

## Data Corroboration for Canada

As noted above, there were concerns about the reliability of some of the data collected. In order to corroborate our data, we looked for a recent official survey with detailed data on topics similar to the ones covered in our survey. In 2004 Statistics Canada published a report on “Environmental Protection Expenditures in the Business Sector - 2002”. This publication contains some data which should theoretically be similar to the ones we obtain through our survey. Therefore, we will compare the two datasets and try to identify possible reasons for any apparent discrepancies.

The sectors in the Canadian survey are defined according to the NAICS classification. Given the correspondence between the NAICS and ISIC Rev 3.1, we were able to match our data with theirs for the following sectors: Food Beverage and Tobacco (NAICS 311-312); Wood Products (NAICS 321); Pulp, Paper (NAICS 3221); Petroleum, Coal Products and Chemicals (NAICS 325); Non-metallic mineral products (NAICS 327); Metals (NAICS 331-332); Transportation equipment (NAICS 336). We did our best to match the sectors but one should keep in mind that the sectoral definitions are not exactly the same between our survey and theirs, and data was not available at a more disaggregated level which would allow for full concordance.

In addition, only establishments that have more than 49 employees have been sampled which means that the population is the same with respect to facility size. However, the results involving facility size should be treated with care since information broken down by facility size also includes some sectors not included in our survey (*e.g.* oil and gas extraction, mining, etc.). We nonetheless report these results. And finally, since our survey was undertaken in early 2003, 2002 is the reference year and therefore there is no reason to believe that the data is incomparable with respect to the period of data collection.

In the following sections we will report results for the two surveys on environmental management systems, ISO14001 certification and emissions of greenhouse gases; the choice between CPP and EOP as well as green procurement policy.

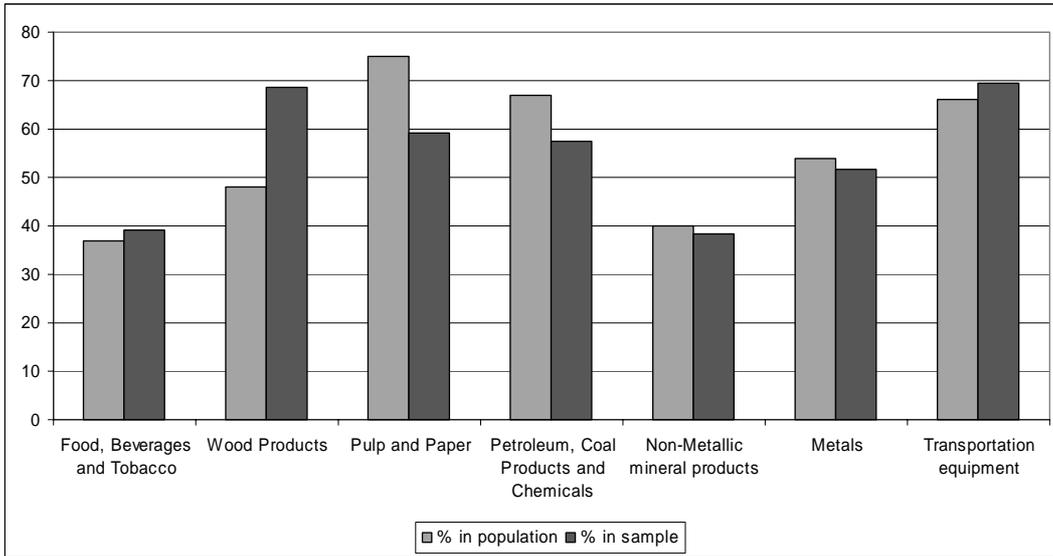
### **Environmental Management Systems and ISO14001 Certification**

During the conference some participants were concerned about a possible strong self-selection bias of firms with an EMS in place. Therefore, we felt it was important to check this in order to assess the degree of selectivity (if any) linked to environmental management systems in our sample and to be able to better interpret our results. Indeed, if facilities with an EMS in place are more likely to reply our results are likely to be biased.

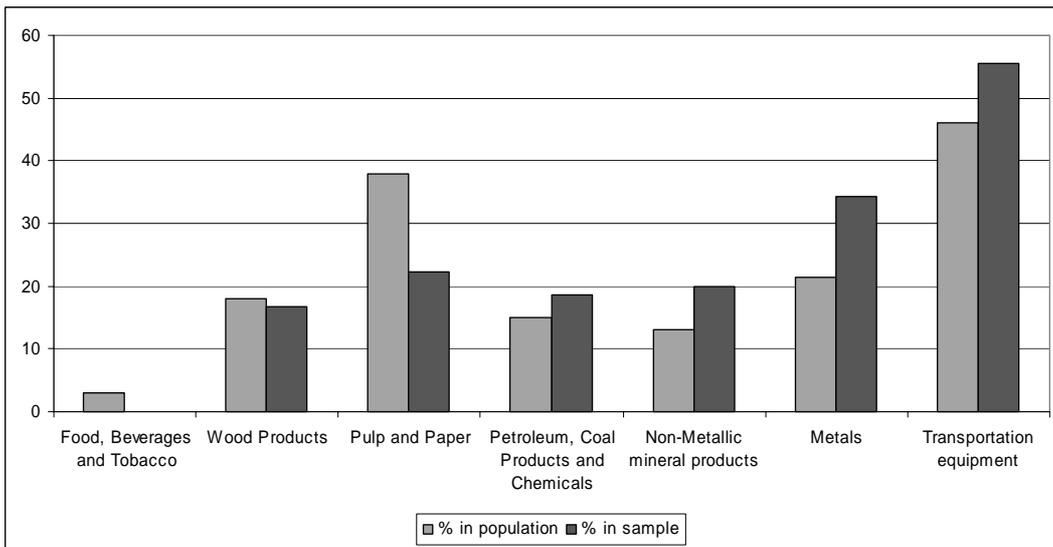
Overall, 56% of the facilities in Canada report having an EMS in place. In our sample the corresponding figure is 53.9% (**yes and in progress**) and therefore one can rule out (at least for Canada) the presence of a strong self-selection bias of facilities with an EMS. In addition, if one looks at the figures broken down by sector and by size, the figures from our survey are not dissimilar from the Canadian survey which increases our confidence in the quality of our data set.

Overall, 19% of the facilities in the manufacturing sector in Canada are ISO14001 certified. The corresponding figure in our sample is 18% and therefore one can rule out (at least for Canada) the presence of a strong self-selection bias of facilities with respect to ISO14001 certification. However, the picture is a bit more mixed when one look at the figures broken down by sector (*cf.* Figure A6.2).

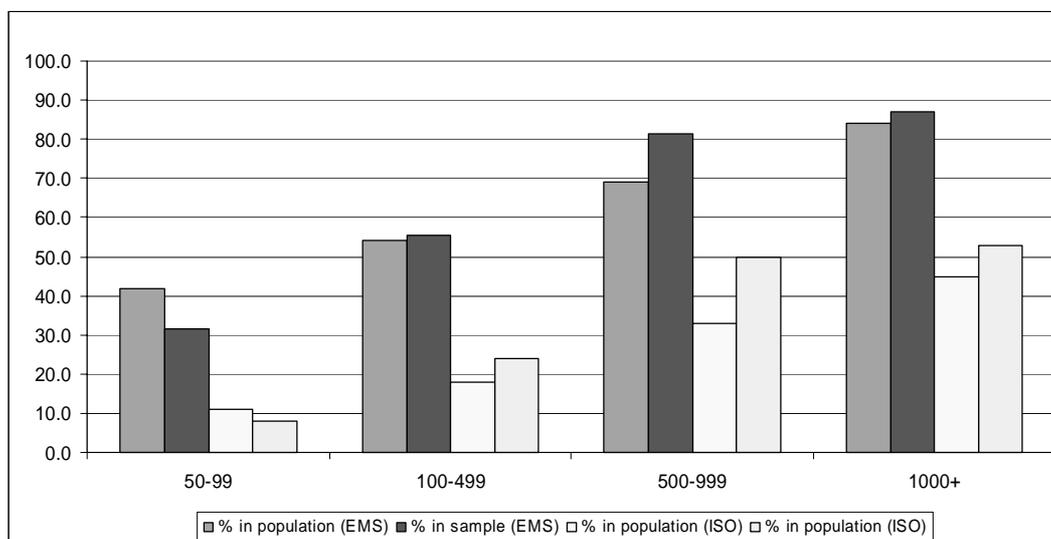
**Figure A6.1: Facilities with an EMS in place by Sector in Canada**



**Figure A6.2: Facilities with ISO14001 Certification by Sector in Canada**



**Figure A6.3: Facilities with an EMS and ISO14001 Certification by size in Canada**



### Changes in Reported GHG Emissions

The Statistics Canada questionnaire asked the respondents whether their establishment put into operation new or significantly improved systems or equipment that reduced GHG emissions during the last three years. If the response was affirmative, the questionnaire also asked to assess the impact of these systems to reduce GHG emissions. In our questionnaire, we asked the respondents to assess change in the environmental impacts per unit of output of its products and production processes in the last three years with respect to ‘Global Pollutants (*e.g.* GHG).

Using the Statistics Canada data, one can rank the sectors according to their reductions of GHG emissions. Similarly, using our data one can rank the sectors according to the change in the environmental impacts per unit of output of their products and production processes with respect to global pollutants. One should expect the two rankings to be pretty similar unless for those sectors in which facilities are under pressure to come up with products with lower emissions of global pollutants.

**Table A6.1: Sectoral Ranking for Reported Reductions in GHG Emissions**

| Population                        | Sample                            |
|-----------------------------------|-----------------------------------|
| Pulp and Paper                    | Pulp and Paper                    |
| Non-Metallic mineral products     | Non-Metallic mineral products     |
| Metals                            | Transportation Equipment          |
| Transportation Equipment          | Metals                            |
| Wood products                     | Fuel, Coal Products and Chemicals |
| Fuel, Coal Products and Chemicals | Wood products                     |
| Food, Beverages and Tobacco       | Food, Beverages and Tobacco       |

For the sectors for which comparisons are possible the rankings are similar. The main differences are for “Transportation Equipment” and “Fuel, Coal Products and Chemicals” which rank higher in our ranking. This result is hardly surprising as facilities in those sectors are more likely to reduce their products’ GHG emissions.

## CPP vs. EOP

The Statistics Canada survey asked the respondents to report their annual capital expenditures related to end-of-pipe processes and to pollution prevention. End-of-pipe processes are defined as being processes for which the sole purpose is to abate or to control undesirable substances resulting from normal production. The questionnaire also provided a definition of pollution prevention: it is the use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and waste, and reduce overall risk to human health or the environment. We can therefore compute an index of “the pollution prevention intensity of abatement capital expenditures” by sector. It is then possible to rank the sectors according to this index.

In our survey, for those facilities in which significant measures related to their production technologies, we asked the respondents to describe the nature of such measures. They had to choose between “changes in production processes which reduce the pollution emissions and/or resource use (1)” and “end-of-pipe technologies which reduce pollution emissions or allow for resource recovery (0)”. It is then possible to compute the mean answer to this question by sector. The higher the mean the bigger is the share of investments in pollution prevention. In the following table we compare the two rankings obtained.

**Table A6.2: Sectoral Ranking for Reported Reductions in GHG Emissions**

| Population                    | Sample                        |
|-------------------------------|-------------------------------|
| Metals                        | Fuel and Chemicals (23-25)    |
| Non-Metallic mineral products | Transportation Equipment      |
| Food, Beverages and Tobacco   | Metals                        |
| Transportation Equipment      | Pulp and Paper)               |
| Fuel and Chemicals (23-25)    | Non-Metallic mineral products |
| Pulp and Paper                | Wood products                 |
| Wood products                 | Food, Beverages and Tobacco   |

The two rankings are different. A couple of reasons could explain why this is the case. First, while the Canadian survey asked respondents to report their expenditures for the fiscal year that ended between April 1, 2002 and March 31, 2003 our question did not include a time frame. Therefore, our data probably include older investments that are not reported in the Canadian survey.

Second, in our survey we “forced” the respondents to answer either change in production process (CPP) of end-of-pipe (EOP) technologies. This means that we are not able to distinguish between a facility that invested everything in CPP and a facility that invested “only” 60% in CPP.

## Green Procurement Policy

In our survey, we also asked the respondents whether their facilities regularly assess the environmental performance of their suppliers and/or require suppliers to undertake environmental measures. Similarly, the Canadian survey asked if the facility has a “green” procurement policy. We ask if procurement is somehow greener while the Canadian asked if the “greening” of their procurement has been formalised. As such, one should expect the Canadian figures to be lower than ours. A quick look at Graph A6.4 that this is the case. However, the large differences observed are more difficult to explain.

**Figure A6.4: Facilities with Green Procurement Policies by Sector in Canada**

