

1st MRV Autumn School, October 2012

German GHG emissions inventory: Estimating emissions from stationary combustion sources

General aspects regarding the national system

Basically there is a need for specific arrangements especially with the authority which is responsible for fuel and production data collection. Nevertheless it's necessary to remain flexible to be able to react to rapid changes. Furthermore there is a need for personal contacts with other authorities and the industry for a realistic assessment. On the other hand it's also necessary to keep a distance in order to remain independent.

The German national system is very complex for two main reasons: Firstly Germany has to report many pollutants – not only greenhouse gases, but also air quality pollutants - which make the inventory compilation process more difficult. Secondly the German political system is very complex with many laws and exemptions. Insofar there is a need to connect the national system with current legislation.

Energy balance

The energy balance is an important basis for the inventory. Many countries don't compile a national energy balance but most of the countries send data to the international energy agency (IEA). The energy balance gives an overview of ingenious fuel production, imports, exports, non energetic use, losses and fuel consumption of power plants, the industry, transport and small combustion plants (residential, commercial/ institutional). This is a basic knowledge for the inventory but more important for the economic development of the country.

Germany is a big industrial country with many plants. Therefore the German energy statistic is very comprehensive. Nevertheless the number of questionnaires is limited by a threshold, in order to limit costs and to unburden the industry. Plants with less than 1 MW electrical power and enterprises with less than 20 persons employed are excluded from the regulation. Insofar fuel consumption in small combustion plants is a calculation of energy available (calculated by fuel production, import, export and stock changes) and the fuel consumption which is covered by the national statistic.

Renewable energy statistics are more complex. Due to the smaller size of installation a threshold is not an appropriate approach. It's much more difficult to gather fuel data of 100 coal fired plants but data of nearly 7500 biogas plants. Data of wood combustion of private households are mostly not available in the national statistic, since it is usually collected individually. There is a need for regular surveys, which are expensive.

Emission factors

Default emission factors for all fuel types are available in the Guidelines and in a realistic order of magnitude. Usually net calorific values are available from the operators. It's a good idea to check the

consistency between the CO₂ emission factor and the net calorific value. However a calculation with the default carbon content is also possible, if the net calorific value is not available. The use of the oxidation factor is not really necessary since it is within the range of uncertainties (1%). It's not absolutely necessary to use plant-specific data in order to calculate CO₂ emissions. Such an approach requires a huge amount of time and effort. Country-specific emission factors can improve the inventory. Usually the oil, gas and coal industry analyzes fuels in regular intervals. But it's also a good idea to order independent fuel analyzes. The frequency and number of analyses depends on the fuel type. Oil products are usually standardized. The composition of coal varies depending on mine and layer. Most difficult fuels are derived gases and waste fuel from industrial processes.

N₂O and CH₄ emissions of combustion plants are of less importance. Insofar it's sufficient to use the default values.

Cross-cutting issues

As the next step (after initial experiences with the inventory compilation process) it's necessary to check the consistency between the energy (combustion) part of the inventory and the industry in order to avoid double counting or underestimation. Especially the iron/ steel industry but also Refineries and chemical industry require additional checks and a more detailed understanding. In terms of iron/ steel there is a need for a more detailed statistic which contains data of all different processes (sinter plants, blast furnace, blast oxygen furnace, electric furnace, foundry and rolling mill).

Moreover it makes sense to check the consistency between calculated diffuse emissions and emissions from stationary combustion processes. There are no specific requirements in the Guidelines but it's a very reasonable approach in order to improve the quality of the inventory and to get the knowledge for possible projects.