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Methodology work for environmental protection investment and current expenditures in the manufacturing industry

Julie L. Hass and Tone Smith – Statistics Norway

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Methodology work for environmental protection investment and current expenditures in the manufacturing industry

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Project Leader:
Dr. Julie L. Hass, Research Fellow in the Division for Environmental Statistics

With contributions from:
Ms. Tone Smith, Senior Executive Officer in the Division for Environmental Statistics

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1 Executive Summary

A new questionnaire was developed by Statistics Norway and evaluated for environmental protection investment in pollution treatment (end-of-pipe) technologies and in pollution prevention technologies (integrated technologies) and for current costs related to environmental protection. The draft questionnaire was evaluated by a number of manufacturing enterprises/establishments, several industry and accounting organisations, colleagues from the Nordic national statistics offices, the survey methodology experts at Statistics Norway as well as the Division for environmental statistics. Discussions with the Division for industry statistics were also part of the project.

Some specific weaknesses in the draft questionnaire were identified that need to be addressed before a new survey and survey instrument can be established. A number of fundamental questions were also identified that need to be discussed as a part of this process of establishing a new statistical area. The most important topics include data precision and quality. A major problem in Norway with establishing a survey covering environmental protection expenditure has been the difficulty in clearly defining and delineating these types of investments and current costs. In addition to the definition problem is the related problem that enterprises are not developing this information for any other purpose than for reporting to the survey. This may be slowly changing since the European Commission recommendation on disclosure of environmental information in annual accounts and reports is now using the Eurostat definitions.

Further planning and development is needed before a new, full-scale survey is established in Norway. This project has been instrumental in identifying and evaluating the different options and approaches that could be used in the future.

We would like to acknowledge the generous help that has been offered in the course of the project. Colleagues from Statistics Norway include Tore Nøtnæs and Gustav Haraldsen from the survey methodology group and Bjørn Bleskestad and Morten Andersen from the Division of industry statistics. We would like to give our thanks to our colleagues in the other Nordic statistical offices and especially to Peter Fränngård from Statistics Sweden, Merja Saarnilehto and Eila Salomaa from Statistics Finland and Laban Karlshøj from Statistics Denmark for hours of discussions about Eurostat definitions and the finer points of their respective survey methodologies. The following enterprises and organisations also gave generously of their time and expertise: Ringnes, Norske Skogindustrier, Borregaard Fabrikker, Peterson, AGA Norge, Jotun, Dyno Nobel (Defence), Norsk Hydro, Lilleborg, Nycomed Pharma Asker plant, Star Carboline Group, Norcem, Elkem ASA, Outokumpu Norzink, the Confederation of Norwegian Business and Industry (NHO), the Foundation for Sustainable Production and Consumption (GRIP), the Federation of Norwegian Process Industries (PIL),

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2 Background

2.1 Driving Forces - Pressure - State - Impact - Response (DPSIR) Model

The DPSIR model is often used as a framework in environment statistics and in sustainable development indicator work. In Norway there has been a great deal of focus on pressure indicators but there has been less emphasis on the response component. Responses from government are typically new laws and regulations. Responses from enterprises are typically in terms of investment in pollution treatment equipment, changes in manufacturing methods and a related increase in current costs. There can also be responses that can potentially decrease costs, such as energy saving efforts, increased efficiency in terms of resource uses, innovative use of previous waste streams and reduction in production of waste.

Developing statistics covering environment-related investment, costs and savings in industry can provide needed insight into the responses of enterprises to environmental regulation and to other environment-related management issues (such as risk and liability). When developing this area, it would be important to develop the structure of the data so that it could be combined with other types of environment data such as emissions data. This integrated set of information would potentially provide valuable information about the relationships between investment and costs and changes in emission levels and provide relevant industry level response indicators.

For this project we have focused on environmental protection investment in pollution treatment and in pollution prevention and related environmental protection current costs. This focus was used as an initial starting point since there may be a change in the reporting requirements to Eurostat in the near future that will mean that this information will become required annual reporting according to the Structural Business Statistics Regulation 58/97.

2.2 History of environment related expenditure in Statistics Norway and by others in Norway

The earliest information about environmental protection expenditure in Norway is from a Statistics Norway survey of 399 manufacturing enterprises that covered environmental protection investment for 1974 - 1985 (de Caprona and Hansen 1987). Investment in end-of-pipe and integrated technology was reported according to the environment domains, air, water, solid waste, odour/noise, and unspecified/other. The Ministry of the Environment financed the survey. No follow-up survey was made. There was also a report financed by the Ministry of the Environment (Foyn 1981) that examined the problems encountered in developing reliable reporting methods and related statistics in this area.

Another survey, not made by Statistics Norway, was published in 1986 and focused on current costs arising from the manufacturing industry's environmental measures (Sveen 1986).

A survey including 200 enterprises was made in 1991 and was financed by the Confederation of Norwegian Business and Industry (NHO). This survey included investment and current costs related to safety, health, and environment. The information was presented just for environment as a total. The numbers were not broken down according to domain or according to end-of-pipe/integrated technology or according to the NACE-classification. There was detailed information for 1991 and time series data from 1973-1991 for investment and current costs.

More recently there was a pilot study of 251 manufacturing enterprises from six NACE groups (15.1 Meat and meat products, 15.9 Beverages, 17 Textiles, 21 Paper industry, 24 Chemical industry, 27 Metal industry) for 1997 (Hass, Solberg and Bersvendsen 2000) conducted by Statistics Norway.

Included in the pilot study were variables for investment in pollution treatment (end-of-pipe) and pollution prevention (integrated equipment) and current costs for the environmental domains, air, water, solid waste, noise and other. There were also questions related to income and cost savings related to environmental protection activities.

And finally, in order to comply with the SBS regulation 58/97, for the years 1999 and 2000 Statistics Norway included a question about end-of-pipe investment according to 5 environment domains, air, water, solid waste, noise and other, in the standard questionnaire sent to enterprises/establishments by the Division for industry statistics. This annual survey is sent to enterprises belonging to NACE D. The statistics developed from the annual survey will be reported to Eurostat as part of the Structural Business Statistics reporting. From reporting year 2001, the question about end-of-pipe investment will also be included in the annual survey for NACE C (excluding NACE 11) and NACE E (except NACE 40.1).

At this time there are no concrete plans to expand the survey to include other variables until it is required reporting under the SBS regulation. If the SBS regulation is not expanded to include the other two variables and the additional environmental domains, it is doubtful that this area of statistics will be expanded beyond investment in pollution treatment on a voluntary basis.

Although it was expected that the SBS regulation would be approved in 2001 so that more concrete plans would need to be made by Statistics Norway, at this time it appears that there will only be an expanded pilot study planned for 2003. The pilot study will be constructed so that that the sample will be designed to cover all the required NACE groups in such a way that the values can be grossed up to provide estimates for the entire population.

3 Environmental Protection Expenditure

3.1 Clear concept?

In the past 20 years the theoretical concept of environmental protection expenditure has undergone development and refinement (see Eurostat documents ACCT-EXP/01/4.3 Table Document and ENV/01/3.6A), however the way of calculating or estimating these values has changed little from the early 1980s. There is still a need for enterprises to identify and then somehow estimate the additional costs that are related to environmental protection.

When the equipment is identifiable as a separate part that reduces or treats pollution, then it is less of a problem finding and estimating this type of investment. Current expenditures need to be identified very specifically but these again can be identified and estimated without too much difficulty. These are not the biggest problem. The biggest problem involves investment in integrated (or pollution prevention) plant and equipment. Decision trees and lists of equipment can all be of help to identify the part of investments that would qualify, but there is no exact methodology for doing this type of estimation and the quality of the data can vary greatly from enterprise to enterprise depending greatly on how much effort and precision they take in making their estimates.

The concept of environmental protection expenditure is far from being established as a standard accounting concept by financial accounting bodies. Norwegian enterprises and industry organizations are using very different approaches and definitions for their own use and for reporting in their annual reports and their environment reports. Although Eurostat has worked with this area for years and the concept has developed over the years, the accounting bodies are not following the same development.

The accounting bodies have focused mostly on having environmental liabilities and environmental remediation liabilities be described and shown in the annual accounts and reports. There has not been a particular focus by the major accounting boards (for example, Financial Accounting Standards Board, FASB and International Accounting Standards Committee (IASC)) on investment of an environmental type or on current expenditures related to the environment.

Another problem is that the definition of equipment for environmental protection can change over time. Relevant examples in Western Europe in the past 20 years are lead-free fuels and catalytic converters on automobiles. Catalytic converters are now standard equipment on automobiles in Norway and most other industrial countries in Europe and North America and are no longer considered an "extra expense" by most people since it is not possible to purchase a new car without this type of equipment.

These definition problems make environmental protection expenditure difficult to develop good reporting and measurement survey instruments.

3.2 Is this type of information readily available from enterprises?

We took several approaches to try to evaluate what information is readily available from enterprises. First we examined as many environment reports from Norwegian companies in the NACE groups that are covered by the SBS regulation. Then we tried to find out from industry organisations, Norwegian accounting bodies and the Ministry of the Environment what they are doing in this area. And finally we obtained comments from a number of companies during the evaluation phase of the 200x draft questionnaire.

3.2.1 Environment reports

The Confederation of Norwegian Business and Industry (NHO) together with The Norwegian Shipowners' Association (NR), the Federation of Norwegian Process Industries (PIL), the Confederation of Norwegian Commercial and Service Enterprises (HSH), the Norwegian Financial Services Association (FNH), the Foundation for Sustainable Production and Consumption (GRIP) and several of the Norwegian accounting associations evaluate environmental reports from Norwegian enterprises/establishments and award prizes for the best report each year. NHO and this annual prize evaluation process have been instrumental in encouraging companies to produce environmental reports. NHO is also encouraging its members to include financial information that is environment related in their environment reports so we are hoping that this area will be developing in the near future.

From examining environment and annual financial reports it was hoped that companies would be voluntarily reporting environment-related financial information and that we could use this as a basis for further work on definitions, etc. We found unfortunately that very few companies were providing this information. There are a couple of noted exceptions. One exception was Norske Skogindustrier ASA that had an entire page describing "environment-related costs" and they provided the following definitions in their report:

> By environment-related investments we mean the cost of building new treatment plants, waste handling equipment, noise reduction measures, energy saving, equipment for environmental monitoring and environment-related rehabilitation measures. By environment related operating costs we mean the cost of chemicals for treatment plants and sludge dewatering, maintenance of treatment equipment, wages to environmental officers and operators at treatment plants, environment related experiments and studies, environment related fees and taxes, and the operation and maintenance of waste deposits.
> Norske skogindustrier ASA Environmental Report 2000 page 23
> (see also Appendix B for this page from the report. http://reports.huginonline.com/818384/89200.pdf)

The definition used by Norske skogindustrier ASA is not exactly the same as Eurostat's definition. Two major differences are the inclusion of investment in energy saving and the inclusion of environment taxes in current costs.

Norzink, a subsidiary of the Finnish company Outokumpu, provided the following information in their annual environment report specifying expenses and investments for 2000. No definitions were provided but from the categories in the table, health and safety staff and protective equipment are included which fall outside the Eurostat definitions.

Expenses and investments in 2000 (NOK million)	
Operating expenses:	
Operating expenses, water treatment plant at the sulphuric acid factory	2.2
Operating expenses, central water treatment and discard plants	12.3
Mountain caverns	12.1
HMS staff and Company Health Service	3.6
Protective equipment	0.9
Investments:	
«Discharge Project»	30.7
Loading up, anhydrite plant	5.9
Hg cellar – new development and alterations	6.0
Mountain cavern study	0.4
Total	**74.1**

Norzink Annual Report 2000 - Health, Environment & Safety, page 9
(entire report available as pdf-file at the following: http://www.norzink.no/pdf/hse00.pdf) see also Appendix B

The environment reports that were examined presented primarily physical information, in particular different types and amounts of pollution generated. There is very little financial information provided. The annual reports that were looked at provided, at most, information in notes to the financial annual report and focused primarily on liability and estimates of future liabilities. In general we concluded that companies are not providing this information in their annual publications, financial or environmental.

3.2.2 Activity in the accounting associations and other influential actors in Norway

There was a revision to the accounting law that came into effect from 01.01.1999 that required enterprises to describe in their annual reports (or at least in the notes to their annual accounts) about their operations that "do not have inconsiderable influences" on the outside environment (in contrast to the work environment). This reporting requirement was interpreted by the Norwegian Accounting Foundation to include the type and amount of energy used, the type and amount of pollution including noise that is produced, the type, amount and treatment method for solid waste, the environmental burden from transportation, the type and amount of chemicals that are dangerous to health or the environmental, the type and amount of solid waste that is produced at the end of a products use, and the environmental burden from the use of products. In the guidelines developed for companies to use in reporting to the revised accounting law, there was no mention of reporting environment-related investment or current costs. The revised accounting law in Norway did not focus on environmental protection expenditure information therefore this has not led to the development of this type of information from enterprises.

The Norwegian Ministry of the Environment published a White Paper on the Right of access to environmental information (NOU 2001:2 Miljøopplysninger). Included in this document was a proposed Bill. This White Paper focuses on the right to access environmental information, which is defined as information on the state of the natural environment and on activities that may have an impact on the environment. This proposal does not have a focus on providing information to be used in the production of statistics, neither is there a focus on the costs related to the environment. This proposal is aimed at establishing the right to obtain environment information from government agencies and from private actors. This proposed bill is not particularly helpful in encouraging

enterprises to develop environmental protection expenditure information. Also the proposed bill has yet to be passed into law.

In 1996 the Norsk RegnskapsStiftelse (Norwegian Accounting Foundation) wrote a discussion paper related to environmental costs and other environmental matters (available in Norwegian only at: http://www.regnskapsstiftelsen.no/pdf/nrsdmiljo.pdf). The appendices of the paper present useful lists of references from both national and international accounting bodies. Although these need updating, the titles of the references are very illustrative. The topics focus on risk, liability, remediation costs and liability, liability disclosure, costs to treat contamination, and abandonment costs. There is very little focus on protection expenditure. Although Eurostat wants to have estimates on environmental protection expenditure, the focus of the international accounting bodies has primarily been on liability. The accounting bodies responsible for changes in the international accounting standards appear to be developing the financial accounting definitions and associated reporting systems along different definitions than is useful for generating environmental protection statistics.

There is one major exception to this focus on liabilities, and this is in a recent European Commission recommendation. The recent European Commission recommendation on the recognition, measurement and disclosure of environmental issues in the annual accounts and annual reports of companies (2001/453/EC) published 30 May 2001 does provide a strong endorsement of the Eurostat definitions of protection expenditure in addition to the more traditional liability focus. In Annex 1, the definition of environmental expenditure is provided and the Eurostat work on these definitions is specifically named. These specific references may have a positive effect on the information available from companies once the EU member countries and Norway implement this recommendation.

The definition in §2 of Annex 1 can be of great help to increase the availability of the information needed by Eurostat if companies implement this recommendation. Environmental expenditure is defined as:

> Environmental expenditure includes the costs of steps taken by an undertaking or on its behalf by others to prevent, reduce or repair damage to the environment which results from its operating activities. These costs include, amongst others, the disposal and avoidance of waste, the protection of soil and of surface water and groundwater, the protection of clean air and climate, noise reduction, and the protection of biodiversity and landscape. Only additional identifiable costs that are primarily intended to prevent, reduce or repair damage to the environment should be included. Costs that may influence favourably the environment but whose primary purpose is to respond to other needs, for instance to increase profitability, health and safety at the workplace, safe use of the company's products or production efficiency, should be excluded. Where it is not possible to isolate separately the amount of the additional costs from other costs in which it may be integrated, it can be estimated in so far as the resulting amount fulfils the condition to be primarily intended to prevent, reduce or repair damage to the environment. (European Commission, 2001)

Specific reference to the Eurostat definitions and reporting requirements specified in SBS regulation 58/97 are also referred to in § 4 of Annex 1 as follows:

> Furthermore, the Statistical Office of the European Union (Eurostat) has produced a series of detailed definitions of expenditures by environmental domain, which are included in the implementation documents of the Council Regulation (EC, Euratom) No 58/97 of 20 December 1996 concerning structural business statistics (2). These definitions, subject to regular updating, are the basis for statistical reporting requirements on environmental protection expenditures in the European Union. When using the general definition in paragraph 2, it is recommended that companies take into consideration these detailed definitions for making the disclosures for environmental expenditures stated in section 4 of this Annex to the extent that they are consistent with the recognition and measurement requirements stated in section 3. (European Commission, 2001)

This European Commission recommendation may have an impact on the financial information available from enterprises/establishments in the future. It will depend on how fully this information is developed and reported by enterprises/establishments, since the recommendation also states that

environment related financial information is needed by stakeholders to evaluate the extent that environmental issues (risks, liabilities, attitudes and environmental performance) might have on the financial health of the company (§6). Since this recommendation is so recent the Confederation of Norwegian Business and Industry (NHO) and the Norsk RegnskapsStiftelse (Norwegian Accounting Foundation) have only just started to discuss its implementation.

3.2.3 Responses from companies

There were very few companies contacted that said that the information requested in the draft questionnaire was easily available. In one large pharmaceutical establishment it was estimated that it would require several days work to be able to answer these questions in an adequate fashion. The environmental protection expenditure definitions simply do not fit together with the current standard accounting definitions. Simply stated, this information is not readily available from enterprises at this time. It is necessary that they search for this information and create it. A couple of companies said that they would need to adapt their accounting systems if this became required reporting and needed to be informed the year before so that they could then obtain this type of information from their accounting systems.

3.3 What are we actually requiring companies to do?

Because the information is not readily available from the standard information that enterprises currently develop for their annual corporate reports or for reporting to the tax authorities, it is necessary for the enterprises/establishments to develop a separate accounting system/coding system to be able to answer these questionnaires.

Although the configuration of the questionnaire can appear to reflect the reporting burden placed on the enterprises/establishments, it makes little difference whether detailed values are requested or the totals are requested, the fact remains that the enterprise/establishment needs to set up a separate system in order to get and report the information requested.

This critique was heard in connection to the Norwegian pilot study for 1999 and again in comments received to the draft questionnaire developed in this current project. A number of enterprises noted that they would need to develop a coding system the year before in order to be able to answer the questionnaire.

If the survey is structured in such a way that only a sample of companies are included each year, then these changes to their standard reporting systems will not be made and will therefore impact the quality of the reported values.

One conclusion is that it will take a number of years before the reporting systems can be implemented in the enterprises and that the important (large) enterprises need to know that this type of information will be required from them on an annual basis so that they do establish new accounting information.

4 Norwegian 200x questionnaire design and evaluation

4.1 Draft questionnaire

A new questionnaire was developed using the pilot study questionnaire from 1999 as the starting point. The description and directions on the reporting page were changed and the instructions were expanded from one to three pages. A decision tree to help clarify how to evaluate integrated investment was also added. Questions related to energy use were included whereas this was not part of the 1999 questionnaire.

Although energy savings are only considered environmental protection expenditure when there is a direct impact on air emissions, in Norway there has been a very strong focus on reducing energy use both in enterprises but also in households. A questionnaire about environmental protection that excludes energy use/savings will not be in accord with the general conception of "environment" here in Norway. For this reason, questions about energy savings were included although it is not part of the Eurostat definitions. This information will be of national interest and it is thought that asking for this information separately will increase the quality of the other data.

The questions in the questionnaire were not that different from the way Sweden had set up their questionnaire although the presentation of the questions and definitions were different. One main difference from the Swedish questionnaire was that no descriptive information was requested. See Appendix A for the draft questionnaire used in this project.

4.2 Evaluation

The 1997 pilot study questionnaire was not thoroughly evaluated before it was used since there was less than four weeks for developing it before it was included in the industry survey. Before a new study is made there needed to be a careful examination of the survey instrument, the corresponding methods connected to the survey and the organisation of the different components of the survey within Statistics Norway.

We developed a new questionnaire and had four different groups evaluate the draft. The four groups were colleagues from the national statistics offices in Sweden, Finland and Denmark, 14 large enterprises, 5 industry organisations and the survey methodology group at Statistics Norway.

4.2.1 Scandinavian colleagues

During the year we had contact with colleagues in the Nordic countries at a number of Eurostat and Nordic meetings and courses. We took these opportunities to discuss the different approaches that particularly Sweden and Finland are using. In addition, Ms. Tone Smith and Dr. Julie Hass attended the Statistics Sweden information seminar led by Mr. Peter Fränngård in November. A number of Swedish companies that have Norwegian subsidiaries also attended the seminar which provided us with the opportunity to talk with a number of other companies on an informal basis.

The major critique of our draft 200x questionnaire was that we would not obtain descriptive information to be able to decide if the investment and costs included by the companies actually should be included. Mr. Fränngård said that simply obtaining totals was not good enough. It was necessary to have a description about the production processes and a short description about the various investments and costs that the enterprises/establishments have included. He meant that we could not evaluate the reported data from the questionnaire in a proper way if we did not have these descriptions. Of course with descriptions of the investments it is necessary to read and evaluate the information presented by the enterprises/establishments, which increases the revision requirements.

A second critique was that the definitions of the types of investments and costs were not on the same page as the questions. They have found that the questions and the definitions need to be on the same page since there are very few who actually read the directions. On the other hand Sweden had also developed an information brochure of approximately 18 pages with even more detailed information than was included in the questionnaire itself.

Statistics Finland also mentioned that it was important to start developing a history on each establishment because then you could send the questionnaire to the right person. The Finns have experienced problems related to consistent reporting and this is often due to not finding the correct person to contact in the establishment. They also send the questionnaire to establishments but they felt

that it would be better to send it to the smallest unit (enterprise) possible to get the most reliable information.

4.2.2 Enterprises / establishments

Fourteen large establishments were sent the draft questionnaire for evaluation. We asked them to evaluate the questionnaire in terms of clarity and whether this information could be reported. We contacted the person responsible for the environment, as identified in the annual report, environment report, or organisation map found on the website of the organisation. If it was not possible to identify a person responsible for the environment then the telephone receptionist was asked to provide the best person to contact.

The establishment representatives were positive to the questionnaire being short and simple. However there were at least two that mentioned that although the questions appeared simple there was a great deal of work required to obtain the values to be reported. One company estimated it would take several days to identify the amounts from each of its plant sites. The other company was one of the few that reports financial information in their annual environment report so although they had a well established system that would enable them to answer the questions they also knew from experience what it entailed to develop such a system.

One enterprise felt that the instructions seemed good enough to serve as guidelines to their environmental report. But they were critical that the questionnaire was sent to the head office instead of to each of the plant sites since that is where the actual investment and costs are made.

One of the largest establishments in Norway said that they did not collect this type of information from their production sites. We were advised that it would be necessary for Statistics Norway to contact the production sites directly to be able to obtain this type of information. They were not positive towards developing this information at the establishment level. This organisation also did not provide information in the 1997 pilot study. Due to the size and importance of this organisation to the Norwegian economy and to the emissions this situation must be considered carefully.

There was also some uncertainty about the best person to contact in the organisations. Although we took contact with the person responsibly for the environment it was often the case that they would not be the one to report this type of information.

A number of suggestions were made to help make the instructions clearer and easier to understand. There were comments related to the definitions and exactly what they included. There was some notable problems regarding the terminology used to ask about energy savings and the related instructions. Apparently this is an area with some very technical terminology that needs closer attention if it is to be included. We realised that we had not clearly defined what we were wanting this information for and that may have contributed to the confusion about these questions as well as a lack of technical knowledge about the topic itself.

A number of representatives were positive to trying to develop this type of information because they could see that their organisations may have some use for it themselves. From these organisations there was also interest in savings and income from environment protection related by-products.

4.2.3 Industry organisations

The Federation of Norwegian Process Industries (PIL) was critical to the focus on "environmental protection" which they felt was old fashioned terminology and outdated since it seems to exclude resource related issues. They felt that at least water use/savings and energy use/savings should be included.

PIL also pointed out the difficulties in measuring whether an investment leads to reduced pollution and asked whether we meant "pollution reduction" in absolute or relative terms. This is a bit tricky

since the Eurostat definitions use the main purpose criteria and not effect criteria, from this question the effects criteria are used in practice.

Another issue discussed was related to the additional costs of choosing more expensive plantation teak rather than the less expensive wild teak. Should these costs be included? We concluded, after some discussion, that the additional cost should be included since it protected biodiversity. It should be included in the "other" category of the current draft of the questionnaire and under "protection of biodiversity and landscape" when that separate category is included in the questionnaire.

The Norwegian Accounting Foundation gave some general comments on the topic of environmental protection expenditure and some of the difficult definition issues that Eurostat has been debating and trying to find solutions for.

The Foundation for Sustainable Production and Consumption (GRIP) provided some general comments and support for developing this type of information and felt that enterprises should present this type of information in their environment reports. The Confederation of Norwegian Business and Industry (NHO) has sent the questionnaire to a number of their members but have yet to give their response. We are hoping to continue discussing this with NHO since this is the main industry organisation in Norway. We are also expecting to attend the next meeting of the business accountants organisation (Norske siviløkonomers forbund) where environment expenditure and the European Commission recommendation will be discussed.

4.2.4 Methodology group at Statistics Norway

During the evaluation of the draft questionnaire one of the key issues arising was how to collect data with good quality. Through this process we had gained a good deal of insight, yet could not figure out a reasonable solution. Before starting on a draft for the 2003 survey we discussed this whole topic with the survey methodologists at Statistics Norway. They took up a number of good issues that need to be considered before the next step in survey and questionnaire development can be taken.

We started talking about what we wanted to find out about. That was easy, environmental protection investment and current costs related to environmental protection. Then they asked for definitions. When we started to provide the definitions they expressed great concern that these definitions were extremely complex and were not according to any standard accounting definitions. The next topic was availability of the data. Could enterprises/establishments provide this information easily? Was this information that they normally report, or do the enterprises have to develop this information only to be able to answer the survey from Statistics Norway? The answers to these questions is that the enterprises will develop this information only to be able to answer the survey questions unless they find other uses for the information as well, such as reporting them in an environment report.

After some discussion and taking a look at the current draft, the feedback from the methodology group was multi-faceted. First, if it is difficult to ask good, precise questions, it is because we actually don’t know what we want. Second, the format of the questionnaire itself needs to be improved. They advised that the heading of the questionnaire needs to have information about the survey and why the enterprises are asked to respond. The guidelines and definitions need to be built into the questionnaire. People only look at the guidelines when they get stuck so it is important to make the definitions easy to find. Third, make choices clear and use action-oriented text to explain what the respondent should do. Finally, does the detail of the information sources correspond to the detail in the questionnaire?

We also need to keep in mind that the information we collect from the respondents is not necessarily in the format we will use for developing statistics. Data quality will usually be much better if the steps in the calculation are requested rather than just the final result. It is very easy to simply make up a total value whereas showing a calculation provides more concrete evidence that the resultant total is a reliable estimate. Actually helping to set up the necessary steps in the calculation may reduce the reporting burden than simply asking for a final value. By only asking for the final value we are putting

the entire calculation burden on the respondent and we are assuming that companies have done the calculations correctly. Of course the length of the questionnaire may become an issue if the calculation steps are requested.

A number of practical issues were also discussed. One very important issue is who in the organisation will answer the questionnaire and how do we be sure that this person gets the survey instrument. A number of these issues were also raised by discussed with our colleagues from Statistics Sweden and Finland.

Two conclusions were made after our discussions. One conclusion is that we need to re-work the draft questionnaire based on the input received. The following steps that take into consideration the cognitive phases of the respondent were suggested for developing a new questionnaire:

- First consider the **interpretation** phases. How the questions are interpreted depend to a great extent to our **formulations.**
- Then he/she has to **find** the data: How this is carried out depends on how difficult the **task** is (don't have the data / cannot remember).
- **Consideration** phases: Problem of **definitions.**
- **Formulation** of an answer: How this is carried out depends on the possible **alternatives**.

They also suggested that a process of cognitive mapping of how a respondent would approach answering the questionnaire could also be of help in this process.

The second conclusion focused on the need to identify the precision of the values we are expecting from respondents. Are we expecting an exact value or an estimate? If an estimate is all that can be expected, how good/rough can that estimate be? Are there any ways we can help the respondent make an estimate based on information we already have? Connected to the question of precision is the issue of defining what will make this survey a success.

5 Evaluation of other country questionnaires and surveys

A large number of questionnaires were collected and reviewed both in the early development stages of this project and then again after we had gained some experience from talking with representatives from industry. After talking with the methodology group the questionnaires from the various countries were examined again to see what assumptions were made about the information being obtained from the companies. Two main approaches were identified with some variations on each type.

5.1 Assumption that company has set up a separate accounting/coding system

The assumption made by most countries conducting this type of survey is that the enterprises/establishments will or have set up a separate accounting/coding system to be able to pull out the requested values out of their existing financial accounting systems. The expectation is that these systems will be fairly precise since exact amounts are usually requested.

There are two major variations related to this approach. The first approach requests totals and the second asks for more details that can then be added up to produce a total.

The first approach, used for example by the UK, is to ask for totals spent on the different environment variables and then asks the respondent to allocate this amount to the various environmental domains using estimates given in percent. Asking for a total value appears to reduce the reporting burden to the enterprises but this is not the case. The enterprises still need to develop a separate accounting system to make the calculations that are then summed up to give the total. Sweden also uses a similar approach but they ask for a written description of the investment to be able to evaluate the information

in more detail and they ask for the values according to environmental domain instead of percent estimates. The Swedish questionnaire can also be answered and submitted electronically.

The second approach of asking for more detailed information according to the various categories is the approach used by most countries. The questionnaires in most countries are divided by two investment types, end-of-pipe and integrated, and according to environment domain. And then there is a section asking about current expenditures according to environment domain. In the questionnaire there is a list of the various types of investment, for example equipment, buildings, land, etc., or types of current expenditure to be included. Portugal and Germany are good examples of this type of questionnaire. Finland also uses this approach and has an Excel worksheet for companies to use. Unfortunately the full functionality of the Excel worksheet is not utilized in the Finish example since no totals are automatically calculated but the Excel worksheet does provide a method for electronic reporting.

The survey instrument in the USA is an extreme example. The USA requests only the reporting of totals on the answer sheets to be returned. However, a workbook of over 17 pages (1994 survey) is needed to be read and filled out in order to calculate the values that are to be reported on the questionnaire.

5.2 Ask for existing information

Again there are two variations that can be considered here. The first approach, used by Statistics Netherlands, asks primarily for a description of an investment and uses expert knowledge to calculate and develop the rest of the needed information. The second approach would be to take the existing information that is reported by the enterprises/establishments and ask for estimates (values or percent) of the reported values that would be for environmental protection. No specific examples of this approach were identified although the current method used by Statistics Norway for reporting investment in end-of-pipe equipment is close.

Statistics Netherlands is the only example found using the first approach. They basically request a description and the cost of an investment that the enterprises/establishments made that year and based on information from manufacturers and experts. The statisticians then estimate the amount of the investment that is considered relevant for environmental protection. And based on expert estimates the current costs related to that investment are also calculated. These estimations are made for each subsequent year that the equipment is used by that enterprise/establishment.

This approach is very labour intensive for Statistics Netherlands. They employ a number of environment engineers that evaluate the equipment that the companies report and even make site visits to discuss the investment with the enterprises/establishments. This approach demands less from the enterprises/establishments in terms of evaluating how much of an investment is related to environment protection and the information requested is readily available since the enterprises/establishments only report the investment in the year in which it is made. All other estimates are made by experts and calculated by the statistical office. The reporting burden on the enterprises/establishments is much more limited than the other approach, however the work is shifted to the statistics office.

The other approach, that of asking for estimates based on the data reported already, was not a method used by any country for all three of the different environment variables. For 1999 Statistics Norway started to have enterprises report the amount of investment made that year related to end-of-pipe (or pollution treatment) according to five environment domains. The question was after the question asking about total investment. The idea was that the enterprise would fill in the total investment for the year and then, answer the question, "of this investment amount, there was so much investment in end-of-pipe type of plant and equipment." Unfortunately our experience with the reporting of 1999 data put some doubt into this approach because of the approximately 500 responses received, about 80 percent reported a value for end-of-pipe investment that was greater than the total investment for the

year. We have a suspicion that the companies reported the total investment made in an end-of-pipe type of investment and not what was made just in that year. The wording in the questionnaire is being revised for the 2002 questionnaire to hopefully improve the understanding of the question.

One idea for trying to reduce the burden of reporting to companies would be to take the values of their investment and current costs that are already reported to Statistics Norway and send these figures back to the company and ask for estimates (values or percent) that were used for environmental protection and then to take those amounts and ask for further estimates according to environment domain. Or to do this in a related part of the questionnaire where the respondent is requested to make an estimate based on the numbers reported in a certain post that was filled out previously.

This approach would potentially reduce the precision of the reported numbers but if we are only expecting estimates this could be one approach to reduce the reporting burden and still obtain some estimates for this information. There could be some problems with the 2-tiered approach in terms of timing. The values returned to the enterprises would have to be the un-revised and this may end up making even more problems.

5.3 Reporting burden and data precision

One issue that needs to be considered is, who does the majority of the work, Statistics Norway or the enterprises/establishments? It is not realistic for Statistics Norway to establish the type of system that is used by Statistics Netherlands. To establish the type of database necessary to estimate current costs and to evaluate investment through the use of experts and environmental engineers working at Statistics Norway is not financially feasible given the resources currently available or that are foreseen in the near future. Statistics Norway does not have the expertise to take a description of an investment and make the necessary evaluation and calculations.

Expertise from the enterprises/establishments needs to be used which means that the reporting burden is placed on the enterprises/establishments. It is necessary therefore that Statistics Norway develop the least demanding approach be developed so that the reporting burden is reduced as much as possible.

The calculations need to be done by the enterprises/establishments and reported to Statistics Norway. The question remains which calculations and the precision that are expected from those calculations. Due to the difficulties and imprecision of the definitions perhaps a method that asks for more estimated values instead of precise values would be an approach to consider.

Deciding on the precision of the values is an important part of deciding which methodology should be considered for future development.

5.3.1 Swedish and Finnish survey information

It can be helpful in the planning and evaluation stages to identify what approaches are being used by the statistical offices in countries that are similar to Norway. Information about the sample size, structure and revision processes have been obtained from those responsible for this work in Statistics Finland and Statistics Sweden.

One important point to consider in the further development of this survey in Norway is the relationship between the annual industry survey and the survey on environment related investment and current costs. In neither Sweden nor Finland are these two surveys coordinated. In Norway, we feel that it would be important that the synergies between the two sets of data be utilized both in terms of sending out the survey but also in the revision process. A simple example is controlling that the environment related investment is less than total investment.

Statistics Sweden

The Swedish survey for 1999/2000 included 1100 enterprises from a population of about 4500. The population included all enterprises from NACE C, D and E. Answering the survey was voluntary but that will change to being obligatory for 2001 reporting. The response rate for the voluntary survey was 60 percent (68 percent with regards to number of employees) but this was only after many phone calls and extending the deadline for answering by several months. The survey was conducted in the fall with the deadline for answering September (but this was extended to January to increase the response rate).

The sample is drawn from a stratified population (stratified into 5 groups by number of employees). All of Group 1 is included every year and includes enterprises over 250 employees. Fifty percent of Group 2 (enterprises with number of employees 100-249) is included. A ten percent sample is taken from Group 3 (enterprises with number of employees 50-99) and a five percent sample is taken from Group 4 (enterprises with number of employees 20-49). No sample is taken from the group with enterprises with number of employees 1-19. This group is calculated through enumeration. Number of employees is used to gross up the values for the different NACE groups and size groups.

There is no co-ordination with the regular annual industry survey. The sample is drawn separately, the questionnaire is sent out separately and the division for environmental statistics has the responsibility for data revision. It is not possible to use the information collected from the annual industry statistics to control the data reported in the environmental protection expenditure survey (checking for example, total investment > investment in pollution treatment and pollution prevention). There may be some co-ordination of the surveys in the future.

The total time used for the survey (excluding the production and sending out of the questionnaires) was 1500 hours. There was one person working full-time on the survey and another part-time worker. The time planned for the 2001 survey is approximately 1000 hours.

To help enterprises answer the questions, Statistics Sweden is placing a list of "typical" capital and current costs according to the different environmental domains for each industry branch. It will then be possible to each enterprise to look up what kind of investments and current costs have been reported so far and see which ones are considered to be environmental protection expenditure.

Statistics Finland

Statistics Finland has compiled statistics on environmental protection expenditure since 1992. The population include all enterprises in NACE C, D and E (classes 10-41, excluding 37). The number of enterprises in the 2000 survey frame was 16 567 and Local activity units were 19 405. In the 2000 survey the number of local activity units included was 2 531 including 1 196 enterprises.

The large enterprises, with more than 250 employees and those operating in at least 2 industry groups (mulit-NACE) are included every year. In addition, a few NACE groups have been selected totally. Other NACE groups have been sampled using the value of production and number of employees for defining the strata for the sampling.

There is no coordination between the annual industry survey and the annual environmental protection expenditure survey, although the sampling is from the same business register. The environmental protection expenditure survey is not obligatory reporting. The questionnaire is sent out in the spring, data revision occurs in the summer and fall and the statistics are usually published some time the next spring. There is an extensive internet page with definitions and a downloadable Excel workbook to allow for electronic reporting (without data encryption). Total time used for the survey is estimated at 9 months. Two students are usually employed for a couple months to help with the data entry and revision tasks.

6 Conclusions

Based on the experiences gained through this systematic evaluation of the proposed questionnaire, additional information needs to be obtained from the enterprises in order to evaluate the types of investments and costs that are being included. The totals asked for allows for too much variation in the reporting from enterprises. Requesting a brief description may be the easiest approach (as in the Swedish questionnaire). This approach would also allow the development of lists of investment types and current costs that are included by an industry-by-industry basis. These lists could be helpful to organisations in identifying the types of investments and currents costs to include in their calculations.

The survey needs to be co-ordinated with the annual industry survey so that synergies can be obtained between the two sets of data and sample methodologies. Also connections to other environment statistics (emissions reporting) should be considered especially for large enterprises.

The questionnaire needs to be developed further to allow for electronic reporting. All reporting to Statistics Norway is being converted to electronic reporting. Developing a new survey needs to have primarily an electronic reporting approach. This will also mean that the explanations to the calculations and to the definitions can be provided embedded into the questionnaire instead of only on paper. However, to be able to have a survey ready by January 2003 there may need to be a paper version of the questionnaire.

A wider focus rather than only environmental protection expenditure needs to be considered in order to provide a more complete picture of what enterprises are doing in Norway related to the environment. Including energy savings and resource use should also be examined. This broader focus was suggested by an important industry organisation. However, these areas will need to be developed in connection with experts in these fields since the expertise at Statistics Norway does not cover these additional areas in the precision that is required to be able to develop a national survey.

7 Next steps

Continued discussions with the Division for industry statistics and others in Statistics Norway are needed to decide the next steps in developing this area of statistics. Key to this will be deciding the precision of the reported values we are expecting from the companies.

If fairly precisely calculated values are desirable then the Swedish model of asking for totals with some brief descriptions could be considered or the Portuguese, German, Finnish, USA, etc. model of reporting detailed calculations should be considered.

If rough estimates are deemed adequate, then the existing variables that are reported to the tax authorities and reported via the annual industry survey need to be evaluated as to their relevance to including environmental protection investment and current costs. It then needs to be determined if estimated amounts and/or percent estimates shall be requested. It will also be necessary to ask for some descriptions about the investments and current costs that are included in the estimates to allow for some evaluation of the reported information.

These different methods will need to be evaluated during spring 2002 to be ready to prepare for a larger study in 2003.

In addition to the survey instrument (questionnaire) the structure of the sample will also need to be designed. Two sectors may need to have special consideration. One is NACE 11 Extraction of crude petroleum and natural gas and NACE 40Electricity, gas, steam and hot water supply, which includes hydroelectricity power production. These two sectors are not covered by the standard annual industry survey. NACE 11 has just a few major actors in the North Sea and it may be better to discuss this with

the companies directly rather than send a questionnaire. NACE 40 has a special reporting system that also makes it difficult to obtain new information from these companies using the annual survey. These two NACE groups are not currently covered in the investment in end-of-pipe (pollution treatment) survey so some special attention needs to be given to these specific NACE groups.

The mechanics of the survey itself also need to be determined. Co-ordination with the annual industry survey will need to occur. Some of the mechanics related to the survey also need to be determined such as including it with the annual questionnaire and the data entry and data revision responsibilities. Financing of this will also need to be decided.

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Industristatistikk 200X

Miljørelaterte utgifter 200X

Underlagt taushetsplikt
Oppgaveplikt

Statistisk sentralbyrå
Statistics Norway

Seksjon for energi- og industristatistikk og seksjon for miljøstatistikk
Postboks 8131 Dep., 0033 Oslo
Telefon: 21 09 45 00
Telefaks: 21 09 49 96

Navn **Organisasjonsnr**
Karakteristikk **Tilstand** **Kommune**
Adresse **Næring**
P.Nr. Poststed **Bedriftsnummer**

Frist for innsending: xx. xxxx 200x

Statistisk sentralbyrå skal i forbindelse med industristatistikken for 200X kartlegge det økonomiske omfanget av ulike miljøverntiltak i bergverksdrift, industri, og kraft- og vannforsyning. Oppgaven gjelder bare ytre miljø (*ikke arbeidsmiljøtiltak*), der **alle bedrifter minst har driftsutgifter i form av avfalls- og avløpsgebyrer/utgifter.** En utfyllende veiledning finnes vedlagt. Oppgavene er underlagt taushetsplikt og omfattes av den generelle oppgaveplikten knyttet til industristatistikken.

Definisjon av miljøvernutgifter

Driftsutgifter og investeringer er definert som "miljøvernutgifter" når utgiftene er knyttet til aktiviteter som har som hovedformål eller hovedfunksjon å forebygge, redusere eller behandle forurensning. Inkludert er behandling av utslipp og andre aktiviteter som skal motvirke forringelse av det ytre miljøet. Dette gjelder bare ytre miljø og ikke arbeidsmiljøtiltak. Hvis utgiften ikke først og fremst er rettet mot miljøvern, skal den IKKE klassifiseres som en miljøvernutgift. Se utdypende veiledning for identifikasjon av utgifter som skal inkluderes.

ALLE TALL SKAL OPPGIS I 1.000 KR OG EKSKLUSIVE MVA.

A. DRIFTSUTGIFTER TIL MILJØVERN

A1. Internutgifter for miljøvern
Omfatter personell, forbruk av miljøvernutstyr, miljøstyringssystemer, intern avfallsbehandling, intern behandling av avløp og produksjonsvann, miljørelatert opplæring og R&D, informasjon, m.m.

A2. Eksternutgifter for miljøvern
Omfatter utgifter til ekstern avfalls- og avløps-behandling/gebyrer, miljøkonsulenter, outsourcing av utstyr, vedlikehold, miljørelatert R&D, m.m

Driftsutgifter til og investeringer i miljøvern, fordelt etter miljøområde (1000 kr, eks. MVA) 200x.			
Luft / Klima	***Produksjons-vann og avløp***	***Avfall***	***Andre miljøområder***
A1.1	A1.2*	A1.3**	A1.4
A2.1	A2.2*	A2.3**	A2.4

**Bedriften må fylle ut A1.2 eller A2.2 for utgifter eller gebyrer knyttet til avløpsbehandling og **A1.3 eller A2.3 for utgifter eller gebyrer knyttet til avfallsbehandling.*

B. INVESTERINGER I MILJØVERN

B1. Investeringer i anlegg og utstyr for rensing og utslippsreduksjon ("end-of-pipe")
Her føres investeringer i utstyr som er uavhengig av produksjonsprosessen og som behandler, forhindrer, kontrollerer eller måler forurensning.

B2. Investeringer i ny eller modifisert produksjons-prosess der miljøvernutstyret er integrert i det øvrige produksjonsutstyret ("pollution prevention")
Her føres *merinvesteringene* som følge av at en renere teknologi blir valgt i stedet for en mer tradisjonell teknologi eller som følge av prosessforandringer som er mindre forurensende.

B1.1	B1.2	B1.3	B1.4
B2.1	B2.2	B2.3	B2.4

B3. Kryss av hvis bedriften ikke har noen investeringer knyttet til miljøvern (ifølge definisjonen)..... ☐

Del C. INVESTERINGER I ENERGIØKONOMISERING

C. Her føres investeringer i energiøkonomiseringstiltak og -utstyr. Denne type investeringer skal ikke inkluderes i miljøverninvesteringer under del B, men rapporteres separat. ☐

D. Angi hvor mange minutter det tok å fylle ut skjemaet..... ☐

E. Kryss av for å motta e-postmelding når SSB publiserer resultatene fra denne undersøkelsen..... ☐

Merknader:

Kontaktperson som Statistisk sentralbyrå kan henvende seg til ved spørsmål ang. besvarelsen

Navn: _____ Tlf.: _____ e-post: _____

Sted: _____ Dato: _____ Underskrift: _____

Veiledning for utfylling av skjema for miljørelaterte utgifter i 200x

Definisjon av miljøvernutgifter
Med miljøvernutgifter menes både driftsutgifter og investeringer som helt eller i det vesentligste påløper for å verne det ytre miljøet mot negative konsekvenser av produksjonsprosessen. Utgifter for å bedre arbeidsmiljøet skal ikke med i denne undersøkelsen. Bruk gjerne feltet "merknader" til kommentarer og forklaringer.

Hovedkriteriet for identifisering av utgifter til miljøvern må evalueres etter det såkalte "hovedformålskriteriet" ("main purpose criteria"). Hovedformålskriteriet innebærer at miljøvern er hovedformålet eller -funksjonen med driftsutgiftene eller investeringene som bedriften har. For eksempel regnes ikke kjøp av el-bil som en miljøverninvestering utfra hovedformålskriteriet. En el-bil er kjøpt først og fremst for transport (som hovedformål). Utgifter som beregnes som miljøvernutgifter i dette eksempelet er kun prisforskjellen, dvs. *mer*kostnaden mellom en el-bil og en annen tilsvarende bil som bruker bensin.

Del A. Driftsutgifter til miljøvern, A1 Interne og A2 Eksterne driftsutgifter for miljøvernsarbeid
Rapporteringen av driftsutgifter skal reflektere bedriftens organisering av de forskjellige aktivitetene, og skal fordeles utfra om utgiftene er interne eller eksterne. Utgiftene klassifiseres ut fra hvilken type forurensning som er motvirket, og skal fordeles på følgende fire miljøområder: luft/klima, produksjonsvann/avløp, avfall og annet.

Hvis bedriften er koblet til det kommunale avløpsnettet og ikke har annen behandling av produksjonsvann eller avløp, skal avløpsgebyr betalt til kommunen føres på post A2.2 (eksterne driftsutgifter tilknyttet avløp). Det er svært sannsynlig at en bedrift har både internutgifter og eksternutgifter (f.eks. til kommunen). Hvis bedriften har oppsamlingstanker og/eller forbehandling av avløp eller produksjonsvann før det slippes ut til det kommunale avløpsnettet, skal driftsutgifter knyttet til bedriftens eget avløps-/vannbehandlingssystem føres som intern driftsutgift (på post A1.2), mens avløpgebyret betalt til kommunen føres som ekstern driftsutgift (på post A2.2).

Dersom bedriften har utgifter knyttet til f.eks. avfallssortering før avfallet leveres til privat og/eller kommunalt avfallsanlegg/deponi fordeles utgifter på tilsvarende måte som for avløp. Bedriftens egenproduksjon (internutgifter) føres på A1.3 og kjøp av tjeneste fra andre aktører (eksternutgifter) føres på A2.3. Operasjonell leasing skal også inkluderes.

Poster A1.1, A1.2, A1.3, A2.1, A2.2, A2.3
Driftsutgifter som er knyttet til miljøområdene luft/klima, produksjonsvann og avløp, og avfall må fordeles på riktig miljøområde og etter intern/ekstern organisering i bedriften. Hvis et tiltak dekker mer enn bare ett miljøområde, må utgiftene estimeres etter en fornuftig fordelingsnøkkel. Blant de driftsutgifter som ofte faller inn under de ovenfor nevnte miljøområder er:

- drift og vedlikehold av tidligere miljøverninvesteringer og miljøutstyr, inkludert materialer brukt i normal drift av utstyret, energibruk knyttet til miljørelatert utstyr, filtermedia, m.m.
- utgifter relatert til utslippstillatelser for luft/klima, avløp, vann, avfall, spesialavfall, osv.
- forbehandling av avfall: sortering, dehydrering, sammenpressing, avgifting, avvanning, osv.
- transport knyttet avfallbehandling
- overvåkings- og analyseutgifter knyttet til utslipp til luft og utslipp til vann

Post A1.4
Driftsutgifter som inkluderes i kategorien "Intern" og "annet" (post A1.4) er:

- ansatte som jobber med miljøvern, miljørapportering, miljøstyringssystemer, miljøsertifisering, miljørevisjon, miljøkonsekvensanalyser, o.l. (inkl. lønn og sosiale utgifter);
- miljøinformasjon, miljøvernrelatert opplæring av ansatte (eksklusive helse- og sikkerhetsopplæring)
- datasystemer knyttet til miljørapportering og utslippstillatelser
- forskning og utvikling for å minske miljøpåvirkningen av bedriftens virksomhet
- miljøvernutgifter knyttet til støy, jord og grunnvann, overflatevann, biodiversitet og stråling
- måling av ytre støynivå og måling av stråling
- vedlikehold av lydfeller og støykilder
- *mer*utgifter til bruk av mer miljøvennlige innsatsvarer, f.eks. brensel med lavere svovelinnhold. Merutgifter er den ekstra utgiften som må betales for dyrere, men mer miljøvennlige innsatsvarer (forskjellen mellom dyrere og normale utgifter). Hvis det ikke er noen prisforskjell mellom varer, er det ingen miljørelaterte driftsutgifter.
- generell administrasjon som er miljørelatert

Post A2.4
Driftsutgifter som inkluderes i kategorien "Ekstern" og "annet" (post A2.4) er:

- miljøkonsulenter og miljørådgivning
- forsikring som er relatert til miljøvern
- vedlikehold av databehandlingssystemer relatert til miljøvern som er kjøpt fra andre
- forskning som er kjøpt utenfor bedrift for å minske miljøpåvirkningene av bedriftens virksomhet

Følgende skal **ikke** tas med i driftsutgifter for miljøvern:

- Generelle miljøskatter
- Avskrivninger (utgifter relatert til kapitalslitasje)
- Renter på lån
- Bot for brudd på utslippstillatelser eller andre miljørelaterte bøter eller kompensasjon o.l. til tredje part for skader knyttet til miljøskadelig utslipp.
- Inntektsbortfall ved driftsstopp pga. miljøkrav

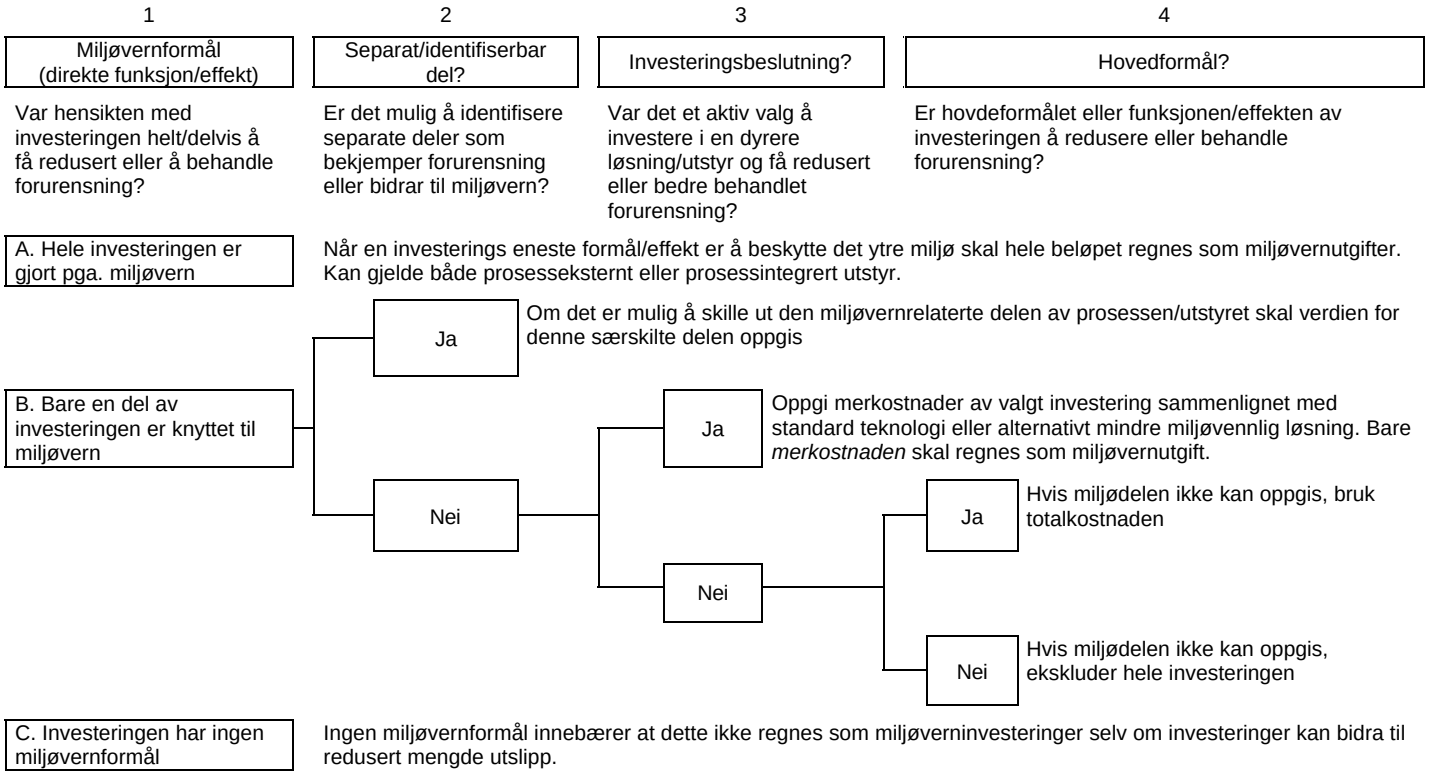
Del B. Investeringer til miljøvern

Investeringsbeløpet som skal oppgis er bruttoinvestering eksklusive MVA. Investeringer med energiøkonomisering som hovedformål skal IKKE inkluderes i del B. Disse investeringene rapporteres i del C.

Definisjonen av miljøverninvestering: Alle nye fysiske kapitalvarer for miljøvern, kjøpt fra en tredje part eller produsert ved egen produksjon, med en livslengde som er lengre enn ett år. Finansiell leasing inkluderes som investering. Til investeringer beregnes erstatnings- og nyinvesteringer og avslutningsutgifter. Når investeringsbeløp beregnes skal omkostninger inkluderes.

Innkjøpspris for nytt utstyr finnes ofte på faktura. Utover utstyrets innkjøpspris skal tilleggsutgifter som er nødvendige for at investering skal fungere inkluderes. Tilleggsutgifter innbefatter f.eks. planer, forberedelsesutgifter, installasjonsutgifter, transport, tester, osv. Disse tilleggskostnadene kan ha stor betydning.

Det kan være vanskelig å avgjøre om en investering skal inkluderes eller ikke. Figuren nedenfor viser skritt for skritt hvordan man kan avgjøre om en investering er miljøvernrelatert.



Del B1. Investeringer i anlegg og utstyr for å redusere utslipp (Prosessekstern eller "end-of-pipe")

er utstyr som er separert fra produksjonsprosessen og som kan behandle, forhindre, kontrollere eller måle forurensning. Dette inkluderer bl.a. overvåkingsutstyr. Utgifteene klassifiseres ut fra hvilken type forurensning de er relatert til: luft/klima, vann (produksjonsvann og avløp), avfall eller annet. Dette kan være vanskelig å avgjøre. En løsning kan være et kostnadsestimat over de utgifter som er nødvendige hvis deler er ødelagt og må erstattes (replacement costs).

Eksempler på denne type investeringer er:

Post B1.1	**Luft/klima:**	Skorsteiner, renseutstyr med posefilter eller elektrofilter, tiltak som begrenser regulære og akutte utslipp. Overvåkingsutstyr inkluderes.
Post B1.2	**Vann/avløp:**	Renseanlegg, rørledninger til renseanlegg og avløpsnett, oppsamlingsbasseng for lekkasjer, tiltak som begrenser regulære og akutte utslipp, kjølesystemer for produksjonsvann før det slippes ut til kommunalt avløpsnett.

Post B1.3	**Avfall:**	Forbrenningsovner, deponier, avfallspresse (utstyr for sammenpressing), slamtørkeseng, utstyr for hygienisering, sedimenteringstanker, utstyr for egen behandling eller forbehandling (f.eks. container).
Post B1.4	**Annet:**	Lydfeller, støyvegger, innbygging av støykilder, utstyr som beskytter grunnvann og jord, bevaring av områder pga. biodiversitet

Del B2. Investeringer i nye eller modifiserte prosesser (renere teknologi / "pollution prevention")

Investeringer som forhindrer at forurensning oppstår regnes til denne kategorien av investeringer. Identifisering av den delen av investeringen som er miljøvernrelatert, kan være vanskelig. Figuren under del B kan være til hjelp.

Gi et overslag over den delen av de totale investeringene i nye eller modifiserte produksjonsprosesser (renere teknologi) som er tilknyttet miljøvern. Ta bare med de ekstrakostnadene ved investeringene som skyldes at bedriften har valgt en mer miljøvennlig prosess framfor en mer tradisjonell prosess.

Et overslag over dette kan beregnes ved å sammenlikne kostnadene til den mer miljøvennlige prosessen (eller utstyret) med kostnadene til en mindre miljøvennlig prosess. Miljøverninvesteringen regnes som forskjellen mellom de to investeringsnivåene (høyere utgifter).

Eksempler på investeringer i integrert eller renere teknologi:

Post B2.1	**Luft/klima:**	Tanker med flytende tak (sammenliknet med f. eks. tanker uten tak), systemer for damputveksling, kontroll-systemer for optimal forbrenning/drift, endringer som er nødvendig for bruk av mindre miljøskadelig kjølingsmedia.
Post B2.2	**Vann/avløp:**	Resirkulering og forbruksreduksjon, kontrollutstyr.
Post B2.3	**Avfall:**	Endringer i innsatsvarer som betyr en reduksjon i avfall eller mindre skadelige avfallstyper, utstyr/prosesser som gir mindre avfall eller mer effektiv bruk av råstoffer.
Post B2.4	**Annet:**	Fundamentering som demper vibrasjoner, lavstøybrenner, dobbeltveggede tanker (sammenliknet med enkeltveggede tanker) installert for vern av jord og grunnvann.

Husk at investeringer med energiøkonomisering som hovedformål IKKE skal inkluderes i del B. Disse investeringene skal rapporteres i del C. Noe energibesparelse har imidlertid som hovedformål å redusere utslippene til luft/klimautslippene. Dette gjelder spesielt reduksjon i bruk av fyringsolje eller andre drivstoffer. Når bruk av drivstoff reduseres, har dette en direkte effekt på utslipp til luft. Disse investeringer skal inkluderes.

Post B3. Ingen miljøverninvesteringer i år

En bedrift har ikke nødvendigvis miljøvernrelaterte investeringer hvert år. Etter at alle investeringer er evaluert og dersom konklusjonen er at dette er tilfelle for gjeldende år, så kryss av i boks B3, så vet vi at dette er vurdert og besvart.

Post C. Investeringer i energiøkonomisering

Norsk bedrifter har i mange år hatt et fokus på reduksjon i energibruken. Økning i energieffektivitet er ofte økonomisk lønnsomt. Etter Eurostat sin definisjon og andre internasjonale rapporteringsdefinisjoner, er ikke energiøkonomisering klassifisert som "miljøvern," men som "bevaring av naturressurser." I Norge har de fleste miljørapporter fra foretak fokus på energibruk og energiøkonomisering. Statistisk sentralbyrå ønsker derfor å inkludere energiøkonomiserings-tiltak i den norske statistikken over bedriftenes miljørelaterte utgifter.

Her føres estimater for investeringer gjort med energiøkonomisering som hovedformål. Figuren som ble presentert under del B miljøverninvesteringer kan være til hjelp. Erstatt "miljøvern" med "energiøkonomisering." Bare et totaltall skal rapporteres. Det er ikke nødvendig å fordele på miljøområder.

Post D. Angi hvor mange minutter det tok å fylle ut skjemaet.

Gi et estimat på tidsbruk for datainnhenting og skjemautfylling (i minutter).

Post E. Kryss av for å motta e-postmelding når SSB publiserer resultatene fra denne undersøkelsen.

Henvendelser til Statistisk sentralbyrå kan rettes til

Xxxxx Xxxxx, Seksjon for miljøstatistikk	Tlf: 21 09 xx xx	e-post:	xxx@ssb.no
Xxxxx Xxxxxxxx, Seksjon for energi- og industristatistikk	Tlf: 21 09 xx xx	e-post:	xxx@ssb.no

Appendix B

Outokumpu Norzink Annual Report 2000 - Health, Environment & Safety, page 9 (entire report is available as pdf-file at the following: http://www.norzink.no/pdf/hse00.pdf)

Quality assurance and internal control

During the course of 2000 a total of 15 reviews were carried out. Three of these were external reviews and 12 were internal reviews. Fifty three deviations[1] and 191 observations[2] were recorded in connection with the reviews. Norzink underwent a routine review carried out by Det Norske Veritas, which showed 2 deviations and 3 observations. The State Pollution Control Authority (SFT) also carried out a system review in the year 2000, where the main emphasis was on maintenance. Five remarks were registered in this context, but no deviations..

Representatives from Norzink's owner companies during a review, accompanied by Norzink's Environmental Coordinator, Per Strømsnes (right).

Reporting and follow-up of deviations

During the last few years Norzink has focussed on dealing with deviations as part of its ongoing improvement process. A new deviation system was introduced in November 1999. Following comprehensive training and marketing of the new system, the number of records increased by 100%, and there was a tremendous increase in the number of employees reporting deviations. During the year 2000, over 2000 deviations were reported. Great emphasis has been placed on the follow-up of reported deviations by dealing with them and making corrections within given deadlines.

[1] *Deviations are a failure to meet requirements (specified needs or expectations – normally implied or compulsory in accordance with documents, regulations, etc.). Norzink operates with 3 types of deviations: quality deviations, HMS deviations and customer claims.*

[2] *Observations are remarks (recommendations) about things which can be improved.*

Expenses and investments in 2000 (NOK million)

Operating expenses:	
Operating expenses, water treatment plant at the sulphuric acid factory	2.2
Operating expenses, central water treatment and discard plants	12.3
Mountain caverns	12.1
HMS staff and Company Health Service	3.6
Protective equipment	0.9
Investments:	
«Discharge Project»	30.7
Loading up, anhydrite plant	5.9
Hg cellar – new development and alterations	6.0
Mountain cavern study	0.4
Total	**74.1**

Norske skog Environmental Report 2000, page 21 (report is available as pdf-file at the following: http://reports.huginonline.com/818384/89200.pdf)

Environment-related costs

By environment-related costs we mean environmental investments and operating costs. The costs shown in the accompanying tables have been estimated as carefully as possible, and on the basis of what we ourselves believe has accrued mainly in order to achieve environmental improvements.

By environment-related investments we mean the cost of building new treatment plants, waste handling equipment, noise reduction measures, energy saving, equipment for environmental monitoring and environment-related rehabilitation measures. By environmentrelated operating costs we mean the cost of chemicals for treatment plants and sludge de-watering, maintenance of treatment equipment, wages to environ-mental officers and operators at treatment plants, environment-related experiments and studies, environmentrelated fees and taxes, and the operation and maintenance of waste deposits.

Norske Skog invested a total of more than NOK 2.2 billion in environmental improvement measures during the 1990's. The largest investments were in effluent treatment plants and in plants for utilising our own bio-waste to produce energy. The most important investments in theese areas have now been completed at the mills in Europe. During the past two years, therefore, the level of such investments at these mills has been well below what it was earlier in the 1990's.

While the major environmental investments were being made, environment-related operating costs were rising. This is because the new facilities involve costs for operation and maintenance, chemicals etc. In step with reduced investments, the relative importance of operating costs has increased and they now account for the greater part of environ mental costs.

In 2000 NOK 47 million was invested in environmental measures at Norske Skog Europe´s mills. The largest single investment was an upgrade of the biofuel boiler at Norske Skog Follum. That alone cost about NOK 14 million. Among other significant investments may be mentioned the debarking plant at Norske Skog Steti, where the environment-related part of the investment was estimated at NOK 12 million. At Norske Skog Saugbrugs, NOK 7 million was spent on measures to reduce steam emissions. At the same time, noise and nuisance to neighbours were reduced.

Environment-related investments at the mills in the other regions totalled around NOK 120 million during 2000. What proportion of this was spent in the five-month period since Norske Skog took over the mills has not been calculated. By far the largest investments were made at the mills in Canada.This includes investments to reduce emissions of odorous gases and dust from the boilers.

Environment-related operating costs amounted to NOK 129 million in Norske Skog Europe in 2000. Of this, chemicals for treatment plants and sludge de-watering accounted for nearly 50%.

In the table showing environment-related investments only the cost side is evident. Many of these investments will, however, also lead to savings, for example:

Energy-saving
→ *Reduces energy costs*

Effluent treatment and sludge de-watering
→ *Provides biofuel which replaces other energy*

Incineration of biofuel
→ *Reduces costs of other energy and costs for landfills*

We believe that an activity which maintains a positive environmental profile will benefit us in the market. The customers environmental objectives are adressed in our environmental policy. Norske Skog will be competitive in the most discriminating markets. We are convinced that an active environmental policy will help Norske Skog to attain this goal.

ENVIRONMENTAL INVESTMENTS (NOK MILLION)

	2000
Norske Skog Europe	47
Norske Skog North America	111
Norske Skog South America	1
Norske Skog Australasia	14
Norske Skog total	173

ENVIRONMENT-RELATED OPERATING COSTS (NOK MILLION)

	2000
Norske Skog Europe	129
Norske Skog North America	40
Norske Skog South America	3
Norske Skog Australasia	26
Norske Skog total	198

ENVIRONMENT-RELATED OPERATING COSTS, BROKEN DOWN BY TYPE OF COST, YEAR 2000