

## Increase the analytical usefulness of greenhouse gas inventories with statistics

Statistical offices could help increase the analytical usefulness of greenhouse gas inventories by providing contextual data; for example, by providing a breakdown of emissions by International Standard Industrial Classification (ISIC) or by developing GHG emissions accounts following the guidelines in SEEA-CF.

Statistics Canada, for example, recasts official Canadian GHG emissions data into GHG emissions accounts to provide users with a tool better suited to economic analysis. In future releases, they will be careful to explain the differences between the SEEA-CF concepts and the inventory concepts so there is no confusion among users (see table).

**Table: Statistics Canada's approach to the different emission estimates**

The differences between the estimates of greenhouse gas emissions according to Environment Canada's National Inventory Report and Statistics Canada's Greenhouse Gas Account (part of its Physical Flow Accounts), produced following the guidelines of SEEA-CF, are explained by two main factors: a) conceptual differences between the UNFCCC reporting guidelines and SEEA-CF; and b) different data sources or lack of data preventing an accurate allocation of some types of emissions.

The largest conceptual difference between the UNFCCC and SEEA-CF is in the treatment of emissions stemming from solid waste. Emissions from landfill gas could be allocated to the waste management industry in the Greenhouse Gas Account but these emissions are not a result of current production. Rather, they represent releases associated with the decay of waste discarded in previous accounting periods. As such, they are excluded from the greenhouse gas portion of the PFA since they do not vary with current period economic output. The Greenhouse Gas Account is used in conjunction with Statistics Canada's input-output tables for modelling purposes and, since the input-output accounts measure only current economic activity, inclusion of landfill gas emissions would lead to improper conclusions.

The Greenhouse Gas Account is based on the residence principle, which is the basis for the economic definition of a country, whereas international agreements on air emissions, such as the Kyoto Protocol, use a national territory principle. Thus, international aviation fuel purchases are the second largest conceptual difference between UNFCCC and SEEA-CF. UNFCCC requires airline emissions to be calculated based on the national territory. SEEA-CF requires that those emissions be based on the residence principle, meaning that the Statistics Canada Greenhouse Gas Account must include emissions of aviation fuel purchased abroad by domestic airlines and exclude emissions from fuel purchased by foreign airlines in Canada. UNFCCC guidelines, on the other hand, require that the total emissions reported in Canada's national inventory report include emissions that occur over Canadian territory regardless of the ownership of the aircraft and excludes emissions of domestic aircraft abroad (although these are included elsewhere in the NIR for information purposes). These adjustments relate to all forms of international transport – land, water and air – and to tourism and fishing vessels. The relative importance of these adjustments in different countries depends on the structure of a country's economy.

Three gases are covered in the UNFCCC NIR which are not covered in Statistics Canada's Greenhouse Gas Account; namely, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>). These are excluded from the Greenhouse Gas Account since there are no data available to allocate these emissions across industries and households. Several of these substances are refrigerants used in many industries and attributing the leaks of the gases properly cannot be done with current data sources. The small amount of SF<sub>6</sub> emissions is a result of processes in several distinct industries and the data to do this allocation properly are also not available. Emissions from solvent use suffer from the same data gap.

Another conceptual difference is the inclusion in the Greenhouse Gas Account of prescribed burns in the forestry industry as an industrial process that is part of the production function for forestry. This is allocated to the Land Use, Land-Use Change and Forestry sector of the NIR. Carbon dioxide emissions from biomass combustion are also included in the PFA, but are reported separately in the NIR.

The final difference between the NIR and the Greenhouse Gas Account relates to the consumption of motor gasoline. All transportation activity is treated as a sector unto itself in the NIR regardless whether the activity is undertaken by industries, governments or households. Environment Canada models the fuel use from transportation so that it can be attributed to different vehicle types for the calculation of emissions. The modelling process introduces a discrepancy between the modelled fuel use and the fuel-use totals from Statistics

Canada's energy balance. The Greenhouse Gas Account retains the fuel consumption statistics from the energy balances leading to the difference between the two accounting approaches.

The remaining statistical difference results from other factors, including changes to source data required to reconcile with other data sources. To explain the differences between the NIR and the Greenhouse Gas Account, an approach called "bridging" between the two systems developed by Eurostat is used. Bridging helps understand the causes and magnitude of gaps between official statistics on GHG and other air emissions data.

Total air emissions (industry + households)

*Less National residents abroad*

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

*Plus non-residents on the territory*

- + Land transport
- + Water transport
- + Air transport
- (+ or -) Other adjustments and statistical discrepancy

= Total emissions as reported to UNFCCC