-products (KOSTRA)

(from the current expenditure account)

| | | |
|---|---|--------------------------|
| - | Deductions for sales of diverse products and services | post 600:630 and 650:660 |
|---|---|--------------------------|

5.6.4 Subsidies/Transfers (D)

The definition for **Subsidies/transfers** from the EPER-JQ 2002 is:

4.4 Subsidies/Transfers

Subsidies/Transfers include all types of transfers financing Environmental Protection activities in other sectors, including transfers to or from other countries. These constitute part of financing expenditure for the paying sector, and reduce the financing of EXP I in the receiving sector. When a sector both receives and gives transfers, the net amount should be recorded.

Included are payments of so called "**ear-marked**" **environmental taxes** (e.g. general pollution taxes), which are not payments for a bought service but where the revenues are ear-marked for financing environmental protection measures. Payments of general environmental or green taxes (such as energy taxes) where the revenues are not ear-marked for financing environmental protection measures are excluded.

Based on that definition the calculation from the KOSTRA accounts is proposed as follows:

Subsidies/transfers (KOSTRA)

(from both the investment expenditure and the current expenditure accounts)

| | | |
|---|---|-----------------------|
| + | Transfer expenses to others (current exp. acc. only) | posts 400:440+460:480 |
| - | Refunds from the state | post 700 |
| - | Refunds from the regional administrative level | post 730 |
| - | Refunds from other municipalities (inv. exp. acc. only) | post 750 |
| - | Refunds from private entities | post 770 |
| - | Transfers from the state | post 800:810 |
| - | Transfers from the regional administrative level | post 830 |
| - | Transfers from other municipalities (inv. exp. acc. only) | post 850 |
| - | Transfers from quasi-public entities | post 880 |
| - | Transfers from private entities | post 890 |

5.6.5 Fees/purchases (E)

The definition for **Fees/purchases** from the EPER-JQ 2002 is:

4.5 Fees/Purchases

Fees/Purchases includes all purchases of environmental protection services, both from public and private producers. These payments are clearly linked with an environmental protection activity done outside the enterprise and should exclude e.g. fines and penalties. The payments include:

- Payments to specialised producers (enterprises) for waste and wastewater collection and treatment and payments to environmental consultants linked e.g. with environmental management and education.
- Payments to Public sector for waste and wastewater collection and treatment (whatever the name of the payments – fees, charges etc) as well as permits and surveillance fees.

Payments of taxes directly used for financing environmental protection expenditure – so called earmarked environmental taxes are excluded, but should be reported as Subsidies/Transfers.

Payments of general environmental or green taxes (such as energy taxes) are excluded completely from this questionnaire.

Based on that definition the calculation from the KOSTRA accounts is proposed as follows:

Fees/Purchases (KOSTRA)

(from the current expenditure account)

| | | |
|---|---|---------------|
| + | Purchase of material/services that substitutes own production | posts 300:390 |
|---|---|---------------|

5.6.6 Revenues (F)

The definition for **Revenues** from the EPER-JQ 2002 is:

4.6 Revenues

Public sector and Specialised producers receive the payments for bought environmental protection services (the Fees/Purchases). This is entered as revenues in the respective sector. These revenues should be deducted from abater expenditure (EXP I) in order to evaluate their financing expenditure (EXP II)

Based on that definition the calculation from the KOSTRA accounts is proposed as follows:

Revenues (KOSTRA)

(from the current expenditure account)

| | | |
|---|---|----------|
| - | Fees | post 640 |
| + | Transfer expenses to other municipalities | post 450 |
| - | Refunds from other municipalities | post 750 |
| - | Transfers from other municipalities | post 850 |

5.7 Public and private sector data

The methodology set up in this project makes it possible to calculate and report data for JQ table 4A - public specialised producers for the environmental domains waste water and waste. There will however be a number of weaknesses related to these data until 2005, when the new accounting system will have been implemented in all publicly owned enterprises.

For defining the border between public and private specialised producers we have used the accounting laws. For some time there has existed a number of different types of municipal-owned public enterprises. New regulations have been devised to streamline the regulations concerning the different types of enterprises, and to reduce the number of different types of organisation formats and accounting practises. By the year 2004 these regulations will have been implemented so that all of the different types of public companies will have to report their accounts according to the KOSTRA accounting system (in 2005). All of the enterprises reporting their accounting data according to the KOSTRA accounting principals will be categorised "public" by our definition. Private companies follow another accounting system established in the Norwegian accounting law. Municipal-owned limited companies will report their accounting data according to the principals established in the accounting law, and will therefore, be categorised as part of the "private" sector.

For some environmental domains the public sector covers the main proportion of the activities, while this is not the case for others. The waste water sector is primarily operated by the municipalities. Therefore the figures in JQ Table 4A (Public Specialized producers) and Table 4 (Public and Private specialized producers) are not expected to be very different. There are, however, some large inter-municipal waste water treatment enterprises that are currently not reporting to the KOSTRA system that will be reporting in 2003 so that the coverage of the public sector specialized producers will be improving in the future.

The water sector, on the other hand, has a number of private companies that sometimes serve a majority of the population in an area. This privately-owned portion of these sectors will need to be investigated in further detail. NACE 41 Collection, purification and distribution of water is an established statistical area so the information available for this NACE division should be fairly easily available. However, the private water sector includes a large number of small water plants, and we need to find out to what extent their accounts are reported and included in the business register. We know also that the National Institute for Public Health collects some economic data from private water producers.

NACE 90, on the other hand, needs to be improved and the latest NACE revision needs to be implemented. In Norway there has been a detailed breakdown of NACE 90 into waste water and waste. Once NACE 90 has been re-coded in a way that allows for the separation of the solid waste and wastewater treatment enterprises these different portions of the sectors can be investigated for further development. It is planned that NACE 90 will be a focus for the business register in 2003.

5.8 Trial calculations

Trial calculations are made only on 2001 data because the municipal accounts for the functions and the accounts (posts) have a number of changes from earlier years. The 2001 data use the most recent municipal account definitions and allow for the most precise estimates for reporting to the JQ.

Almost all municipalities had reported their accounts when the calculations were done. For the 6 municipalities that had not reported, we have estimated data. The estimations were done by calculating average economic variables per capita for each county. These factors were then used to estimate figures for the municipalities who had not reported.

The table presents calculations according to the Eurostat definitions and can be used for reporting to the JQ in 2004 (assuming these definitions are the same as those in JQ-2002). These calculations use a different definition and another data source than the figures previously reported, which have been calculated from the Norwegian waste water statistics that uses another definition (cost instead of expenditure). The operationalisation of the JQ-economic variables differs from the definitions and concepts used in the statistics on the Norwegian municipalities' economy. This means that we have to make different calculations to produce tables for use in Norway and for the Eurostat reporting. Statistics for national use are calculated to show the annual cost of the sector (and therefore include

depreciation and calculated interest cost) instead of the financial outlays of a given year. They also include estimates of overhead. This means that the time series previously reported to Eurostat/OECD may need to be re-estimated since we can now produce the statistics with definitions that are closer to the specified definitions in the JQ.

Table 4.14. Public specialized producers: Waste water and water. 1000 NOK. 2001.

| 2001 | Waste water | Water |
|---|--------------------|------------------|
| Investment expenditures A | | |
| • Total investments | 1 723 628 | 1 372 559 |
| Internal Current expenditures B | | |
| • Total material and labor costs | 1 725 016 | 1 430 267 |
| Receipts from by-products C | | |
| • Energy, recycled materials and revenues from non-environmental activities | 156 645 | 94 176 |
| Expenditure I (= A + B - C) | 3 291 999 | 2 708 650 |
| Subsidies/Transfers D | | |
| • Received | 114 428 | 105 238 |
| Fees/Purchases E | | |
| • Payments of environmental services | | |
| ○ of which to Public sector (table 1) | 638 615 | 371 271 |
| Revenues F | | |
| • Total revenues from the environmental (main) activity | 4 114 214 | 3 132 689 |
| Expenditure II (EXP I - D + E - F) | -298 028 | -158 006 |

It is not surprising that Expenditure II is negative. The prices on municipal waste water are generally based on the polluter pays principle. For municipal fees there has for a long time existed guidelines on how to calculate the municipality's annual cost concerning a given service. This annual cost sets the upper limit for how much income the municipality can take from fees. Most municipalities have decided to let the polluter pay the annual cost for waste water and also the whole cost of production of the water service.

In calculating annual costs according to the Norwegian Ministry of the Environment method, more expenditures are included than are included in the standard Eurostat/OECD JQ EPEA-tables. Capital costs are calculated based on annual depreciation plus a calculated interest cost on the capital goods in the balance. In addition, overhead costs are also included. This means that ideally the Expenditure II in the Norwegian water and waste water cost statistics, is 0.

In reality, however, this changes from year to year. Some municipalities have more income than costs for a given year, and must therefore adjust their fee income for the next year. Since not all municipalities follow the polluter pays principle for waste water, the total fee income for the country is usually lower than the total costs. For 2001 the fee income from subscribers in the municipal waste water sector amounted to NOK 3.99 billion, while the total annual cost amounted to NOK 4.40 billion. This means that the fee income covered 91 per cent of the costs only, and the Norwegian expenditure II was positive.

Currently there is no established cost statistics for the municipal water sector. Norway's last reporting to Eurostat's regional questionnaire only included cost data for waste water and not for water. Due to the EU Water Directive this information will need to be established in the near future and this current work will help to provide some important evaluation of the data availability for these new information needs.

Originally the 2001 municipal data were supposed to include accounts data from the municipalities' inter-municipal co-operations. Due to technical problems this was not done. Therefore we know that the elements included in the JQ Expenditure I - calculations are underestimated in the data presented above. In addition inter-municipal corporations are not yet required to report accounting data according to the KOSTRA accounting system, and are therefore not included either (in Exp. I). All

together these two types of establishments cover some of the very large waste water treatment plants, which means that the underreporting of investments and current expenditure for the public specialised producers might be considerable. This situation is expected to improve next year for the inter-municipal co-operations and at the lack of reporting will be solved at the latest by the reporting year 2005 (for accounting year 2004) when the inter-municipal corporations are required to report to KOSTRA.

5.9 Further work

Until all of the various types of enterprises are reporting to the KOSTRA system, it will be necessary to try to obtain some estimates from the Division for Public Finance for these enterprises outside the KOSTRA system in order to be able to calculate better estimates for reporting to Eurostat in the 2004 Joint Questionnaire. At this time it is not clear what the proportion of the total waste water sector (or water sector) these non-reporting entities cover. Some of the costs relating to these enterprises may be found in the municipal accounts but this is currently unclear. Finding information regarding inter-municipal waste water enterprises will need to be the first priority since a number of these are very large and service large portions of the population especially in the greater Oslo metropolitan area.

6 Expenditures for solid waste by municipal governments: Trial calculations

6.1 Current situation in Norway

The waste sector in Norway has a combination of actors including municipal governments, inter-municipal co-operations, inter-municipal corporations, municipal-owned public limited companies, municipal separate establishments and private enterprises. Because of the combination of all of these different actors it is more difficult to develop statistics since the possibility for double counting is high. We are first concentrating on developing statistics for the entities that report accounting data according to the municipal government accounting system and definitions. These entities would be primarily reported on the Joint Questionnaire 2002 EPER on Table 4A Public Specialized Producers. The activity in the private waste collection and treatment enterprises (incl. the municipal-owned public limited companies) would be reported on Table 4.

There has been a new law in Norway allowing for municipalities to establish various types of enterprises. These different types of enterprises need to report their financial information either according to the KOSTRA municipal accounts system or according to the principles for private enterprises. The municipalities, inter-municipal co-operations, inter-municipal corporations and the municipal separate establishments are required to report their financial information according to the KOSTRA municipal accounts using the same accounting structure and principles as the municipalities themselves. The municipal-owned public limited companies are publicly owned but their financial information is to be reported according to the accounting structure and principles of limited liability companies and not KOSTRA.

The current project has focused on those entities that currently report according to the KOSTRA municipal accounting structure and principles. Currently the municipalities, inter-municipal co-operations and the municipal separate establishments are reporting according to the KOSTRA municipal account structure and principles. However, the data quality of the municipal co-operations and municipal separate establishments in relation to the municipal accounts is poor. Improving the data quality and consistency between the various entities (for example, expenses from municipal accounts is the same as income in the co-operation and separate establishment accounts) is of concern and will be the focus of additional work to try to be improved in the coming years. The inter-municipal corporations are not reporting according to KOSTRA principles but are scheduled for reporting from 2005 (for 2004). The Ministry of Local Government and Regional Development has postponed the required reporting to KOSTRA for these types of enterprises from 2004 to 2005 so there will be yet another year before these data become available.

For this project, a short investigation was made regarding the private and municipal-owned public limited companies in the business register. These entities report financial data according to totally different principles and definitions since they follow a different legal accounting framework. These entities are of interest because in the future they will need to be included to obtain a complete picture of the waste sector in Norway.

We wanted to check what kind of information we could currently get from NACE 90 in the business register. Unfortunately, the Business register currently has only one NACE 90 category, but with the NACE revision (rev 1.1.), the enterprises in this category will need to be reclassified into 90.01 Collection and treatment of sewage, 90.02 Collection and treatment of other waste and 90.03 Sanitation, remediation and similar activities. Before this is done it is not possible to separate out (by codes) solid waste enterprises from the other NACE 90 enterprises in the register. This last portion of the waste sector will need to wait for development until the business register is revised. The coding of the NACE 90 rev.1.1 has been started in 2002, so hopefully we might start to use these data in 2003.

For this reason we have focused on those entities that use the KOSTRA accounting system and definitions.

In the municipal accounts (and in the accounts for entities that will also use/report according to this accounting system) there are currently two accounts that are specific for solid waste:

| <u>Functional account No.</u> | <u>Description</u> |
|-------------------------------|---|
| • 355 | Collection of consumer waste |
| • 357 | Recycling and final treatment of consumer waste |

A third account is also used for expenditures related to production waste:

| <u>Functional account No.</u> | <u>Description</u> |
|-------------------------------|--|
| • 320 | Municipal industry activity, including operation of municipal-owned farming property, forests, electricity product, collection and treatment of production waste, etc. |

The reason for the third account is based on the Ministry of the Environment's current definition of waste for which the municipalities have responsibility, i.e. consumer waste, and the requirement by law that the costs related to the collection and treatment of consumer waste is paid for in full by the producers of this waste (polluter pays principle). Under this law the municipalities are not allowed to earn money in the collection or treatment of consumer waste.

On the other hand, there are no restrictions limiting the earning of profits associated with the collection or treatment of production waste. This split is not seen to be too important with regards to total expenditures for waste collection and treatment since there are only a minority of municipalities that still have waste collection and treatment activities that include production waste. Private waste collection enterprises, and not the municipalities, usually handle production waste.

The following box provides the definitions of waste currently being used in Norway.

Principal waste terminology

Consumer waste:

Normal waste, including larger items such as fixtures and fittings etc., from households, smaller shops and offices. The same applies to waste of similar type and quantity from other businesses.

Production waste:

Waste from industry and services, which in type or quantity differ significantly from consumer waste.

Hazardous (Special) waste:

Waste that cannot be adequately dealt with together with consumer waste because it may lead to serious pollution or hazards that are damaging to humans or animals.

Household waste:

Waste from private households.

Industrial waste:

Waste from public and private enterprises and institutions.

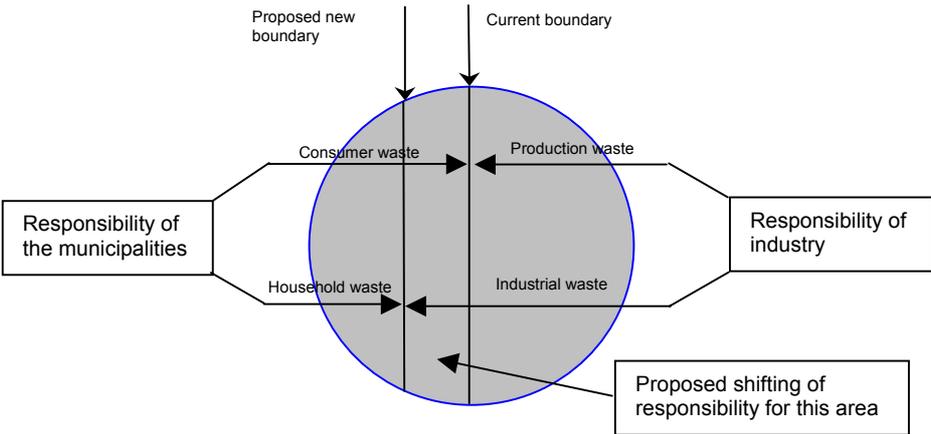
Municipal waste:

All waste that is dealt with by municipal refuse disposal, i.e. almost all household waste and large amounts of industrial waste.

The Ministry of Environment has proposed changing the municipalities' area of responsibility within the waste sector. Currently the municipalities are responsible for consumer waste whereas the proposal is for them to be responsible for only household waste. The following figure shows the current and proposed waste types and which entities are responsible for the collection and treatment of these different waste types.

(Note: Parliament's Energy and Environment Committee has approved this change in the law on 6. February 2003 and the changes will become effective 1. July 2004).

Figure 6.1 Current and proposed solid waste definitions and respective responsible entities



From the municipal accounts it is currently possible to obtain an overview of the expenditures related to consumer waste. When the Ministry of Environment changes the boundary of responsibility from consumer waste to household waste, the municipal accounts will probably be changed accordingly, and the situation will need to be re-evaluated since the expenditures in the municipal accounts will then only provide good information for household waste.

6.2 Calculation Approach

The calculations for municipalities that have municipal activity for waste collection and treatment will follow the calculation model presented in the section for water and wastewater (see section 5 of this report). The calculations will provide a picture of the municipalities' own production. But from the way the accounts are set up it is also possible to identify some of the demand side for purchases of services from others.

For municipalities that purchase some or all of their waste collection and treatment activity from others, these transfers of funds will be identified in the following posts in the functional accounts 355 Collection of consumer waste and 357 Recycling and final treatment of consumer waste:

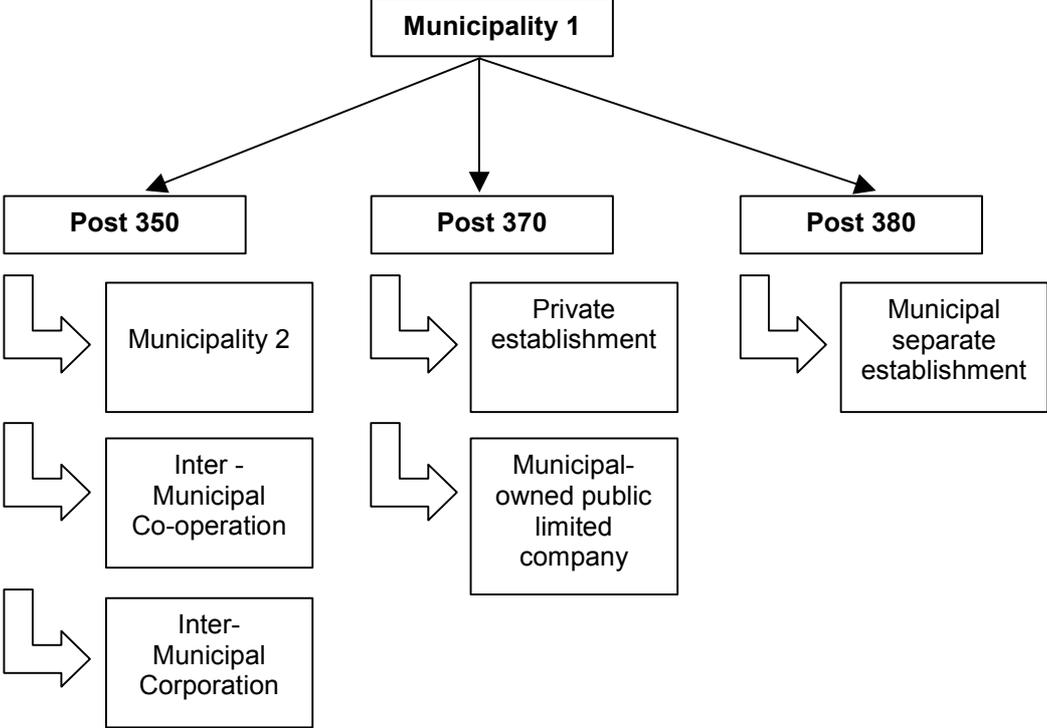
| <u>Post No.</u> | <u>Description</u> |
|-----------------|---|
| • 350 | Purchase of services from other municipalities, inter-municipal co-operation, inter-municipal corporations, |
| • 370 | Purchase of services from private establishments and municipal-owned public limited company, |
| • 380 | Purchase of services from municipal separate establishment |

The information from these posts will identify the amounts that need to be subtracted from municipal activity and which should be located in the results from the inter-municipal co-operations, inter-municipal corporations, municipal separate establishments, municipal-owned public limited companies and private enterprises.

From the physical solid waste statistics reporting from the municipalities, it is possible to map fairly well which municipalities use which solid waste treatment facilities (corresponding to functional account no. 357 Recycling and Final treatment of Consumer Waste). Unfortunately it is not possible to know exactly which collection enterprises are used although the name and the ownership in the municipal-related entities will provide some clues from the KOSTRA data and the Business register. The following figure shows how the municipal accounts can be used to determine how much is purchased from others and how much is performed by the municipality itself. The activity of the municipality itself can be identified using a calculation of internal current expenditure (see section 5

for this definition). The amount purchased from others can be identified by specific entries in each of the functional accounts (posts 350, 370 and 380).

Figure 6.2 Schematic of municipal and other actors in the waste collection and treatment sector



Since the municipalities, inter-municipal co-operations, inter-municipal corporations (post 350) and the municipal separate establishments (post 380) all use the same accounting system and definitions it should be possible to combine the data from these KOSTRA sources to obtain a reasonable picture of the municipal activity in the waste sector. For example, the payment from Municipality 1 to Municipality 2, should show up as an expense in the accounts of Municipality 1 and as income in the accounts of Municipality 2. Those with responsibility for the municipal accounts are attempting this type of co-ordination and checking and it is hoped as the KOSTRA accounting system is implemented and used for some time, that the data quality will improve. Currently these types of balancing checks are performed only at a very aggregated level and not at the functional accounts level.

6.3 Trial calculations

For this year's trial calculations we should be able to obtain estimates that include the own-production of the municipalities and the associated activity from the inter-municipal co-operations and the municipal separate establishments. The inter-municipal corporation information will unfortunately not be available until 2005. It should be possible, however, to obtain a rough estimate of the demand side for these inter-municipal corporations and for the private enterprises and municipal owned public limited companies.

Again, due to the changes in the accounting definitions, the trial calculations will be made only on 2001 data.

Table 6.1. Public specialized producers: Solid Waste. 1000 NOK. 2001.

| 2001 | Waste |
|---|-----------------|
| Investment expenditures A | |
| • Total investments | 107 672 |
| Internal Current expenditures B | |
| • Total material and labor costs | 827 477 |
| Receipts from by-products C | |
| • Energy, recycled materials and revenues from non-environmental activities | 200 697 |
| Expenditure I (= A + B - C) | 734 452 |
| Subsidies/Transfers D | |
| • Received | 5 104 |
| Fees/Purchases E | |
| • Payments of environmental services | |
| ○ of which to Public sector (table 1) | 1 825 374 |
| Revenues F | 2 746 934 |
| • Total revenues from the environmental (main) activity | |
| Expenditure II (EXP I - D + E - F) | -192 212 |

A brief examination of these figures shows that the amount reported as "Fees/Purchases E" is considerably larger than Expenditure I. It was reasoned that this was due to the privatisation of the waste collection and treatment in Norway. If this were the case then there would be a large figure for purchases recorded under post 370, which is the post where purchases from private establishments should be recorded. To try to identify what type of enterprise the municipalities were purchasing services from the detailed figures for posts 350, 370 and 380 were investigated and the following values were calculated:

| | | |
|-----------|--------------|------------------|
| Post 350: | in 1000 NOK: | 1 096 097 |
| Post 370: | in 1000 NOK: | 636 603 |
| Post 380: | in 1000 NOK: | 64 599 |
| TOTAL: | in 1000 NOK: | <u>1 797 299</u> |

From these detailed breakdowns, it appears that the municipalities are purchasing waste services for NOK 636 million from the private sector, NOK 64 million from municipal separate establishments and NOK 1 096 million from other municipalities, inter-municipal co-operations and corporations.

Ideally we would expect that the amount calculated for post 350 should not exceed Expenditure I since the cost of services purchased from other municipalities (total of post 350) is expected to be lower than the total cost of all services produced. However this is not what is observed. It appears that the municipalities' own-production totalled NOK 734 million and yet services purchased from the municipalities (and inter-municipal co-operations and corporation) were NOK 1 096 million. It does not seem likely that services were purchased for more than were produced.

The probable explanation for the big difference between E - fees/purchases (NOK 1 825 374) and Expenditure I (NOK 734 452) is that we lack the supply side of the part of post 350 consisting of the inter-municipal co-operations and the inter-municipal corporations (they do not report to KOSTRA at this time, but will in the future). There are many of these types of enterprises in the waste sector so it is not surprising at this point in time that these two figures do not balance.

In this respect, it is the financing part of the table (Fees and revenues) that gives the best estimate of the expenditure level in the public waste sector. Even though a large amount of waste companies are separated into municipal separate establishments or some kind of inter-municipal co-operation, most of the revenues are collected through the municipality and therefore show up in the revenue side of the municipal accounts. Only about 10 per cent of the waste companies that provide waste services to households bill the subscribers directly.

6.4 Conclusion

As the number and types of establishments that report to the KOSTRA system increase, the use of the municipal KOSTRA accounts to developing statistics related to the public waste sector should improve. At this point we have only a partial picture of the public sector waste sector.

These calculations also point out that it is very important to obtain a fuller picture of the production of the inter-municipal co-operations and inter-municipal corporations in order to develop a clearer picture of the waste sector in Norway.

6.5 Further work

Estimates for the non-KOSTRA reporting public enterprises need to be obtained from the Division for Public Finance. The figures may not be as detailed as for those that report to KOSTRA, but some estimates could help to fill in the gaps until they do report in 2005.

Also as the business register is updated, information concerning an additional portion of the waste sector will become available. Unfortunately the only financial parameters available in the business register are turnover and employees. This information will be of some help in the further develop of economic information for the waste sector as a whole since it will give some information regarding the private waste sector.

7 Developing statistics for public sector (central government) environmental protection expenditure

Our NOREEA work has, until now, focused on local government expenditures for the environment. The next step in developing an overall view of public sector environmental protection expenditure is an analysis of the central government budget. The Italian Istat methodology for calculating General Government expenditure on environmental protection (ACCT-EXP/99/4.2.5) and the work by Austria concerning general government EPE was used as starting points for developing the Norwegian methodology. In addition to the budget analysis methodology and analysis it was also necessary to evaluate the various databases that are used by the division of public finance and the division of national accounts and obtain access to the right databases before the trial calculations could be attempted.

7.1 Data sources

After discussions with both the Division for national accounts and the Division for public finances it was decided that we had to work with the central government accounts data file and not the national accounts data files. The reason was due to the level of detail that is required for this analysis. The central government accounts data file contains the references to the specific records in the government accounts and the government budget, whereas the national accounts data file does not have these identifying details.

The division of environmental statistics does not normally have access to the database where the central government accounts are maintained while under revision or to the database where they are saved when finalised. It was necessary to obtain access to these data. We obtained limited access (lasting for one year) to these files related to this project. A file with one year's data (2001) was extracted from the database and served as the basis for our trial calculations. Once the methodology is more established it will be necessary to discuss the need for regular publishing and reporting of these data to the OECD/Eurostat Joint Questionnaire with the division for public finances.

7.2 Data formats and terminology

The final central government accounts data is saved as a SAS data set (Unix \$STATREGN), which makes it very easy to use directly in our future (hopefully "semi-automatic") calculation system for developing public sector environmental protection expenditure statistics. The calculation system that we are setting up will also be SAS-based and will be linked to this final set of data. This is the same file that is used in the National Accounts for government figures. By choosing this solution, we make sure that our environmental protection expenditure statistics are based on the same raw data as the government accounts data in the national accounts, and thereby the two statistics are made as consistent as possible with each other.

For this trial project we used Excel. The SAS data set was exported as a tab-delimited file and imported into Excel. All the further classification work was done in Excel, before the data were converted back into a SAS data set and used as input for producing the final tables presented in this report. The final concepts/economic variables used are consistent with the national accounts terminology, and therefore the EPE calculation programs could be built on the same programmes as is used for other types of expenditures separated out from the national accounts, for example environment-related taxes and the tourism satellite accounts.

7.3 Setting up the budget analysis system

The next step of this work was to develop a budget analysis methodology. First, gaining familiarity with the government accounts and budget system was necessary.

The Italian Istat methodology for calculating General Government expenditure on environmental protection (ACCT-EXP/99/4.2.5) and the work by Austria concerning general government EPE was used as starting points for developing a Norwegian approach. We have also used several techniques from the Danish system, which we learned about during a visit at Statistics Denmark. The annual publication on public environmental expenditures and income from Statistics Denmark (Danmarks Statistik, 2002) has also been used as a template for the type of publication that we would like to produce in the future.

The first step of the Istat methodology consists of identifying the posts of expenditure to be recorded as EPE. We used the Istat coding system as a starting point, but supplemented it to fit specific Norwegian purposes. The expenditure and income posts in the 2001 central government accounts were first coded according to the following categories:

- 0 Non-Environmental Protection Expenditure (NEPE)
- 1 Environmental Protection Expenditure (EPE)
- 2 Non-Homogeneous Expenditure (NHE)
- 3 Uncertain Expenditure (UE)
- 5 Non-earmarked environmental taxes
- 9 Specific Norwegian environmental categories: Management of natural resources, energy savings, outdoor recreation and cultural heritage

The central government accounts file had a total of 5100 records, of which 3982 were expenditure items, and the rest were income posts. We focused especially on the expenditure posts and not so much on the income posts. There are no earmarked taxes for environmental protection use in Norway so there are few specific income posts that are important in this context.

Codes 0-3 are the standard codes used in the Istat methodology. We also wanted to code the environmental taxes in this data file, for possible later use. These were given the code 5. For specific Norwegian use (not for Eurostat/OECD reporting), we wanted to be able to identify the records that are not considered environmental expenditure according to CEPA definitions, but which are considered environment related in Norwegian politics and in a broader Norwegian context and which are also resource management related. Outdoor recreation and cultural heritage are defined thematic areas within Norwegian official environmental politics and these were given specific codes (see appendix to this chapter for the full coding list in Norwegian). Other fields that are also considered environmentally related are energy savings and management of natural resources. All of these were given the code 9, such that they may be identified for further development and analysis at a later stage.

The coding was done in the printed version of the government accounts, because contrary to the government accounts file, the printed Ministry budgets give brief information about the actual expenditure/income (through the name of the record and other descriptive text). In the electronic version there is no text information, only the account identification numbers. After the coding was completed in the written budget documents the codes were transferred to the electronic version by defining a new variable in the electronic account file.

Using this coding approach meant that those records coded with a "0" could be automatically eliminated and those coded with "1" would be included in their entirety. The records given code 2 and 3 had to be investigated further. After the first coding, 323 records were given code 3. These had to be checked further, to find out if they should be included or excluded from the EPE. For the records coded with 2 and for those coded 3 that were to be included in the EPE calculations, it was necessary to determine a percentage of the post that would be included. The different Ministries' budgets were used for this purpose. Each Ministry's budget is presented in its own White paper. In total, 16 White papers were studied for this part of the NOREEA project.

A specific study was done for each ministry by carefully examining the compulsory chapter on environment in each budget. This was done to check whether we had missed some important environmental expenditure by only identifying expenditures by each record's name/title. This was a very important part of the study. Some ministries provided relatively detailed additional information, and helped specifically to identify important non-homogenous expenditure posts. For some ministries reference was given to the specific post (record) in the account, while for others the reference was not made explicit. For some ministries there was little specific information, which meant we were not able to identify the expenditure in the account. This study showed that there are big differences in the different ministries when it comes to reporting, identifying and defining environment related expenditure. Some use a fairly narrow definition of environment related expenditure, while others interpret this in a very broad sense. The interpretation and information provided in the budget documents from each Ministry influenced the final calculation model that was developed.

These budgets from each Ministry were also used both for quantifying the non-homogeneous expenditure and for classifying EPE and NHE according to the applicable CEPA categories. For the NHE posts (code 2) a percentage of the sum had to be decided. For some of these records this information could be found in the ministries' budgets. This was not the case, however, for most of these posts. We did not have the time to investigate further, by checking out other sources of information. Therefore, a tentative percentage has been set for most of these records. In developing the budget analysis system further and before these figures can be published and reported regularly, this will be reviewed with each of the Ministries. This will need to be the focus of the next stage in the development of this budget analysis system and there are plans for this to be done in 2003.

The next step was to classify the posts given code 1 and 2 according to environmental domain (CEPA). We wanted to do this at as detailed a level as possible, which meant coding to a 4-digit level CEPA/national categories code. The coding system used is presented in the appendix to this chapter. A 4-digit code was assigned to most of the records, however, some records were only given 2-digit codes due to lack of time. At this point in the development of the system we only have plans to develop statistics based on the 2-digit codes. As the system becomes more refined we can investigate the possibility for more detailed tables but the uncertainty in the methodology at this point does not merit publication of data at more detailed categories.

When the coding was finalised 4258 records were defined as Non-Environmental Protection Expenditure (NEPE), 415 records as Non-Homogeneous Expenditure (NHE), and 204 records as Environmental Protection Expenditure (EPE). In addition 67 records were coded as environmental taxes and 156 as environmental expenditure within the broader Norwegian concept of environmental related expenditure. The specific Norwegian categories were excluded from further analysis since we are first focusing on improving Norway's reporting of central government expenditure for environmental protection expenditure as defined by CEPA.

7.4 Results

The environmental protection expenditure is presented for each of the 9 CEPA main categories as totals and broken down by Ministry. The percent of each Ministry's budget used for environmental protection is also presented in Table 7.1. In order to include the total of central government's expenditure it was necessary to include information for some items that are not found in the budgets of the various Ministries, for example, the National Insurance Scheme and the Petroleum Fund.

Table 7.1. Environmental Protection Expenditure by Central Government, according to CEPA categories and Ministries, 2001. 1000 NOK.

| 2001 | Total expenditure Central Government | Of this: Environmental protection expenditure | Per cent of total expenditure used for environmental protection | Environmental expenditures according to Classification of Environmental Protection Activity (CEPA) categories | | | | | | | | |
|---|--------------------------------------|---|---|---|----------------|----------------|---------------------|-------------------|--------------------------|---------------|----------------|------------------|
| | | | | Ambient air & climate | Waste water | Waste | Soil & ground-water | Noise & vibration | Biodiversity & landscape | Radiation | R&D | Other |
| Total expenditures according to central government fiscal accounts | 912 208 288 | 3 921 160 | 0.43 | 262 562 | 129 613 | 289 653 | 363 730 | 19 757 | 544 557 | 87 906 | 887 747 | 1 335 635 |
| Royal House of Norway, Government, Parliament, Supreme Court | 1 214 347 | - | - | - | - | - | - | - | - | - | - | - |
| Ministry of Foreign Affairs | 14 847 034 | 595 146 | 4.01 | 36 779 | - | - | - | - | - | 87 906 | - | 470 461 |
| Ministry of Education, Research and Church Affairs | 32 793 741 | 240 270 | 0.73 | - | - | - | - | - | - | - | 240 270 | - |
| Ministry of Cultural Affairs | 3 907 205 | - | - | - | - | - | - | - | - | - | - | - |
| Ministry of Justice | 11 790 651 | 47 979 | 0.41 | - | - | - | - | - | - | - | - | 47 979 |
| Ministry of Local Government and Regional Development | 65 196 976 | 15 226 | 0.02 | - | - | - | - | - | - | - | - | 15 226 |
| Ministry of Health and Social Affairs | 33 219 311 | 92 704 | 0.28 | - | - | - | - | - | - | - | 92 131 | 573 |
| Ministry of Children and Family Affairs | 23 498 244 | 5 658 | 0.02 | - | - | - | - | - | - | - | 355 | 5 303 |
| Ministry of Trade and Industry | 5 674 580 | 96 546 | 1.70 | 18 231 | - | - | 17 364 | - | - | - | 58 167 | 2 784 |
| Ministry of Fisheries | 2 376 695 | 14 137 | 0.59 | - | - | - | - | - | - | - | 14 137 | - |
| Ministry of Agriculture | 14 018 709 | 131 727 | 0.94 | - | - | - | 5 776 | - | 56 931 | - | 32 293 | 36 727 |
| Ministry of Transport and Communications | 20 848 383 | 20 222 | 0.10 | 262 | - | - | - | 19 757 | - | - | 203 | - |
| Ministry of the Environment | 2 730 408 | 2 118 037 | 77.57 | 207 290 | 129 613 | 289 653 | 341 620 | - | 476 877 | - | 322 098 | 350 886 |
| Ministry of Labour and Government Administration | 21 486 842 | 269 262 | 1.25 | - | - | - | - | - | - | - | - | 269 262 |
| Ministry of Finance | 68 263 657 | 4 256 | 0.01 | - | - | - | - | - | - | - | 4 256 | - |
| Ministry of Defence | 26 842 235 | 83 306 | 0.31 | - | - | - | - | - | - | - | - | 83 306 |
| Ministry of Petroleum and Energy | 22 503 490 | 128 788 | 0.57 | - | - | - | - | - | 10 749 | - | 118 039 | - |
| Miscellaneous expenditures | 29 051 | - | - | - | - | - | - | - | - | - | - | - |
| Government financial institutions, other government corporations including oil-related activities | 95 898 674 | 57 896 | 0.06 | - | - | - | -1 030 | - | - | - | 5 798 | 53 128 |
| National Insurance Scheme | 187 641 879 | - | - | - | - | - | - | - | - | - | - | - |
| The Norwegian Government Petroleum Fund | 257 426 176 | - | - | - | - | - | - | - | - | - | - | - |

For the Norwegian central government as a whole, the EPE has been calculated as NOK 3 921 million, which corresponds to 0.43 per cent of total central government expenditures. If only the budgets of the Ministries are considered, then the per cent increases to 1.04. These figures must be considered to be very preliminary estimates since a comparison of these figures with those reported by the Ministries themselves often shows large differences.

7.5 Current information from the Ministry of the Environment

In February 2001 the Ministry of the Environment issued a White Paper (St.meld. 24 (2000-2001)) covering the Government's Environmental policy and presenting the State of the Environment. In the first chapter of that report, Table 1.1 presents information from the national budget for 2000 and for the proposed 2001 budget. This breakdown is by Ministry only and not according to environmental domain as was developed from the budget analysis and presented in Table 7.1.

The following is excerpted from the English summary of this white paper (available at: <http://odin.dep.no/md/engelsk/publ/stmeld/022001-040011/index-hov001-b-n-a.html>).

1.7 Environmental measures included in the central government budget for 2001 (environmental profile)

Table 1.1 lists allocations by all the ministries to environmental measures in the central government budget for 2001. Since the mid-1980s, various ways of presenting these figures have been used. According to recent changes to the system, funds are now only to be classified as expenditure on environmental measures if they are used entirely to improve the state of the environment, if environmental considerations were the factor that determined whether the measure or project was implemented, or if the allocations are intended to counteract adverse environmental effects of other measures (preventive measures)...

...There is an overall increase in environmental expenditure in the budget of the Ministry of Transport and Communications. This is partly related to special environmental measures along existing roads in order to comply with the regulations relating to limit values for local air pollution and noise, laid down pursuant to the Pollution Control Act, and to measures to limit emissions of chemicals from airports. Another item that shows an increase this year is toll revenues earmarked for improvements of public transport. This is because a larger proportion of the planned public transport measures that are part of several of the toll road schemes will be carried out in 2001.

The increase in the Ministry of Foreign Affairs' budget is mainly explained by larger allocations to nuclear safety measures in Russian and Eastern Europe and to environmental assistance.

The growth in the budget of the Ministry of Health and Social Affairs is explained by higher allocations to the Norwegian Radiation Protection Authority.

NOK 600 million of the allocations to environmental measures in the Ministry of Agriculture's budget is related to the Agricultural Agreement. The main aims are to reduce pollution and encourage the management, maintenance and restoration of the cultural landscape, including its bio diversity, to improve the accessibility of cultural monuments, reduce the risk to health and the environment associated with the use of pesticides and to promote organic farming. Allocations to organic farming have been increased by NOK 17 million. Conservation measures for cultivated and cultivable land will be strengthened to safeguard the resource base for agricultural production.

| Table 1.1 Allocations for environmental measures in the central government budget for 2001 (environmental profile) (Million NOK) | | |
|---|--------------------|----------------------|
| Ministry: | Budget 2000 | Proposal 2001 |
| Ministry of Labour and Government Administration ¹⁾ | 7.0 | 6.5 |
| Ministry of Children and Family Affairs | 4.2 | 4.1 |
| Ministry of Finance | 12.5 | 8.4 |
| Ministry of Fisheries | 333.2 | 342.6 |
| Ministry of Defence | 571.4 | 564.0 |
| Ministry of Justice | 54.2 | 54.5 |
| Ministry of Education, Research and Church Affairs | 325.2 | 335.6 |
| Ministry of Local Government and Regional Development ²⁾ | 157.0 | 97.0 |
| Ministry of Cultural Affairs | 410.7 | 415.3 |
| Ministry of Agriculture ³⁾ | 1 045.2 | 1 020.0 |
| Ministry of the Environment ⁴⁾ | 2 406.2 | 2 244.6 |
| Ministry of Trade and Industry | 248.2 | 235.9 |
| Ministry of Petroleum and Energy ⁵⁾ | 454.6 | 414.7 |
| Ministry of Transport and Communications ⁶⁾ | 3 437.6 | 3 562.3 |
| Ministry of Health and Social Affairs | 109.7 | 122.3 |
| Ministry of Foreign Affairs ⁷⁾ | 1 450.0 | 1 495.0 |
| Total all ministries | 11 026.9 | 10 930.2 |

1) The figures do not include funds allocated to the Directorate of Public Construction and Property for the rehabilitation of architecturally important buildings, but do include energy efficiency measures run by the Directorate.

2) The Ministry of Local Government and Regional Development used a narrower definition of environmental measures in the 2001 budget than in 2000. In the 2001 budget, regional and district policy measures have not been included. These totalled NOK 68 million in the 2000 budget.

3) Allocations to environmental measures in the Ministry of Agriculture's budget have dropped because the operating budget for the county governors has been transferred to the Ministry of Labour and Government Administration. In 2000, environmental measures accounted for NOK 56.9 million of this. If this is taken into account, the share of the Ministry of Agriculture's budget allocated to environmental measures is NOK 30 million higher than in the 2000 budget.

4) The main reason for the reduction in the Ministry of the Environment's budget is that the operating budget for the county governors has been transferred to the Ministry of Labour and Government Administration. The budgeting routines for the Norwegian Government Environmental Fund have also been altered.

5) There is a proposal to increase funding for measures to bring about a shift in energy production and use by NOK 50 million to NOK 150 million in 2001. If this is included, there is a slight rise from 2000 to 2001 for the Ministry of Petroleum and Energy.

6) Negotiations with Norwegian State Railways on purchases of passenger transport services by the central government sector were not completed at the time of publication. In accordance with a temporary agreement of 19 December 2000, the figure for 2000 has also been used in the 2001 budget (NOK 987 million).

7) Norwegian development assistance policy is based on standards laid down by the OECD/DAC. The definition of environmental protection measures differs somewhat from that used by the Ministry of the Environment.

One outcome of the debate on Report No. 29 (1998-1999) to the Storting on Norwegian energy policy was that the Storting asked the Government to evaluate various schemes for speeding up the development of «CO₂-free gas-based power production, and to submit proposals to the Storting. Public funding for research into technology to reduce emissions from gas-fired power plants has until now been channelled through the KLIMATEK programme under the Research Council of Norway. In the budget for 2001, the Government proposes to increase funding for further development of technology for CO₂ removal by at least NOK 20 million, to be allocated to the budgets of the Ministry of the Environment, the Ministry of Trade and Industry and the Ministry of Petroleum and Energy."

(Source: Ministry of the Environment (February 2001): White paper, [T-1376 The Government's Environmental Policy and the State of the Environment](#); Summary in English: Report No. 24 to the Storting (2000-2001)).

Until now, this table was the only information regarding central government environmental protection expenditure. The OECD criticized these figures in their latest environmental performance review of Norway in 2000. The OECD report referred specifically to this table and stated that, "The precise nature of much public expenditure is often unclear. An example of the difficulties involved in classifying such expenditure is the fact that the Ministry of Transport and Communications appeared

to have a larger environmental budget than the Ministry of the Environment." (OECD 2001, page 106). The Ministry of the Environment, however, does not feel that this is a particularly relevant criticism since they feel it can be likely that other Ministries have higher environment related expenditures than the Ministry of the Environment.

7.6 Comparing the Ministry of the Environment and the NOREEA budget analysis results

The figures presented by the Ministry of the Environment from their White Paper can be compared directly with the totals developed from the budget analysis that are presented in Table 7.1. Table 7.2 provides the data from each source for easy comparison.

Table 7.2. Comparison between Ministry of the Environment budget information and data from the budget analysis. 2001. Million NOK

| Ministry: | Ministry of Environment proposed budget 2001 ^a | Budget Analysis for EPE according to CEPA | Per cent difference |
|---|---|---|---------------------|
| Total of all Ministries | 10 930.2 | 3 863.2 | 66 |
| Ministry of Foreign Affairs | 1 495.0 | 595.1 | 60 |
| Ministry of Education, Research and Church Affairs | 335.6 | 240.3 | 28 |
| Ministry of Cultural Affairs | 415.3 | 0.0 | 100 |
| Ministry of Justice | 54.5 | 48.0 | 12 |
| Ministry of Local Government and Regional Development | 97.0 | 15.2 | 84 |
| Ministry of Health and Social Affairs | 122.3 | 92.7 | 24 |
| Ministry of Children and Family Affairs | 4.1 | 5.7 | -39 |
| Ministry of Trade and Industry | 235.9 | 96.5 | 59 |
| Ministry of Fisheries | 342.6 | 14.1 | 96 |
| Ministry of Agriculture | 1 020.0 | 131.7 | 87 |
| Ministry of Transport and Communications | 3 562.3 | 20.2 | 99 |
| Ministry of the Environment | 2 244.6 | 2 118.0 | 6 |
| Ministry of Labour and Government Administration | 6.5 | 269.3 | -4 043 |
| Ministry of Finance | 8.4 | 4.3 | 49 |
| Ministry of Defence | 564.0 | 83.3 | 85 |
| Ministry of Petroleum and Energy | 414.7 | 128.8 | 69 |

^a Source: Ministry of the Environment (February 2001): Table 1.1 in White paper, [T-1376 The Government's Environmental Policy and the State of the Environment](#); Summary in English: Report No. 24 to the Storting (2000-2001)).

From the data presented in Table 7.2 it can be seen that there are considerable differences between the Ministry's own published budget figures and the environmental protection expenditure (EPE) that was estimated based on the budget analysis. For most Ministries our calculated EPE are much lower than the figures presented in the white paper. There are however two exceptions. One is the Ministry of Labour and Government Administration. We suspect that this can be explained primarily due to the transfer of the operating budget for the county governors from the Ministry of the Environment to the Ministry of Labour and Government Administration in 2001. The other exception is the Ministry of Children and Family Affairs, where our estimates are higher than the Ministry's. Although the percentage difference is fairly high the amount is very small in comparison with some of the other Ministries. Except for the Ministry of the Environment, there is apparently a large difference between the environmental protection expenditure definition using the 9 CEPA category definitions (classification of environmental protection activities) on one side and the definitions used by the Norwegian Ministries on the other.

The figures published by the Ministry of the Environment have been reported from each of the other Ministries. The Ministry of the Environment has allowed each of the other Ministries to report environment related expenditure without much of a critical evaluation of the figures or definitions that

are used. The 2001 figures from the Ministries are the proposed budget for 2001 and not the final approved budget amounts. The final budget amounts related to environmental expenditure for 2001 were not published so this may explain some of the differences between the published amounts (proposed budget) and the amounts actually used (from the central government accounts).

We are quite certain that the Ministries are including a wider definition of "environment" than the CEPA definition allows. The Ministries could most likely include, for example, spending on energy savings, management of natural resources and compensation paid for environmental damage in their budgets, which would not be included in the CEPA estimates. The Ministries would also include expenditures for outdoor recreation and cultural heritage since these are considered environmental expenditures in Norway.

The Ministry of Defence is in the process of selling a number of military installations that they are rehabilitating before being sold. These expenditures would be considered "environmental expenditures" since a number of these sites are considered of cultural importance and would be classified as "cultural heritage" expenditures in the Norwegian context. This may help to explain the difference between the two values.

It will be important for us to discuss our system and definitions with those responsible for publishing these environment expenditure figures at the Ministry of the environment, and also with those responsible within each Ministry who supply these figures to the Ministry of the environment. We have already made a first presentation at the Ministry of the environment and they have shown interest in this budget analysis work and are interested in improving the consistency of the data from the different Ministries.

We will need to complete the work on the two specific national environmental categories, outdoor recreation and cultural heritage, before reviewing the results with the different Ministries. It would be judicious to include as many of the Norwegian categories as possible and to reduce the differences between the two sets of data before meeting with each of the Ministries.

7.7 Other plans for presenting these figures

Once the calculation model has been evaluated and adjusted in cooperation with the Ministry of the Environment and the other Ministries, it is desirable that these figures also be published in a format that is consistent with the national accounts terminology. By also publishing the figures according to more standard terminology, they can be more easily incorporated into the standard publishing of the national accounts.

We would have liked to present the 2001 data according to the usual national accounts definitions, but the figures for 2001 are not yet final or published by the national accounts so these data are unfortunately not possible to present at this time. Some other practical problems were identified in the process of establishing test data.

The CEPA coding exercise depended heavily on the reference to the Government accounting codes. In the files used for the National Accounts these codes are no longer present. This is why the coding could not be established directly on the National Accounts basis in the first place. The recoding used for the National Accounts are known. To establish the National Accounts aggregates, more data is needed than those that are published in the Government accounts. In our context the adjustments done to the data on taxes and subsidies to arrive at an accrual basis can safely be ignored. However, there are more data from 'other Government accounts' that are only indirectly related to the published accounts. The relevant part of these accounts are detailed data for 'net-budgeting' Central Government units. In the published Government accounts the expenditures of these units are recorded as a lump sum under the heading 'transfers to net-budgeting units'. In 2001 these units were the universities, the national research council and two central government hospitals. Statistics Norway collects data on

their expenditures direct from the units, and to be consistent with National Accounts data, these data should be included in the analyses not as transfers but with their detailed basic data. The CEPA coding had to be made from the published Government Accounts. Some of the expenditures of these units are classified as EPE. The detailed data would help to classify the expenditures of these units according to National accounts categories, but probably not by CEPA category.

7.8 Related work: Classification of Functions of Government (COFOG)

The work done related to COFOG is presented separately, since it did not produce results that could be used to any large extent in this budget analysis. In fact just the opposite may occur. It appears that this budget analysis may be used to improve the COFOG coding of the central government accounts.

After getting access to the government accounts file we investigated the COFOG system to see if it could save us time in setting up the budget analysis system. The new COFOG classification, consists of 6 environmental functions that are consistent with CEPA:

- 0510 Waste treatment
- 0520 Wastewater
- 0530 Protection against pollution
- 0540 Protection of biodiversity and landscapes
- 0550 R&D on environment
- 0560 Other environmental protection activities

Since the new COFOG has recently been implemented in Norway, we thought this would provide information usable for identifying environment related expenditures. We soon found out, however, that the current COFOG coding as applied to the central government accounts was not going to provide us with much information at this point in time. The 6 environmental functions of COFOG have only been applied for posts in the accounts from the Ministry of Environment. No environmental posts in other ministries' accounts have been given codes that are environment related even when it is clear from the title of the record/post that it is an environmental expense. Probably due to time considerations, those who have set up the COFOG coding system have not gone into the details in the different ministries' accounts.

The conclusions drawn from this brief investigation of the COFOG coding of the accounts were that improvements are needed with respect to the 6 environmental functions. This budget analysis work might therefore lead to a re-coding of some central government accounts in the future. We will have meetings with the Department for Public Finances when we have finished this project to decide which changes should be done to the COFOG coding.

7.9 Development of the coding system

7.9.1 Coordinating environmental domains: CEPA and Norwegian

At the beginning of this project we had planned to develop a coding system that would include all the different categories needed for producing both nationally relevant statistics and for international reporting. Although we were able to make a coding system, it was harder to code all of the records so that both national and international needs were met.

The challenge was to develop a system that has relevance both nationally and internationally. In order to accomplish this, the statistics to be developed need to satisfy the needs of both audiences. The problem is if the statistics are presented only according to CEPA categories there is a high risk that the information will only be of marginal use nationally, since the Ministry of the Environment is primarily interested in information according to their own eight categories. To combine these two classification sets so that we can abstract information according to either system is the key and a major challenge. In

addition, there is interest in developing natural resource management accounts and not simply environmental protection accounts.

Although the Ministry of the Environment does publish an overall breakdown of environmental expenditures of the other government ministries, this breakdown does not follow Eurostat definitions or use CEPA categories.

The Ministry of the Environment has defined the following eight environmental domains, with corresponding national goals and indicators:

1. Conservation and sustainable use of biological diversity
2. Outdoor recreation
3. Cultural heritage
4. Eutrophication and oil pollution
5. Hazardous substances
6. Waste and recycling
7. Climate change, air pollution and noise
8. International cooperation on environmental issues and environmental protection in the polar areas

The CEPA categories are as follows:

1. Protection of ambient air and climate
2. Wastewater management
3. Waste management
4. Protection and remediation of soil, groundwater and surface water
5. Noise and vibration abatement (excluding workplace protection)
6. Protection of biodiversity and landscapes
7. Protection against radiation (excluding external safety)
8. Research and development
9. Other environmental protection activities

Since the Norwegian classification system combines several of the CEPA categories and the Norwegian categories are neither exhaustive nor exclusive, it was decided to use the CEPA classification as the main starting point and then add categories to cover the elements in the Norwegian system and to add codes for natural resource management.

During the project process it proved very useful to have started with the CEPA categories. While there exists an in depth description of the CEPA categories for our specific purpose of identifying EPE, it was much more difficult to use the general political definitions of the Norwegian environmental policy areas for the purpose of classifying environmental expenditure according to the Norwegian concepts. Due to lack of time, we therefore concentrated on setting up a system based on CEPA categories. But as explained earlier in this chapter, the identification of records of expenditure that fall within a broader Norwegian concept of environmental related expenditure has been done. The classification of these expenditures into different environmental categories has, however, to be worked on further.

7.9.2 Classification scheme

The initial work focused on developing a classification scheme would allow for coding of all the different categories that are needed. The following table was developed as a rough first step in the coding system development. The empty cells in the table indicate where no overlap is found in the categories. It must also be noted that the categories may not fit each other exactly -- there can be missing portions that need to be found elsewhere. From this rough overview, a more detailed, four digit coding system was developed. The complete coding system is provided (in Norwegian) in the appendix to this section of the report.

| CEPA | Norwegian Ministry of the Environment | Other environmental categories of possible interest |
|--|--|---|
| 1. Protection of ambient air and climate | 7. Climate change, air pollution and noise | |
| 2. Wastewater management | 4. Eutrophication and oil pollution | |
| 3. Waste management | 6. Waste and recycling | |
| 4. Protection and remediation of soil, groundwater and surface water | 4. Eutrophication and oil pollution 5. Hazardous substances | |
| 5. Noise and vibration abatement (excluding workplace protection) | 7. Climate change, air pollution and noise | |
| 6. Protection of biodiversity and landscapes | 1. Conservation and sustainable use of biological diversity | |
| 7. Protection against radiation (excluding external safety) | | |
| 8. Research and development | | |
| 9. Other environmental protection activities | | |
| | 1. Conservation and sustainable use of biological diversity | |
| | 2. Outdoor recreation | |
| | 3. Cultural heritage | |
| | 4. Eutrophication and oil pollution | |
| | 5. Hazardous substances | |
| | 8. International cooperation on environmental issues and environmental protection in the polar | |
| | | Management of oil and natural gas resources |
| | | Management of other sub-soil resources |
| | | Energy savings and management |
| | | Fisheries management |
| | | Water resources management |
| | | Forest resource management |
| | | Management of soil resources |
| | | Environmental criminality |
| | | Workers' health and safety |

7.10 Future plans

Now that the methodology and coding system has been developed and tested, we now need to refine the calculation methodology. First it needs to be extended to include the two Norwegian areas, outdoor recreation and cultural heritage. Then these trial calculations from the budget analysis need to be evaluated by each of the Ministries and the Ministry's own calculations need to be evaluated in an independent manner. Most likely the percentages for the various records need to be adjusted. Through this evaluation process it is also possible that the Ministries will develop a clearer view regarding appropriate expenditures to include when reporting their environmentally related expenditures to the Ministry of the Environment in the future.

Once the calculation methodology is revised, the central government environment related expenditure accounts will need to be integrated with the independently developed municipal and county environment related expenditure accounts. This will require that double counting between the different levels of government will need to be considered and ways to eliminate this will need to be devised. When this is accomplished, a more complete picture of the public sector environmental protection expenditure will be obtained.

Another problem that needs to be considered is when the same monies could be coded according to two different categories. This can easily be the case when we are trying to develop information according to the Norwegian categories that are not as exclusive as the CEPA classification. It could be

possible that the detailed values would not necessarily add up to the total if there were double counting between the categories. This issue will need to be considered more carefully in the future.

7.11 References for Section 7.

Danmarks Statistik (2002): Offentlige miljøintægter og -udgifter 1991-2001. Statistiske efterretninger, Miljø og energi, 2002:8 (22th of May 2002).

Ministry of the Environment (February 2001): White paper, [T-1376 The Government's Environmental Policy and the State of the Environment](#); Summary in English: Report No. 24 to the Storting (2000-2001)

OECD (2001): Environmental Performance Reviews: Norway. Paris: OECD.

Detailed Coding list of Environmentally related activities and expenditures used in Norwegian central government budget analysis

The 2- and 3-digit codes are based on the CEPA classification and are just translated to Norwegian (for codes 01-09). The CEPA coding system was extended with codes from 10-15 to cover activities of national concern.

The 4-digit codes were developed so that there is as much detail as possible available from the coding system and to try to have it also correspond to the Norwegian environmental policy areas. The Norwegian extension to the CEPA coding system was developed but was not extensively used since coding for the Norwegian policy areas proved to be rather problematic and need to be re-evaluated in the next stages of development of the budget analysis system.

- 01 **VERN MOT LUFTFORURENSNING OG KLIMAUTSLIPP (Protection of ambient air and climate)**
- 011 Vern mot forurensning gjennom integrerte løsninger/integrert teknologi
 (0111 for vern mot luftforurensning) ikke bruke, i stedet 0113 og 0114 som summerer opp til 0111
 0112 for vern av klima og ozonlaget (dele opp klima og ozon?)
 E0113 for vern mot helse- og miljøfarlige stoffer (=norsk 5) (ikke relevant for luft?)
 E0114 for vern mot annen luftforurensning
- 012 Vern mot avgasser og utslipp til luft
 0211 for vern mot luftforurensning
 0212 for vern av klima og ozonlaget
- 013 Måling, kontroller, laboratoriearbeid og liknende
 0130 Måling, kontroller, laboratoriearbeid og liknende
- 014 Andre aktiviteter
 E0141 internasjonalt samarbeid (=norsk 8)
 E0142 annet

- 02 **AVLØP (Waste water management)**
- 021 Vern mot forurensning gjennom integrerte løsninger/integrert teknologi (=norsk 4)
 0210 Vern mot forurensning gjennom integrerte løsninger/integrert teknologi
- 022 Ledningsnett (=norsk 4)
 0220 Ledningsnett
- 023 Behandling av avløpsvann (=norsk 4)
 0230 Behandling av avløpsvann
- 024 Behandling av kjølevann
 0240 Behandling av kjølevann
- 025 Måling, kontroller, laboratoriearbeid og liknende
 0250 Måling, kontroller, laboratoriearbeid og liknende
- 026 Andre aktiviteter
 0260 Andre aktiviteter

- 03 **AVFALL (Waste Management)**
- 031 Vern mot forurensning gjennom integrerte løsninger/integrert teknologi
 0310 Vern mot forurensning gjennom integrerte løsninger/integrert teknologi
- 032 Innsamling og transport
 0320 Innsamling og transport
- 033 Behandling og disponering av farlig avfall
 0331 forbrenning
 0332 deponi (landfyll)
 0333 annen behandling og disponering
- 034 Behandling og disponering av ikke-farlig avfall
 0341 forbrenning
 0342 deponi (landfyll)
 0343 annen behandling og disponering

- 035 Måling, kontroller, laboratoriearbeid og liknende
0350 Måling, kontroller, laboratoriearbeid og liknende
- 036 Andre aktiviteter
0360 Andre aktiviteter
- 04 **VERN OG BEHANDLING AV JORD, GRUNNVANN OG OVERFLATEVANN
(Protection of soil and ground water)**
- 041 Vern mot forurensende infiltrering
E0411 infiltrering av næringssalter/partikler og olje (=norsk 4)
E0412 infiltrering av helse- og miljøfarlige kjemikalier (=norsk 5)
E0413 infiltrering av andre stoffer
- 042 Rensing av jord og vann
E0421 rensing av helse- og miljøfarlige kjemikalier (=norsk 5)
E0422 rensing av andre stoffer
- 043 Vern av jord mot erosjon og annen fysisk degradering
0430 Vern av jord mot erosjon og annen fysisk degradering
- 044 Vern og avbøtende tiltak mot forsøling av jord
0440 Vern og avbøtende tiltak mot forsøling av jord
- 045 Måling, kontroller, laboratoriearbeid og liknende
0450 Måling, kontroller, laboratoriearbeid og liknende
- 046 Andre aktiviteter
0460 Andre aktiviteter
- 05 **VERN MOT STØY OG VIBRASJONER (ekskl. vern på arbeidsplassen) (norsk inkl. ikke vibrasjoner..)
(Noise and vibration abatement)**
- 051 Preventive tiltak rette mot kilden, gjennom integrerte løsninger/integrert teknologi
(0510 hvis vi ikke kan beregne detaljer - heller bruke fordelingsnøkkel?)
0511 trafikk- og (jern)bane
0512 flytrafikk
0513 industri og annet
- 052 Bygging av anti-støy/vibrasjonsfaciliteter
0521 trafikk- og (jern)bane
0522 flytrafikk
0523 industri og annet
- 053 Måling, kontroller, laboratoriearbeid og liknende
0530 Måling, kontroller, laboratoriearbeid og liknende
- 054 Andre aktiviteter
0540 Andre aktiviteter
- 06 **VERN AV BIODIVERSITET OG LANDSKAP (Protection of biodiversity and landscape)**
- 061 Vern og rehabilitering av arter og habitater (=norsk 1)
0610 Vern og rehabilitering av arter og habitater
- 062 Vern av natur- og semi-naturlandskap (=norsk 1)
0620 Vern av natur- og semi-naturlandskap
- 063 Måling, kontroller, laboratoriearbeid og liknende
0630 Måling, kontroller, laboratoriearbeid og liknende
- 064 Andre aktiviteter
E0641 internasjonalt samarbeid (=norsk 8)
E0642 annet
- 07 **VERN MOT STRÅLING (ekskl. ytre sikkerhetstiltak) (Protection against radiation)**
- 071 Vern av omkringliggende miljø
0710 Vern av omkringliggende miljø
- 072 Transport og behandling av høygradig radioaktivt avfall
0720 Transport og behandling av høygradig radioaktivt avfall
- 073 Måling, kontroller, laboratoriearbeid og liknende
0730 Måling, kontroller, laboratoriearbeid og liknende
- 074 Andre aktiviteter
E0741 internasjonalt samarbeid (=norsk 8)
E0742 annet

- 08 FORSKNING OG UTVIKLING (**Research and Development**)
- 081 Vern mot luftforurensning og klimautslipp
0811 vern mot luftforurensning
0812 vern mot klimautslipp
- 082 Vern av vann
0820 Vern av vann
- 083 Avfall
0830 Avfall
- 084 Vern av jord og grunnvann
0840 Vern av jord og grunnvann
- 085 Venn mot støy og vibrasjoner
0850 Venn mot støy og vibrasjoner
- 086 Vern av arter og habitater
0860 Vern av arter og habitater
- 087 Vern mot stråling
0870 Vern mot stråling
- 088 Annen forskning må miljøet
0880 Annen forskning må miljøet
- 09 ANDRE MILJØVERNAKTIVITETER (**Other environmental protection activities**)
- 091 Generell miljøadministrasjon og -forvaltning
0911 generell administrasjon, regulering osv.
0912 miljøforvaltning
- 092 Utdanning, opplæring og informasjon
0920 Utdanning, opplæring og informasjon
- 093 Aktiviteter der miljødelen ikke kan utledes
0930 Aktiviteter der miljødelen ikke kan utledes
- 094 Aktiviteter som ikke er klassifisert andre steder
E0941 internasjonalt samarbeid (=norsk 8)
E0942 annet

Specific Norwegian Codes:

- 10 FRILUFTSLIV
1000
- 11 KULTURMINNER OG KULTURMILJØER
1100
- 12 ENERGIØKONOMISERING
1200
- 13 NATURRESSURSFORVALTNING
1310 Fisk
1320 Vann
1330 Skog
1340 Jord
1350 Olje og gass
1360 Mineraler
- 14 MILJØKRIMINALITET
1400
- 15 ARBEIDSMILJØ (OG SIKKERHET)
1500

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