

Facility data in the Netherlands emission inventory

Methods used in the Netherlands to
integrate facility level and plant specific data
into the national inventory submissions

TNO | Knowledge for business



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- Methodology for estimating industrial GHG emissions
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- Conclusions

My role in the Netherlands Emission Registry

- Emissions from individual companies in the emission registry
- Energy chapter in the National Inventory Report 2010, together with Statistics Netherlands (Mr. Bas Guis)
 - For confidentiality reasons, calculations for this chapter are performed by Statistics Netherlands

Introduction

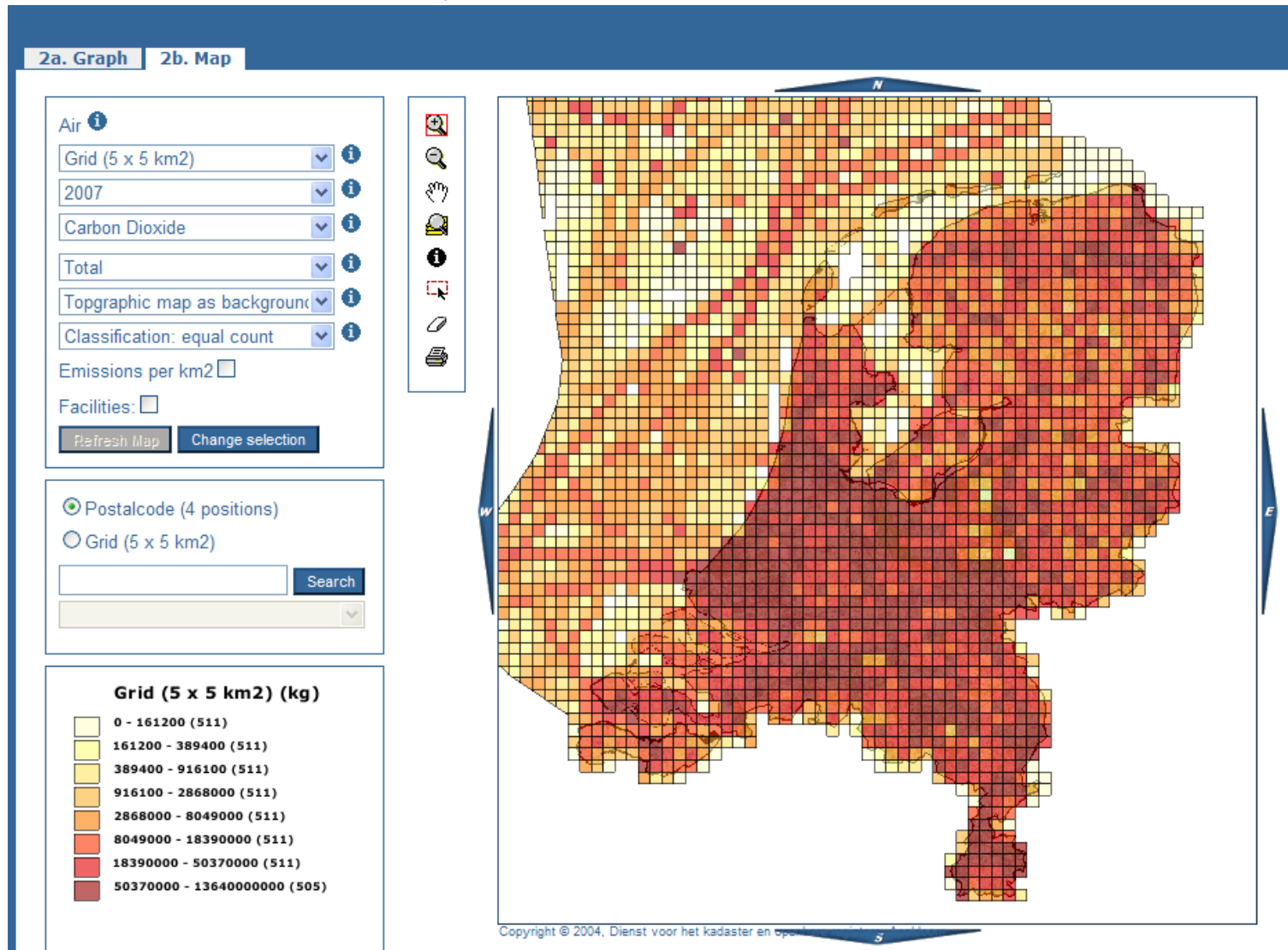
- Netherlands emission registry:
 - First, emission calculations for companies only (in 1974 it started with approximately 6000 companies, but quickly reduced to approximately 450)
 - Now the Netherlands calculate emissions to air and water for 350 components and for many emission sources
 - Emission database is used for many purposes:

Official reporting



Emission maps

Publicly available via www.prtr.nl

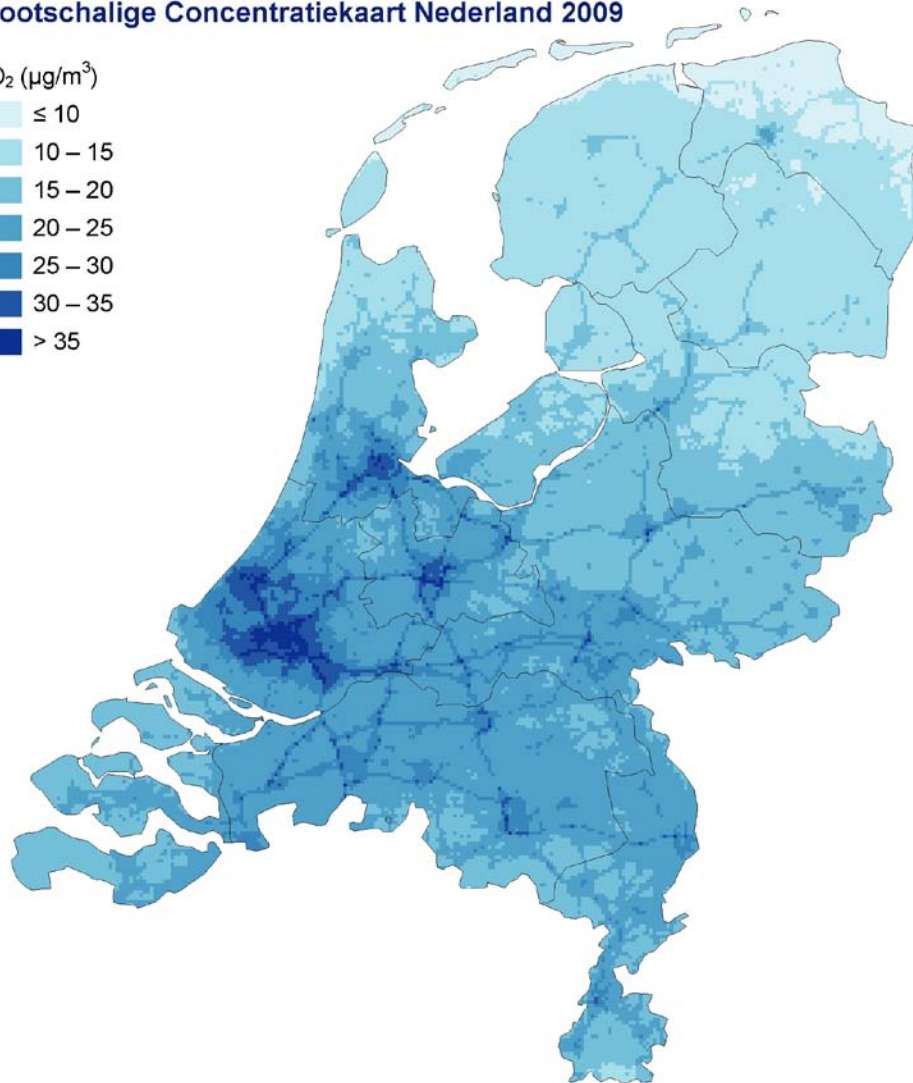
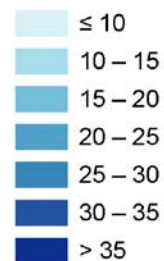


Air quality modeling

Available via www.pbl.nl

Grootschalige Concentratiekaart Nederland 2009

NO₂ (µg/m³)



Bron: PBL, 2010

no2_2009

Methodology for calculating GHG emissions

- Emissions are estimated using energy statistics or production data combined with country-specific or company-specific emission factors
 - N_2O and CH_4 : only country-specific emission factors
 - CO_2 : company-specific emission factors for several (large) companies
- Facility data is used for:
 - Company specific emission factors (mainly for companies with deviating fuel types, like residual gases, various types of coal, etc)
 - Production data
- Data available from environmental reports and from the emission trading system

Annual environmental reports

- Approximately 450 companies submit atmospheric emissions in their annual environmental report (reporting almost 70% of total industrial CO₂ emissions)
- This report often also includes:
 - Emissions to water and soil
 - Energy use
- For each installation, a company can submit fuel use and emissions
- The electronic format also includes reference calculations, which can be used to compare to the submitted emissions

Example of part of an emission report (data is fictional), Example from www.fo-industrie.nl

Nuon Power Generation BV (Lage Weide), UTRECHT-2009-gj

Kies verslag Verlaat applicatie Contact Help

Ministerie van Volkshuisvesting,
Ruimtelijke Ordening en
Milieubeheer

e-MJV elektronisch Milieujaarverslag version 4.9.04.01 beta

Index Status Opmerkingen Controle Printen

> Index > Lucht > Verbrandingsemissies

Installaties

Voeg toe Verwijder

> Installatie (-groep)

> **verbranding 1**

> Brandstofgerelateerde emissies

> **Aardgas**

> Brandstofmixgerelateerde emissies

> mix verbranding 1

Emissies van brandstof van installatie 'verbranding 1'

Verbruik (jaar) Nm Stookwaarde GJ/Nm3 Emissiefactor kg CO2/GJ Zwavelgehalte gew. %

1.000.000 0,03165 56,7

Gemiddelde concentratie NOx (als NO2) 100 mg/m3

Gemiddelde concentratie SO2 100 mg/m3

Gemiddelde concentratie Totaal stof 100 mg/m3

Emissiestoffen

emissiestof	referentie	emissie
Benzo(a)pyreen		100
Kooldioxide (CO2 totaal)	1.790.000	1.800.000
Koolwaterstoffen (totaal VOS)	3.170	3.000
N2O	3,17	3

Koolwaterstoffen (totaal VOS)

Emissie (jaarvracht) 3.000 kg Bevestig

Referentiewaarde gebruiken

VOS specificeren? ☒ Ja ☐ Nee

VOS specificatie

Emissiestof toevoegen Emissiestof verwijderen

Emission trading system

- For the emission trading system (ETS), companies need to report their CO₂ emissions
- Emissions reported for the emission trading system often differ from emissions reported in the environmental report, mainly caused by differences in definition (fuels and installations)
- In 2008, Statistics Netherlands performed an analysis of the differences between these reported emissions. These conclusions were used to decide which information is used for determining the company-specific emission factors.

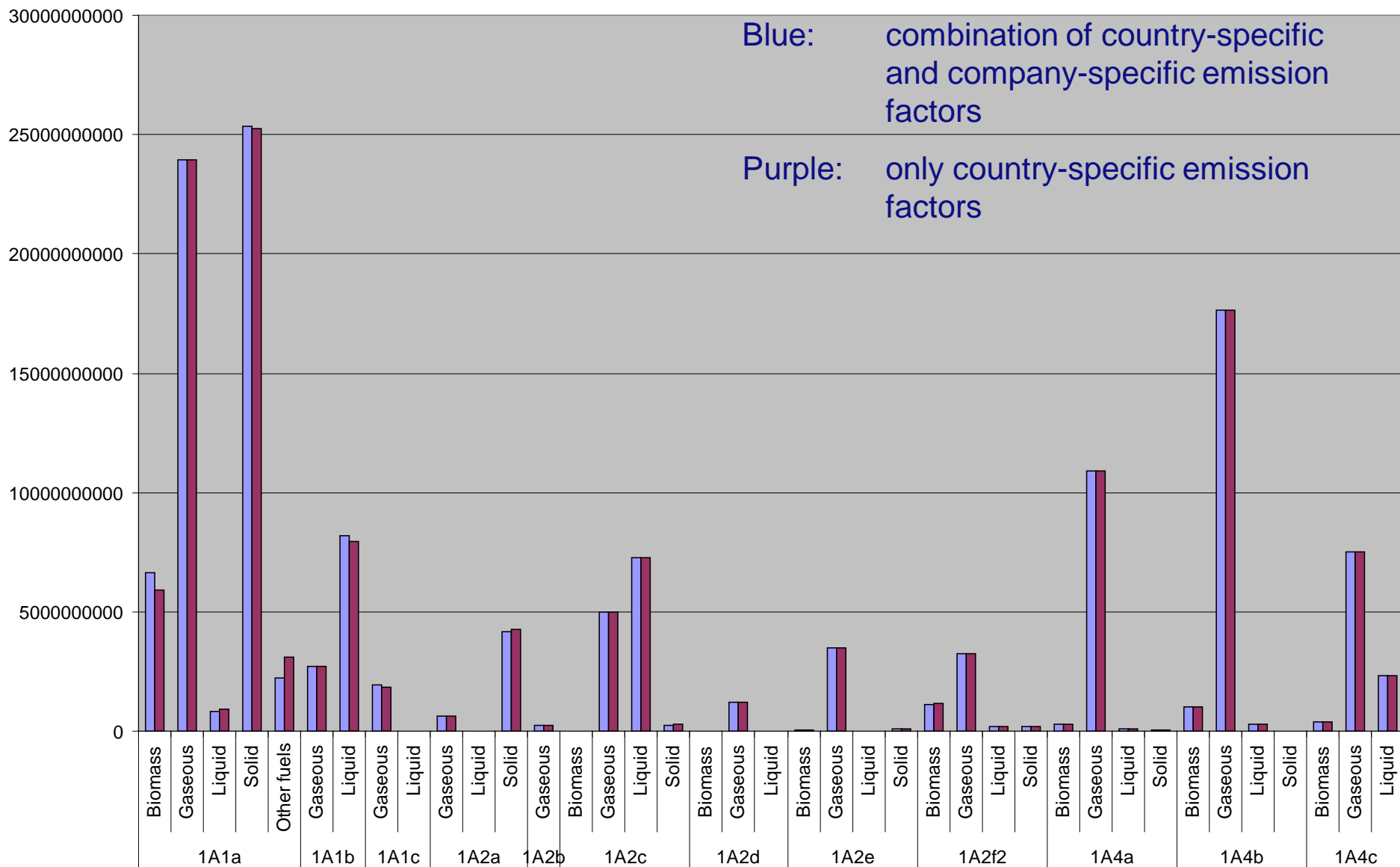
Company specific emission factors (1)

- Liquid fuels:
 - Chemical waste gas
 - Emission data of one specific (large) company (as reported in its annual environmental report) combined with energy statistics for that company.
 - For all the other companies, a country-specific emission factor has been used.
 - Refinery gas
 - Emission data of five refineries in the Netherlands (as reported in their annual environmental reports) have been combined with energy statistics for those companies

Company specific emission factors (2)

- Solid fuels:
 - Blast furnace gas and coke oven gas:
 - Emission data of power plants (as reported for ETS) combined with energy statistics for these companies.
 - These emission factors are also used for another company which uses the same gases, but which does not specify the CO₂ emissions from combustion of these gases.
 - Phosphor gas
 - The emission data of companies (as reported for ETS) has been combined with the energy statistics for those companies.
 - Coal
 - Emission data of several power plants and other companies (as reported for ETS) combined with energy statistics for these companies.

CO2 emissions



Responsibilities for quality in data supply, environmental reports (from QA/QC plan 2010)

- Data from individual companies that submit annual environmental reports (legally required or submitted within the framework of covenants)
 - Quality of the data is the responsibility of the companies
 - Competent authorities (usually those that are responsible for permits, in most cases regional authorities) are responsible for validation of the data
 - Where these individual company data hold information on activity data and emissions of sufficient quality and transparency, these data are used in emission estimates

Data quality

- Annual environmental reports
 - 450 companies report their emissions each year (before April 30th)
 - These reports are validated by competent authorities (before June 30th)
- Extra data checks:
 - Before the reports are validated by competent authorities, the Dutch Emission Registry selects approximately 75 environmental reports and advise the authorities when emissions seem incorrect or unclear. This can be used by the authorities in the evaluation process.
 - After the reports are validated, all reports are checked in detail (mainly fuel use and CO₂ emissions, but also other components)
 - Eventually, the CO₂ emissions of only 20 companies have been used in the calculation of greenhouse gas emissions (only the largest companies or the companies with deviating fuels).

How to improve transparency and ensure confidentiality of company data?

- National inventory report 2010
 - Implied emission factors
 - Explanation for IEFs deviating from standard country specific emission factors

Notes to the source specific emission factors:

- The standard CH₄ emission factor for natural gas is 5.7 g/GJ. Only for gas fired CHP, a higher emission factor is used, which explains the higher emission factor for this sector.
- The CO₂ emissions from coal and blast furnace gas are based on emission data from the NEA. Therefore, the implied emission factor is slightly different from the standard country-specific emission factor.
- The CO₂ emissions from waste gas are CO₂ emissions occurring in the chemical industry and in refineries. The emissions are partly based on emission data from the NEA.
- The N₂O emission factor from waste combustion is depending on the amount of waste incinerated in incinerators with or without a SNCR, which have emission factors of 9.43 g/GJ and 1.89 g/GJ respectively.

Overview of emission factors used in (2008) in the sector Energy Industries [1A1]

Table 3.3

Fuel	Amount of fuel used in 2008 (TJ NCV)	Emission factors (g/GJ)		
		CO ₂	N ₂ O	CH ₄
Natural gas	498510	56.70	0.10	6.72
Coal	202840	96.23	1.40	0.44
Waste Gas	95526	68.77	0.10	3.60
Waste, biomass	30433	109.60	4.97	30.00
Blast Furnace Gas	23825	239.08	0.10	0.35
Solid biomass	20342	109.60	4.00	30.00

APPENDIX 1 Calculating CO₂ emissions from stationary sources

Activity data

Information concerning the consumption of fossil fuels was used to calculate CO₂ emissions from fossil fuels used by stationary sources. CBS publishes these statistics as part of the total Energy Balance (Netherlands energy management system, or CBS Energiebalans). When gathering information for the Energy Balance, CBS uses written surveys and also makes increasing use of registrations. Companies in the energy sector and industry are intensively observed via integral surveys. Random checks are only used for smaller industrial companies with a relatively low energy consumption.

Emission calculations

The energy used, according to the CBS Energiebalans per SBI code, is used to calculate the total CO₂ emissions for stationary sources – these figures are used in the NIR. This method is used because not all companies in the Netherlands report on their CO₂ emissions via the annual environmental reports. The CO₂ emissions are calculated from the energy consumption taken from the CBS Energiebalans and standard emission factors from the Netherlands fuel list [Vreuls et al, 2009].

Use of company-specific emission factors

The calculation is refined by including the CO₂ emissions reported by selected companies in their annual environmental reports (MJV) and incorporating this into the emissions database. This refining is primarily applied to companies with deviating fuel types (residual gases, various types of coal) and for companies with extremely high emissions. The calculation of CO₂ emissions, per fuel type, is carried out as follows.

Starting from the CO₂ emissions reported in the MJV, first the emissions are deducted of fuels with a fixed emission factor (e.g. natural gas). Emissions from remaining fuels are then divided according to their energy consumption (in the CBS Energiebalans) for each fuel. If a company only uses a few types of fuel (e.g. coals), the emission factor is calculated by dividing the CO₂ emission from the MJV by the energy consumption in the CBS Energiebalans. This approach results in the company-specific emission factor for the particular fuel used by that company. This is only possible if the statistical unit and energy consumption of both data sources are equal. If the CBS Energiebalans reports at corporate level, and the MJV reports per facility, then it is not possible to calculate the company-specific emission factor. When setting up the NIR 2005, experts started to report on residual gases at refineries. This group has now grown to around 20 companies and, in 2009, the group will be expanded to include around 30 companies.

If a company states a deviating heating value in the survey, this use is reconverted by the CBS Energiebalans into the standard heating value. Company-specific heating values are therefore not used in the NIR.

The aforementioned process compares the MJV data concerning the total fuel consumption in TJ (validated by the competent authority) and the further provisional figures from the CBS Energiebalans. If significant errors/differences are shown, the necessary modifications will be made to the further provisional CBS Energiebalans figures. However, this hardly ever happens, although a number of points are highlighted which are then taken into account during the following annual report (e.g. deviating heating value, other fuels).

How to improve transparency and ensure confidentiality of company data?

- Methodology description
 - General details
 - No company specific information

Conclusion

- We use facility data of 20 companies in order to improve the estimation of CO₂ emissions for several fuels (and we wish to expand this to 30 companies)
- Emissions from these companies are validated by competent authorities and checked by emission registry
- How to improve transparency while ensuring confidentiality of company data?