

Early CO₂ emission estimates for 2018 based on Eurostat monthly energy data

Annual project report

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List of Abbreviations

CO ₂	Carbon dioxide
CRF	Common Reporting Format
EU	European Union
GCV	Gross calorific value
Gg	Gigagram = 10 ⁹ g = 1 kt (kiloton) = 1000 tons
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
kt	Kiloton (1 kt = 1000 t)
MS	Member State
NCV	Net calorific value
NIR	National inventory report
QA/QC	Quality assurance and quality control
TJ	Terajoule
UNFCCC	United Nations Framework Convention on Climate Change

1. Introduction and background

In order to improve the timeliness of the EU carbon dioxide emissions data, Eurostat initiated an action some years ago called “Early Estimates of CO₂ Emissions”. The aim is to provide estimates of CO₂ emissions from energy use (combustion of fossil fuels) only four to five months after the reference year (t+4), instead of the usual 16 months. These first estimates are based on a harmonised method and monthly energy statistics already available through the Energy Statistics Regulation. This information is particularly relevant because CO₂ emissions from fossil fuel combustion make up nearly 80% of the total GHG emissions and, on average, around 80% of the annual change in EU greenhouse gas emissions.

The first objective of this project is to test whether the trend method developed to estimate early CO₂ emissions continues to produce valuable results based on the use of monthly energy data. For this purpose, early CO₂ estimates at t+4 months were calculated in April 2019 for the year 2018. In addition, the early CO₂ estimates calculated for 2017 were verified by comparison with subsequent official CO₂ emission data reported in the GHG inventory submissions to the UNFCCC under CRF table 1.A (b)¹, available since 27 May 2019.

The second objective of this project is to analyse the quality level of monthly Eurostat energy data on fuel consumption compared to annual Eurostat data and to energy data used by Member States for their GHG inventories. Based on this comparison it is assessed whether the quality of the monthly data improved in 2017 and in which areas substantial deviations continue to occur.

This report includes a description of the method used, a verification of the early CO₂ emission estimates for the year 2017 and the calculation of the 2018 early CO₂ emission estimates.

¹ CRF (Common Reporting Format) table 1.A (b) SECTORAL BACKGROUND DATA FOR ENERGY: CO₂ from Fuel Combustion Activities - Reference Approach (IPCC Worksheet 1-1), Common Reporting Format - a set of standardised spread sheet data tables containing mainly numerical information and submitted electronically. These form one component of annual inventory submissions to the EU and the UNFCCC.

2. Method for early CO₂ estimates

2.1. Calculating early CO₂ emissions from fossil fuel combustion based on Eurostat monthly energy data

2.1.1. Method to calculate early CO₂ emission estimates

The method used to calculate early CO₂ estimates is based on the reported IPCC (2006) reference approach for the CO₂ emissions from fuel consumption of EU Member States and uses up-to-date Eurostat monthly energy data on fuel consumption.

The method estimates the consumption of cumulated liquid fuels, solid fuels, peat and gaseous fuels for the previous year and the year before and calculates the trend changes of consumption by dividing the year t-1 by the year t-2. The trend changes for liquid, solid, gaseous fuels and peat consumption are applied to the CO₂ emissions of the same aggregate fuel categories of the latest available reported year in Member States' GHG inventories as reported in the CRF reference approach table 1.A.(b)². Fossil waste is not included.

The first step of this method calculates the percentage changes in the consumption of fossil fuels over the last two years for solid, liquid, gaseous fuels and peat for each Member State based on Eurostat's monthly energy data in kilotons (kt) and in TJ NCVs for natural gas. According to the methodology for the IPCC reference approach, fossil fuel consumption is calculated differently for primary and for secondary fuels and differs from the method of calculating gross inland consumption used by Eurostat:

Apparent consumption for primary fuels (IPCC): production + imports – exports – stock change.

Apparent consumption for secondary fuels (IPCC): imports – exports – stock changes – international marine and aviation bunkers.

This definition differs from the calculated gross inland consumption calculated by Eurostat under the flow code GIC.

- Recovered products etc. are not considered under the IPCC definition.
- The use of kerosene type jet fuel without bio-components (product code 04661) for international flights is not to be considered and is therefore subtracted from the apparent consumption following the IPCC definition.

Biofuels should not be included in the calculation of the apparent consumption for liquid fuels, as the CO₂ emission factor for biofuels is zero.

In the second step, the percentage changes of consumption are applied to the published CO₂ fuel combustion emissions for the most recent year available, as reported by Member States to the UNFCCC as part of their GHG inventories in CRF table 1.A (b), which is the reference approach calculation of CO₂ emissions.

The early CO₂ emission estimate calculations are conducted for each fossil fuel group and for each Member State. The sum of Member States' CO₂ emissions then represents the emissions for the energy sector for the EU-28.

² http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php

Equation 1

$$E_{CO_2}^Y = \frac{C_{solid}^Y}{C_{solid}^{Y-1}} \cdot E_{solid, CO_2}^{Y-1} + \frac{C_{peat}^Y}{C_{peat}^{Y-1}} \cdot E_{peat, CO_2}^{Y-1} + \frac{C_{liquid}^Y}{C_{liquid}^{Y-1}} \cdot E_{liquid, CO_2}^{Y-1} + \frac{C_{gaseous}^Y}{C_{gaseous}^{Y-1}} \cdot E_{gaseous, CO_2}^{Y-1}$$

with

$E_{CO_2}^Y$ CO₂ emissions in reference approach table 1A(b)

$C_{solid/peat/liquid/gaseous}^Y$ consumption of solid/peat/liquid/gaseous fuels

$C_{solid/peat/liquid/gaseous}^{Y-1}$ consumption of solid/peat/liquid/gaseous fuels in the previous year

$E_{..., CO_2}^{Y-1}$ CO₂ emissions in the respective fuel category in the previous year

The advantage of the method is the simplicity that ensures a fast and straightforward calculation for each Member State and better results than a bottom-up calculation of CO₂ emissions based on Eurostat monthly energy data and fuel-specific emission factors for each Member State. The trend change method also means that discrepancies between the Eurostat monthly energy data and (annual) energy data used in the GHG inventories are smoothed out when such discrepancies persist through the entire time series of fuel consumption data.

However, the application of the trend change method requires consistent reporting of monthly data for at least two consecutive years. Changes or improvements in the data may affect the trend change method in a negative way, leading to higher deviations between early CO₂ estimates and CO₂ emission data reported in the GHG inventories.

Carbon stored

Further uncertainties are related to the concept of carbon stored. Fossil fuels that are consumed from an energy balance perspective are not entirely combusted from the emission perspective. A share of the carbon of the fuels is not released as CO₂ into the atmosphere but is retained in products. This is called carbon excluded (or carbon stored; ESTAT calls it non-energy use). Either the excluded carbon is reported in other sectors (as emissions from industrial processes) or it is stored in a product manufactured from the fuel. Fuels that contain relevant quantities of excluded carbon include:

- Reductants for iron, steel and non-ferrous metals: coke (and petroleum coke),
- Non-energy fuel use: lubricants to be excluded (even if combusted in 2-stroke engines)
- Feedstocks: (Naphtha, LPG, refinery gas etc.): all deliveries to petrochemical feedstocks should be excluded, not subtracting products that are combusted in industry

With the application of the 2006 IPCC guidelines since reporting year 2013 (submission year 2015), the quantity of carbon stored in certain products changed. Non-combusted fossil fuels are mentioned in Eurostat's annual questionnaire in specific tables as 'non-energy use'. E.g. natural gas can be used to produce fertilisers or for plastic production in the industry. Certain oil products are also used for plastic production as well as certain coal fractions. Carbon from coke oven coal has a dual use in blast furnaces: energy use to heat the ore, stabilising the process of melting the ore or as alloying agent in steel production (max. carbon content in steel 2%).

All these amounts of carbon from fossil fuels not being combusted can therefore be deducted before calculating CO₂ emissions from fuel combustion. Consequently, for certain countries (hosting the

respective industries) one can expect that monthly data tend to be bigger than the respective annual data.

The share of carbon stored varies strongly between different fuels and different countries and is additionally time-dependent as the shares fluctuate from one year to another. The methodology applied does not explicitly reflect carbon stored, due to data quality issues and missing data on monthly level. But the methodology uses implicitly constant shares of carbon stored.

2.1.2. Allocation of fuels from monthly data

The method requires an accurate correspondence of fuel categories between Eurostat monthly data, Eurostat annual data and the fuel consumption data used in the GHG inventories reported in the CRF table 1.A.(b).

There are corresponding categories for almost all fuel types. However, the following fuels are not provided in Eurostat monthly data at the level of disaggregation required by the IPCC reference approach:

- Orimulsion is not reported separately in the Eurostat monthly energy data but reported under 'Other hydrocarbons' in Eurostat monthly energy data.
- Shale oil is not reported separately in the Eurostat monthly energy data but reported under 'Other hydrocarbons' in Eurostat monthly energy data.
- Bitumen and lubricants are not reported individually but are included under 'Other products' in Eurostat monthly energy data.
- Hard coal is reported as an aggregate category in Eurostat monthly energy data covering anthracite, coking coal, other bituminous coal and sub-bituminous coal.
- Oil shale and oil sands are reported under 'Lignite'.
- Eurostat monthly energy data do not include fossil waste whereas the new Eurostat database for annual data and the new reporting under the 2006 IPCC Guidelines CRF table 1.A(b) include fossil waste as a separate category.
- Monthly and annual Eurostat energy data do not include the category 'Other fossil fuels' whereas the new reporting under the IPCC 2006 Guidelines includes this category in the CRF table 1.A(b).

2.1.3. Units of measurement / Conversion factors

Eurostat data provide liquid and solid fuel consumption in physical units (mass units kt) while natural gas is reported in energy units (TJ GCV). The calculation of the trend changes used for calculating early CO₂ emissions are therefore based on trend changes in kt for liquid and solid fuels and peat. The trend changes for natural gas consumption are calculated from Terajoule (TJ) based on Net calorific values (NCV).

The energy data on fuel consumption in the GHG inventories for the reference approach (CRF Table 1.A(b)) are provided in physical or energy units (TJ) in the CRF table 1.A(b). For the year 2017 13 of the 28 Member States (Czech Republic, Germany, Denmark, Italy, Lithuania, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Sweden and United Kingdom) report fuel consumption data for calculating CO₂ emissions from fuel combustion only in energy units (TJ). For these Member States, fuel consumption data reported in the CRF table 1.A (b) in the GHG inventories were converted to physical mass units (kt) to allow for the comparison with Eurostat monthly and annual fuel consumption data. The Net calorific values (NCVs) used for this purpose were taken from Member States' national inventory reports (NIR) as submitted to the UNFCCC, if available. If these

were not available, NCVs as reported to Eurostat for annual fuel consumption were used. Nevertheless, the selection of NCVs is a source of uncertainty and can affect the comparison of the fuel consumption data; regarding the latter, the use of different NCVs can have a large impact on the results, especially for coal consumption. This is only relevant for the comparison of fuel consumption data and the calculation of trend changes in energy units (TJ), which is used as a quality check of the CO₂ emission estimates. The calculation of the early CO₂ emission estimates is not affected by this conversion.

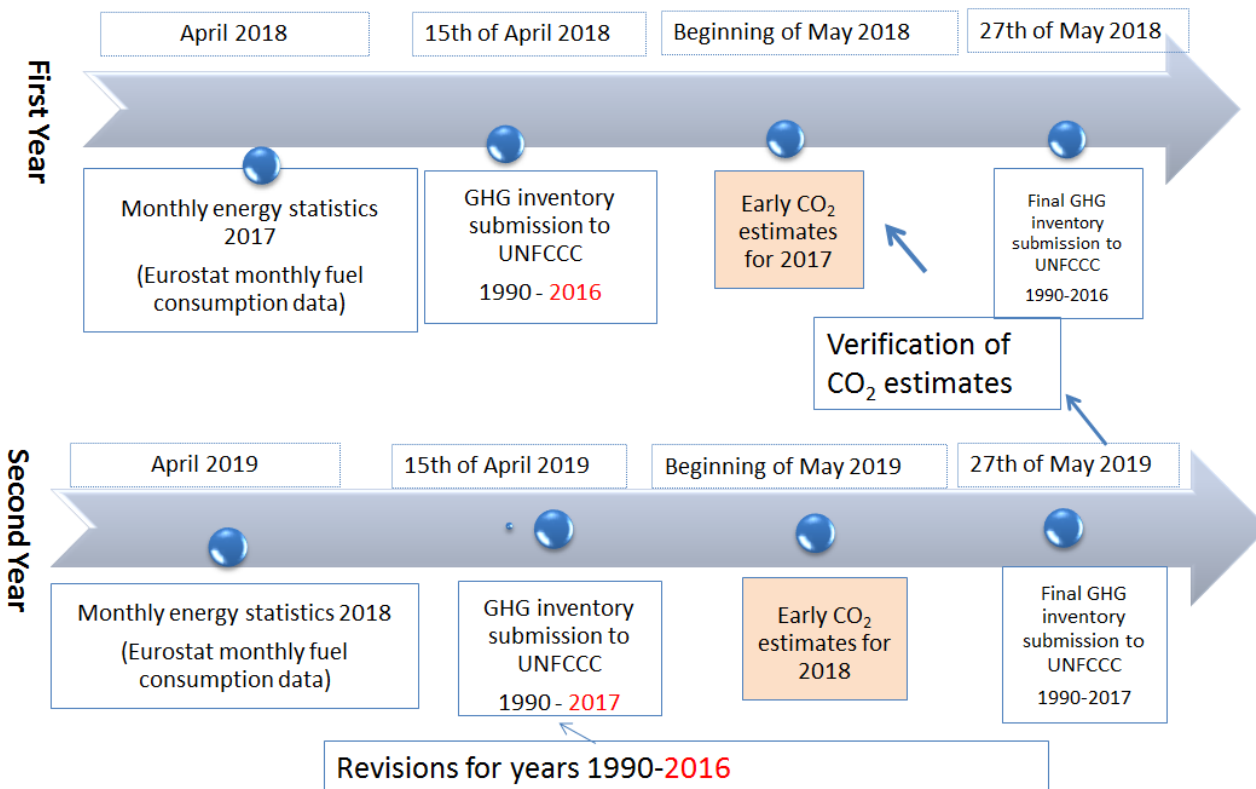
Data for natural gas are provided in Eurostat monthly energy data in TJ based on gross calorific values (GCVs), whereas natural gas consumption reported in the GHG inventories in the CRF table 1.A(b) are provided in TJ based on NCVs. For the comparison of Eurostat data with GHG inventory data, Eurostat data was multiplied with the factor 0.9 to convert to TJ NCV. Again, because the calculations are based on trend changes, the early CO₂ emission estimates are not affected by this conversion.

2.2. Data sources and data evaluation

2.2.1. Availability of data to calculate early CO₂ emissions and for verification of results

The estimation of early CO₂ emissions and the verification of results are based on a specific timeline depending on the availability of data sources used. Figure 2-1 shows the data sources used to calculate the 2018 early estimates and to verify results of the early estimates of the year 2017.

Figure 2-1: Availability of data sources, example CO₂ estimate for reference year 2017 and verification of results of the CO₂ estimate for reference year 2016



Source: Authors' own compilation

Calculation of early CO₂ estimates 2018

To estimate CO₂ emissions four months after the reference year for the year 2018, three data sources are used:

- 1) Eurostat monthly energy data 2017 (as available in April 2018).
- 2) Eurostat monthly energy data 2018 (as available in April 2019).
- 3) GHG inventory data for CO₂ emissions for 2017 based on the reference approach (Table 1.A(b)) as available under UNFCCC on 15th April 2019.

Verification of results from early CO₂ estimates 2017

To assess the quality of the early CO₂ estimates for the year 2017, the following data sources are compared:

- 1) Early CO₂ estimates for the year 2017.
- 2) GHG inventory data for CO₂ emissions based on the reference approach (CRF Table 1.A(b)) as reported to the UNFCCC for the year 2017 (as available on 27th May 2019).

The closeness of results for the early CO₂ estimate for reference year 2017 with the respective inventory data can be influenced by several factors. The application of the trend change method requires consistent reporting of monthly data for at least two consecutive years. Change (improvement or deterioration) of data quality may affect the trend change method in a negative way, leading to higher deviations between early CO₂ estimates and CO₂ emission data reported in the GHG inventories. Large differences related to the reporting of monthly Eurostat data can be due to:

- a) Quality of Eurostat monthly energy data for 2016 (available in April 2017).
- b) Quality of Eurostat monthly energy data for 2017 (available in April 2018).

Further differences between trend changes of early CO₂ estimates and GHG inventory data are due to reporting issues for the GHG inventory and include:

- c) Differences in the amount of carbon stored in the total carbon content of the fuel consumption
- d) Data revisions for the year t-3³.

With the application of the 2006 IPCC guidelines since reporting year 2013 (submission year 2015) the quantity of carbon stored increased in some countries and were therefore excluded. According to the IPCC Guidelines quantities of coke delivered to the iron and steel and non-ferrous metals industries as well as fuels used for non-energy use and feedstocks should be excluded from total carbon in the IPCC reference approach. In Member States where the share of carbon stored is not changing over the years there is no influence on the trend change. However, in some Member States the share of carbon stored shows inter-annual changes, which leads to differences in the trend changes that are not related to the quality of the reported monthly Eurostat data. It seems that some countries are using this new margin excessively (e.g. Austria, Belgium), while others do not change the carbon stored figures.

Differences in the trend change related to GHG inventory are not influenced by the reporting quality of monthly Eurostat data, but it increases the uncertainty of the results.

Quality of monthly data

To assess the quality of the Eurostat monthly energy data for the year 2017 (as available in April 2018), it is compared with:

- 1) Annual Eurostat data 2017 (as available in April 2019).
- 2) GHG inventory data on fuel consumption as reported to the UNFCCC for the year 2017 (as available on 27th May 2019).

This is performed at the level of aggregated fuel consumption in physical units for liquid and solid fuels and in energy units for gaseous fuels. If differences exceed $\pm 3\%$ in 2017, a detailed comparison is carried out.

³ For the calculation of the early CO₂ estimates for the year 2016 the inventory data for the year 2015 (2017 submission) is used as a reference point. In 2018 the results of the early CO₂ estimates 2016 are verified by using the 2018 GHG inventory submission. Some Member States revised the data for the year 2015 to have a consistent time series. But this introduces a level of uncertainty for the comparison of the early CO₂ estimates.

As there are only early national statistics for some Member States available that deliver data as soon as 4 months after the reference year, the quality of the monthly data (for the year t-1) is analysed in terms of completeness, outliers and gaps.

2.2.2. Data revisions

Member States can submit revised data that affect the comparison of energy data on fossil fuel consumption and the closeness of results of early CO₂ emission estimates. Data revisions can be submitted by Member States during the year and for any historic year for monthly and annual Eurostat energy data as well as for GHG inventory data.

Revisions of Eurostat monthly energy data

Within the data preparation and processing for calculating early CO₂ emissions data, checks for the most recent year of Eurostat monthly energy data are carried out. These include checks on completeness, consistency, outliers and gaps. If there are issues identified, Eurostat contacts the Member State(s) and asks either for confirmation or for a revision of monthly data. In some cases, Member States send a revised set of monthly questionnaires that is uploaded to the Eurostat database; in other cases, information on revisions of monthly data is only provided via email and included manually in the project file.

For this project normally the earliest data available is used. However, many Member States revise their data often. Eurostat processes these revisions and makes them available in Eurobase. Older data are overwritten by younger data. Therefore, a user cannot extract the data used for the calculation of the CO₂ emission estimate from Eurostat's database. Throughout the year there might be new revisions of monthly data available that are uploaded to the Eurostat database. Thus, monthly data for 2017 that has been available in April 2018 might have been revised and is not necessarily identical with monthly data for 2017 available in the database in April 2018.

To ensure consistency in calculating early CO₂ emissions for the year 2018, the checked monthly data 2017 as available in April 2018 and the checked monthly data 2018 as available in April 2019 were used to establish the trend change.

Revision of annual Eurostat data

Member States also revise their annual data and Eurostat incorporates these revised annual data in its database as described for monthly data. However, revisions of annual data are not as frequent as revisions of monthly data. As annual Eurostat data is only used for verification of the quality of monthly data, revisions of annual data do not have a large effect. A retracing of original annual data (as available in April for the year t-2) used for the comparison with monthly data is not possible if Member States have revised their annual data.

Revision and recalculation of GHG inventory data

Member States must report their GHG inventory data to the UNFCCC by the 15th April for the year t-2 including the entire time series beginning in 1990. Until the 27th May Member States have time to make additional changes (error fixing etc.) and submit a final version to the UNFCCC. This final version submitted by the 27th May is reviewed by UNFCCC review experts.

Member States' inventory submissions are based on a quality control and quality assurance system. Additionally, the inventories are reviewed by external review experts from the EU and from the UNFCCC. Therefore, revisions of inventory data are common. In most cases Member States' inventory submissions include the most recent year (i.e. the data for reference year 2017 is available in Member States' submissions since April 2019) and revised data for the years 1990-2016. This

ensures consistent reporting along the time series. When new data sources for activity data or new country-specific emission factors become available they can be applied consistently to all years in the time series.

2.3. Evaluation of Eurostat monthly energy data

2.3.1. Data tool, quality assurance and quality control

For consistency and comparability, the analysis is based on spreadsheet for each Member State including the data sets for monthly data 2017 and 2018. The data used is drawn from Eurostat monthly energy data on fuel consumption from the Eurostat database as of April 2019 (for reference year 2018).

Eurostat monthly energy data are imported from the raw data files (as extracted from Eurostat's production database) and analysed with standard Excel features and functions such as pivot tables, conditional formatting, filters and formulas. Pivot tables are used to view and analyse the data in a convenient monthly table with separate sheets for each Member State, including rows for all fuels and flows.

The spreadsheet tool is also subject to quality control practices whereby each member of the team independently reviews the work of others and verifies data flows, calculations and results.

2.3.2. Completeness and Outliers in Eurostat monthly energy data for reference year 2018

Twelve Member States provided complete datasets for monthly 2018 Eurostat data until mid of March 2019. The first checks for these twelve Member States were completed by 27th of March 2018. Until mid of April monthly Eurostat data was complete. Because of the late Easter holidays in 2019 the outlier and gap analysis including the communication with the Member States has been finished by the end of April. In general reporting of monthly Eurostat data improved and only very few gaps and outliers could be identified.

The analysis of data gaps was based on a pivot table with formulas and conditional formatting configured to identify possible gaps. These results were then assessed for plausibility based on our own expert opinion. The first part of the analysis on the Eurostat monthly data set was to identify missing data (no values). The analysis was conducted on the Eurostat monthly data of the 28 Member States for six flows (primary production, total imports, stock change, total exports, international marine bunkers and deliveries to international aviation) and 33 fuels. While not all the fuel categories are directly relevant for the calculation of CO₂ early estimates, it was however assumed useful to apply the search for data gaps to the complete fuel list provided, independently of the use in the early CO₂ emissions calculations.

The gap analysis tries to identify gaps of a single month or for all months from one flow. The analysis of gaps uses the reporting of the year before (2017) as a reference. If single fuels or flows are not reported in the year before, the non-reporting in the recent year analysed (2018) is not identified as a gap. However, if fuels or flows have been reported in the previous year (2017), then the non-reporting in the recent year is identified as a gap. The same goes for gaps identified in a single month. If in the year before and in the recent year, there is no import of natural gas in the summer months this is not identified as gap. The following Table 2-1 shows an example for the gap analysis. The analysis shows that the Member State reports in 2015 919 kilotons export from refinery feedstocks. In 2016 no export is reported. So, it is not clear if there is really no export in 2016 or if this is just a gap in the monthly data.

Table 2-1: Example for gap analysis

Name	Flow	201501	201502	201503	201504	201505	201506	201507	201508	201509	201510	201511	201512	Summe
Refinery feedstocks	Gross Inland Consumption	-81	-97	-20	-47	-31	100	-56	123	-138	-155	-89	31	-460
	Total Exports	0	145	109	0	107	0	0	0	69	195	294	0	919
	Total Imports	0	0	0	0	0	33	48	72	45	35	0	0	233
	Stock changes	81	-48	-89	47	-76	-67	104	-51	114	-5	-205	-31	-226
Name	Flow	201601	201602	201603	201604	201605	201606	201607	201608	201609	201610	201611	201612	Summe
Refinery feedstocks	Gross Inland Consumption	-14	38	17	11	-1	-206	125	111	99	54	-65	194	363
	Total Exports	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total Imports	0	15	68	34	0	0	35	26	26	0	0	0	204
	Stock changes	14	-23	51	23	1	206	-90	-85	-73	-54	65	-194	-159

Source: Eurostat monthly data 2015 (April 2016) and 2016 (April 2017)

For the outlier analysis two tests are applied, focusing on the twelve reported months in the recent year (2016). On average every month should equal 1/12 of the total. Values are identified as outliers if the value deviates from the median by 10% or by more than 2.5 of the standard deviation. The following Table 2-2 gives an example for the outlier analysis.

Table 2-2: Example for outlier analysis

Name	Flow	Summe	Outlier Value (kt)	Month	Range of other months	% of total	threshold is set for 2,5 STDEV > median	percent outlier test						
Crude Oil	Gross Inland Consumption	6,914					2.5	10%						
	Indigenous Production	6,926	434	2	500 - 625	6%		434						
	Total Exports	3,876	470	4	182 - 401	12%		470						
	Total Imports	3,837	26	4	239 - 468	1%		26						
	Stock changes	-27												
Name	Flow	201601	201602	201603	201604	201605	201606	201607	201608	201609	201610	201611	201612	Summe
Crude Oil	Gross Inland Consumption	678	595	559	311	348	573	639	642	642	624	622	681	6,914
	Indigenous Production	572	434	625	597	601	622	589	623	500	612	586	565	6,926
	Total Exports	394	182	321	470	366	322	401	387	229	353	235	216	3,876
	Total Imports	412	332	285	26	273	239	468	450	316	418	331	287	3,837
	Stock changes	-88	-11	30	-158	160	-34	17	44	-55	53	60	-45	-27

Source: Eurostat monthly data 2016 (April 2017)

Due to large variations in the reporting of stock changes, results from the outlier analysis of stock changes are not considered.

After identifying gaps Member States were asked if they could confirm the data where potential gaps and outliers have been identified. Member States responded very quickly and confirmed the data in most cases.

The resulting list of data gaps, included as Table 5-3 (see annex 5.1), was further examined with Eurostat, with the consensus that no data gaps and outliers were filled.

Ireland's monthly solid data contain many confidential cells. Therefore this data was estimated based on the transformation input of hard coal and peat in main activity electricity plants and a multi-annual average of the share of this transformation input compared to gross inland consumption of these fuels.

3. Main findings

3.1. Comparisons of early CO₂ estimates for 2017 with inventory data

The overview provided in Table 3-1 shows the closeness of results of the early CO₂ emission estimates based on Eurostat monthly energy data with final⁴ GHG inventory data (CRF table 1.A.(b)) submitted to the UNFCCC for the year 2017. The comparison is based on trend changes calculated for CO₂ emissions from fossil fuel combustion. A comparison of calculated CO₂ emissions in kilotons (kt) is not conclusive due to data revisions and recalculations of UNFCCC inventory data (see chapter 2.2.2). The analysis of results is therefore based on the trend change analysis and not on absolute CO₂ emissions in kt.

Table 3-1: Closeness of early CO₂ emission estimates with final GHG inventory CO₂ emissions (CRF table 1A(b)) for 2017

	2017
Number of MS with a difference to final inventory of $\leq \pm 2\%$	18 MS
Contribution of those MS' to total EU-28 emissions	70%
Number of MS with a difference to final inventory of $\pm > 2$ and $\leq 5\%$	8 MS
Contribution of those MS' to total EU-28 emissions	29%
Number of MS with a difference to final inventory of $> \pm 5\%$	2 MS
Contribution of those MS' to total EU-28 emissions	1%
Closeness at EU28 level	0.7%

Source: Authors' own compilation based on Eurostat early CO₂ estimates and MS' GHG inventory submissions to UNFCCC

Table 3-1 and Table 3-2 indicate that the closeness of the early CO₂ estimates to the final GHG inventory data on CO₂ emissions from fossil fuel combustion for EU aggregates was good for reference year 2017. The contribution of CO₂ emissions from Member States with less than 2 % difference in trend change was 70 % of total EU-28 emissions in 2017. Member States with differences in trend change above 5 % represent only 1 % of the total EU-28 emissions in 2017. The closeness of 0.7 % at EU 28 level is also a result of the closeness of results for big Member States but also of balancing differences between Member States. Some Member States show positive differences, while other Member States show negative differences.

⁴ For the verification of the early CO₂ estimates that final inventory data which becomes available on the 27th of May each year is used.

Table 3-2: Comparison of changes in CO₂ emissions from total fossil fuels

Member States	Trend changes of early CO ₂ estimates	Trend changes in CO ₂ emissions based on GHG inventory data	Differences trend changes early estimates-GHG inventory	MS share in EU 28 total emission from fuel combustion
	2017/2016		%	2017
Belgium	-2.4%	-1.0%	-1.4%	2.4%
Bulgaria	8.3%	6.6%	1.7%	1.4%
Czech Republic	1.0%	-1.9%	3.0%	2.9%
Denmark	-5.8%	-4.2%	-1.6%	1.0%
Germany	-0.2%	-0.8%	0.5%	23.2%
Estonia	11.3%	-13.4%	24.7%	0.5%
Ireland	-2.9%	-4.2%	1.3%	1.1%
Greece	4.0%	4.5%	-0.4%	2.1%
Spain	7.4%	9.4%	-2.0%	7.8%
France	3.2%	3.0%	0.2%	10.1%
Croatia	1.2%	0.6%	0.6%	0.5%
Italy	3.2%	-0.9%	4.1%	10.1%
Cyprus	1.7%	3.5%	-1.8%	0.2%
Latvia	-0.7%	1.1%	-1.8%	0.2%
Lithuania	3.7%	3.4%	0.3%	0.3%
Luxembourg	1.8%	1.6%	0.3%	0.3%
Hungary	6.9%	3.6%	3.3%	1.4%
Malta	12.8%	9.4%	3.3%	0.05%
Netherlands	2.3%	-2.2%	4.5%	4.8%
Austria	3.0%	4.2%	-1.2%	1.7%
Poland	3.8%	5.2%	-1.4%	9.7%
Portugal	7.3%	8.7%	-1.4%	1.5%
Romania	6.8%	7.5%	-0.6%	2.2%
Slovenia	3.1%	-2.1%	5.2%	0.4%
Slovakia	3.7%	7.7%	-4.0%	0.9%
Finland	-5.9%	-7.7%	1.8%	1.2%
Sweden	-7.0%	-3.4%	-3.6%	1.0%
United Kingdom	-3.2%	-3.3%	0.1%	11.1%
EU 28	1.7%	1.0%	0.7%	

Note: Green: difference $\leq \pm 2\%$, Yellow: difference $\pm >2$ and $\leq 5\%$, Red: difference $> \pm 5\%$.

GHG inventory CO₂ emissions from CRF table 1A(b) without CO₂ emissions from waste and other fossils

Source: Eurostat early CO₂ estimates, MS GHG inventory submissions to UNFCCC 27th of May 2018

EU CO₂ emissions from fossil fuel combustion are dominated by six Member States each of which have a share of more than 5 % of the total. Germany, France, Poland and the United Kingdom show a good match between the trend changes of the early CO₂ estimates and the trend changes from the GHG inventory with differences of less than 2.0 %. Spain with 7.8 % of EU total CO₂ emissions shows a difference of 2.0 %. However, Italy with 10.1 % of EU total CO₂ emissions shows a

difference of 4.1 %. Differences above 5 % can only be found for Estonia and Slovenia with low share (<1 %) in EU 28 total CO₂ emissions from fuel combustion.

The differences between Eurostat early CO₂ estimates and final GHG inventory data were analysed separately for liquid, solid and gaseous fuels. Table 3-3 shows the differences in trend changes for the aggregated fuel categories. No Member State shows differences below 2 % for the trend changes of all fuel categories.

While emissions from liquid, solid or gaseous fuels are all relevant, the relative contribution varies according to national circumstance. The share of CO₂ emissions from liquid, solid, gaseous fuels in Member State's total CO₂ emissions from fuel consumption indicates the importance of the fuel in the Member State.

In all Member States except Estonia more than 20 % of CO₂ emissions originate from liquid fuel consumption. Differences in the trend change for liquid fuel consumption in Estonia are not as relevant for the results of the early CO₂ estimates as the differences in the trend changes for liquid fuel consumption in Sweden or in other Member States. Liquid fuel consumption in Estonia contributes only 0.5 % to total CO₂ emissions of fossil fuel consumption in Estonia⁵, while for Sweden liquid fuels make up 79 % of total CO₂ emissions.

Solid fuel consumption is most relevant in Bulgaria, the Czech Republic, Germany, Estonia and Poland. In these Member States the share of CO₂ emissions from solid fuel consumption in total national CO₂ emissions is above 40 %. Member States with a low share of CO₂ emissions from solid fuel consumption (< 10 % of total CO₂ emissions) are Belgium, Latvia, Lithuania, Luxembourg Austria and the United Kingdom. In Cyprus and Malta almost no solid fuels are consumed.

Member States with emissions from natural gas consumption contributing more than 40 % to total national CO₂ emissions include Belgium, Italy, Latvia, Hungary, the Netherlands and the United Kingdom. In Estonia, Finland and Sweden CO₂ emissions from natural gas consumption are below 10 % of total national CO₂ emission. In Cyprus there is no natural gas consumption in 2016 and 2017. Malta reported a small amount of natural gas consumption in 2016 for the first time.⁶

⁵ Estonia uses relevant amounts of liquid fuels especially in the transport sector as in other Member States. However these liquid fuels like gasoline and diesel fuel are produced in Estonia from oil shale, a solid fuel.

⁶ Malta started using natural gas in 2016 after commissioning an LNG terminal and a natural gas fired power-plant.

Table 3-3: Comparison of changes in CO₂ emissions from liquid, solid and gaseous fuels

Member States	Eurostat early CO ₂ estimates	Member States GHG inventory emission data (CRF Table 1.A(b))	Difference	Share of liquid fuels in total CO ₂ emission of MS	Eurostat early CO ₂ estimates	Member States GHG inventory emission data (CRF Table 1.A(b))	Difference	Share of solid fuels in total CO ₂ emission of MS	Eurostat early CO ₂ estimates	Member States GHG inventory emission data (CRF Table 1.A(b))	Difference	Share of gaseous fuels in total CO ₂ emission of MS
	Change 2017/2016	%			Change 2017/2016	%			Change 2017/2016	%		
Belgium	-5.5%	-1.0%	-4.5%	55%	-2.3%	-14.1%	11.8%	3%	1.6%	0.1%	1.5%	42%
Bulgaria	7.2%	4.9%	2.3%	29%	10.3%	7.9%	2.4%	59%	1.3%	4.1%	-2.8%	12%
Czech Republic	17.3%	0.7%	16.6%	22%	-5.1%	-4.1%	-0.9%	60%	2.6%	2.8%	-0.2%	18%
Denmark	1.0%	3.9%	-3.0%	59%	-21.8%	-22.0%	0.2%	20%	-4.4%	-4.6%	0.1%	21%
Germany	2.3%	1.9%	0.4%	36%	-4.1%	-6.4%	2.4%	40%	3.3%	5.9%	-2.5%	24%
Estonia	-69.4%	-92.9%	23.4%	0%	18.1%	-8.7%	26.9%	94%	-5.0%	-7.7%	2.7%	6%
Ireland	-2.9%	-2.4%	-0.5%	50%	-9.6%	-14.1%	4.5%	21%	3.1%	1.5%	1.5%	28%
Greece	-4.3%	-3.7%	-0.6%	49%	11.2%	12.8%	-1.6%	37%	20.5%	17.1%	3.4%	13%
Spain	3.4%	6.6%	-3.2%	56%	18.5%	19.5%	-1.0%	19%	8.9%	9.0%	-0.1%	25%
France	2.8%	3.0%	-0.2%	61%	11.7%	8.7%	3.0%	12%	0.5%	0.6%	-0.1%	27%
Croatia	6.7%	4.7%	2.1%	61%	-37.5%	-39.5%	2.0%	10%	13.1%	16.5%	-3.4%	30%
Italy	5.2%	-2.6%	7.8%	43%	-11.7%	-16.3%	4.6%	11%	6.0%	5.8%	0.2%	46%
Cyprus	1.5%	3.3%	-1.8%	100%	-	-	-	0%	-	-	-	-
Latvia	5.7%	10.3%	-4.5%	62%	-3.4%	-0.6%	-2.7%	3%	-9.6%	-11.7%	2.2%	35%
Lithuania	3.1%	6.4%	-3.2%	73%	8.2%	7.3%	0.9%	7%	4.1%	-7.7%	11.8%	19%
Luxembourg	3.4%	2.8%	0.7%	79%	-17.2%	-7.0%	-10.2%	2%	-2.3%	-2.2%	0.0%	19%
Hungary	8.1%	4.0%	4.1%	37%	6.0%	-1.1%	7.0%	20%	6.3%	5.6%	0.7%	43%
Malta	-27.5%	-30.5%	2.9%	64%	-	-	-	-	-	-	-	-
Netherlands	0.1%	-1.6%	1.8%	32%	-7.2%	-10.3%	3.1%	24%	9.7%	2.4%	7.3%	44%
Austria	0.4%	2.2%	-1.8%	61%	6.0%	-2.2%	8.3%	6%	7.7%	9.5%	-1.8%	33%
Poland	10.5%	16.6%	-6.1%	25%	1.0%	1.3%	-0.4%	65%	7.2%	5.9%	1.3%	10%
Portugal	-0.9%	-0.8%	-0.1%	49%	14.0%	14.1%	-0.1%	26%	22.2%	26.4%	-4.2%	25%
Romania	6.1%	12.3%	-6.2%	39%	7.1%	3.1%	4.0%	29%	7.3%	6.0%	1.3%	31%
Slovenia	-3.4%	-3.8%	0.5%	51%	11.7%	-1.9%	13.6%	37%	4.9%	4.8%	0.1%	13%
Slovakia	4.8%	14.1%	-9.4%	36%	6.4%	4.2%	2.2%	34%	-0.6%	4.8%	-5.4%	30%
Finland	-4.6%	-7.0%	2.3%	54%	-7.5%	-8.0%	0.5%	37%	-6.8%	-11.3%	4.5%	9%
Sweden	-6.1%	-2.9%	-3.1%	79%	-8.8%	4.9%	-13.6%	16%	-17.7%	-27.8%	10.1%	5%
United Kingdom	-0.5%	-0.1%	-0.3%	47%	-19.1%	-22.3%	3.2%	8%	-2.3%	-2.1%	-0.2%	45%

Note: Positive differences show an overestimation of emissions, while negative differences show that the applied method underestimates emissions

Source: Eurostat early CO₂ estimates, MS GHG inventory submissions to UNFCCC

3.2. Analysis of differences

The analysis in the following sub-sections addresses liquid, solid and gaseous fuels and follows the same structure for each fuel type.

Firstly, the differences for the trend changes for the CO₂ emissions between early CO₂ estimates and final GHG inventory data for the year 2017 are shown. The trend changes that are based on monthly Eurostat data are calculated for total fuel consumption in kt in comparison to the GHG inventory submission data where trend changes are calculated based on CO₂ emissions from fuel consumption. Additionally, information on the share of carbon stored is provided for Member States with large shares of carbon stored in total liquid, solid or gaseous fuel consumption.

Secondly, because the results of the trend change method depends on the data quality of two consecutive years, we provide a comparison of the data quality for the reporting of total liquid, solid or fossil fuel consumption for the years 2016 and 2017.

Finally, if this comparison shows differences above $\pm 3\%$ for the year 2017 a detailed analysis of the fuel(s) that contributes to the differences on the level of aggregated fuel consumption is carried out.

3.2.1. Analysis of differences for liquid fuels

Table 3-4 provides an overview of the trend changes for CO₂ emissions from liquid fuel consumption. The comparison between trend changes calculated with Eurostat monthly data for the early CO₂ estimates and final GHG inventory data shows that more than half of the Member States have differences in trend changes above 2 %. Large differences above 5 % can be found for the Czech Republic, Estonia, Italy, Poland, Romania and Slovakia.

Table 3-4: Comparison of trend changes in CO₂ emissions from liquid fuel consumption

Member States	Trend changes of early CO ₂ estimates	Trend changes in CO ₂ emissions based on GHG inventory data	Differences trend changes early CO ₂ estimates- GHG inventory	Share of liquid fuels in total CO ₂ emission of MS
	2017/2016			
	liquid fuels			
Belgium	-5.5%	-1.0%	-4.5%	54.9%
Bulgaria	7.2%	4.9%	2.3%	29.0%
Czech Republic	17.3%	0.7%	16.6%	22.1%
Denmark	1.0%	3.9%	-3.0%	58.9%
Germany	2.3%	1.9%	0.4%	36.3%
Estonia	-69.4%	-92.9%	23.4%	0.5%
Ireland	-2.9%	-2.4%	-0.5%	50.4%
Greece	-4.3%	-3.7%	-0.6%	49.2%
Spain	3.4%	6.6%	-3.2%	56.0%
France	2.8%	3.0%	-0.2%	60.9%
Croatia	6.7%	4.7%	2.1%	60.5%
Italy	5.2%	-2.6%	7.8%	43.1%
Cyprus	1.5%	3.3%	-1.8%	99.8%
Latvia	5.7%	10.3%	-4.5%	62.0%
Lithuania	3.1%	6.4%	-3.2%	73.3%
Luxembourg	3.4%	2.8%	0.7%	78.6%
Hungary	8.1%	4.0%	4.1%	37.3%
Malta	-27.5%	-30.5%	2.9%	63.5%
Netherlands	0.1%	-1.6%	1.8%	31.8%
Austria	0.4%	2.2%	-1.8%	60.9%
Poland	10.5%	16.6%	-6.1%	24.7%
Portugal	-0.9%	-0.8%	-0.1%	48.9%
Romania	6.1%	12.3%	-6.2%	39.1%
Slovenia	-3.4%	-3.8%	0.5%	50.6%
Slovakia	4.8%	14.1%	-9.4%	35.7%
Finland	-4.6%	-7.0%	2.3%	53.5%
Sweden	-6.1%	-2.9%	-3.1%	78.8%
United Kingdom	-0.5%	-0.1%	-0.3%	46.8%
EU 28	2.2%	2.1%	0.2%	43.1%

Source: Own Calculation based on extraction from Eurostat database, MS inventory submission to UNFCCC, CRF table 1.A(b)

Carbon stored/Non-energy use

In some Member States trend changes of liquid fuel consumption are affected by changing shares of carbon stored (see 2.1.1), especially if the share is changing between years. If the share is rather high (e.g. 40 % in the Netherlands) also changes of 1 % in the share of carbon stored do have large effects on the trend changes for liquid fuel consumption.

Table 3-5 shows UNFCCC inventory data for the total carbon content of all fuels consumed and the respective share of carbon stored in products which are not combusted. The tables shows data for all Member States with high shares of carbon stored.

Table 3-5: Member States with high shares (=> 15 % in 2016 or 2017) of carbon stored in total carbon content of liquid fuels consumed in 2016 and 2017

Member States	Carbon content (kt)	Carbon stored (kt C)	Share of carbon stored in total Carbon content (%)	Carbon content (kt)	Carbon stored (kt C)	Share of carbon stored in total Carbon content (%)
	2016			2017		
Belgium	17,707	6,325	36%	17,516	6,245	36%
Czech Republic	6,616	1,081	16%	7,615	2,043	27%
Germany	84,058	15,875	19%	85,715	16,382	19%
Estonia	331	42	13%	81	62	76%
France	60,769	8,909	15%	62,878	9,452	15%
Hungary	5,589	1,369	24%	6,011	1,622	27%
Netherlands	21,773	8,400	39%	22,024	8,867	40%
Slovakia	2,828	496	18%	3,143	481	15%
Sweden	8,783	1,979	23%	8,477	1,873	22%

Source: GHG inventory data (CRF Table 1.A.(b)) for the year 2016 and 2017 from the 2019 submission to UNFCCC

Differences in trend changes in Table 3-4 for the Czech Republic, Estonia and Hungary are strongly influenced by changes of the reported share of carbon stored. Also trend changes of the other Member States listed in Table 3-5 are partly influenced by changed shares of carbon stored.

Differences in the data reported

As pointed out above the trend changes are influenced by the reporting quality of two consecutive years and any changes in the quality of reporting affects the trend changes. Additionally, there are some Member States with large differences in the reporting of monthly Eurostat data and GHG inventory data that show good matches for the level of trend changes calculated with Eurostat monthly data and GHG inventory data, but only due to systematic differences in the reporting of monthly Eurostat data throughout the years. This becomes obvious in Table 3-6 that shows the differences in the reporting of liquid fuel consumption between Eurostat monthly data, Eurostat annual data and GHG inventory data for the years 2016 and 2017.

The comparison in Table 3-6 indicates that the quality of the reporting of liquid fuel consumption under monthly Eurostat data is not consistent over the years for most Member States. The fluctuation in the reporting quality results in inconsistencies and causes differences in trend changes in the period 2017/2016 (as shown in Table 3-4). The basis for the calculation of differences is aggregated liquid fuel consumption data calculated in kt. The differences are displayed as deviations from annual Eurostat data (which is 100 %), which is supposed to be the best reporting standard. GHG inventory data are close to annual Eurostat data in most Member States.

For Bulgaria, Denmark, France, Italy, Latvia, Slovakia and Sweden the consistency in reporting of total liquid fuel consumption between monthly and annual Eurostat data improved in 2017 in comparison to 2016 by more than 1 %. In Estonia, Ireland, Luxembourg, Malta, the Netherlands and

Finland differences between monthly and annual Eurostat data increased by more than 1 % in 2017. Spain, Portugal and Poland show a fluctuation in the reporting of monthly data as the differences between monthly and annual Eurostat data change from positive in 2016 to negative in 2017 or the other way around. The highest absolute differences in the reporting of liquid fuel consumption in 2017 are found for Belgium, Spain, France, Italy and the Netherlands.

The trend changes for the early CO₂ estimates are more affected by differences between monthly Eurostat data and GHG inventory data. More Member States show differences on this level than between monthly and annual Eurostat reporting. Member States that show a good match between monthly and annual reporting but show relevant (> 3 % in 2017) differences between monthly Eurostat reporting and GHG inventory reporting include Croatia, Lithuania, Romania and Sweden.

Table 3-6: Differences in liquid fuel consumption between monthly and annual Eurostat data and GHG inventory data

Member States	Eurostat monthly vs. Annual Eurostat		Difference monthly-annual Eurostat in kt		Eurostat monthly vs. GHG inventory		GHG inventory vs. Eurostat annual	
	2016	2017	2016	2017	2016	2017	2016	2017
Belgium	3%	4%	732	823	4%	4%	-1%	0%
Bulgaria	-2%	0%	90	16	-2%	1%	0%	0%
Czech Republic	-1%	-1%	56	56	-1%	1%	0%	-1%
Denmark	10%	6%	580	375	9%	6%	1%	1%
Germany	0%	0%	46	293	1%	-1%	-1%	1%
Estonia	-38%	-92%	143	71	-39%	-92%	1%	0%
Ireland	3%	5%	178	279	6%	6%	-3%	-1%
Greece	1%	0%	65	10	1%	1%	0%	-1%
Spain	1%	-2%	246	822	3%	0%	-2%	-2%
France	3%	1%	1,752	933	-1%	-2%	4%	3%
Croatia	-2%	-2%	52	76	-9%	-6%	8%	4%
Italy	-5%	-1%	2,718	676	-10%	-2%	5%	1%
Cyprus	0%	-1%	3	14	-1%	-2%	0%	1%
Latvia	-4%	-2%	47	29	4%	0%	-7%	-2%
Lithuania	0%	-1%	3	15	-7%	-6%	7%	6%
Luxembourg	0%	-5%	1	106	0%	1%	0%	-5%
Hungary	0%	0%	18	24	0%	1%	0%	-1%
Malta	-3%	-5%	15	18	-3%	-1%	2%	-5%
Netherlands	0%	-3%	87	852	-2%	1%	2%	-4%
Austria	0%	-1%	39	143	-2%	-1%	2%	0%
Poland	1%	-1%	353	213	0%	-2%	2%	1%
Portugal	-1%	1%	110	96	-2%	1%	0%	0%
Romania	1%	0%	111	35	-1%	-6%	2%	7%
Slovenia	-3%	-3%	59	59	-3%	-3%	0%	0%
Slovakia	6%	0%	184	15	5%	-1%	1%	1%
Finland	0%	5%	30	412	3%	5%	-2%	0%
Sweden	-6%	0%	633	30	3%	-3%	-8%	4%
United Kingdom	0%	-1%	115	470	-1%	-2%	1%	1%
EU 28	0%	0%	32	- 1,252	-1%	-2%	1%	2%
<+/- 2%	16 MS	17 MS			12 MS	17 MS	17 MS	20 MS
+/-2-5%	7 MS	7 MS			10 MS	5 MS	7 MS	5 MS
> +/- 5%	5 MS	4 MS			6 MS	6 MS	4 MS	3 MS

Note: The data for GHG inventory submission for the year 2016 is based on the 2018 submission, the data for 2017 based on the 2019 submission, as this table focuses on the comparison in the specific year. Data used in this table might not reflect the trend changes for the GHG inventory as shown in Table 3-4 due to data revisions and recalculations between 2018 and 2019 GHG inventory submissions.

Data does not include the reporting of biofuels.

Differences are based on liquid fuel consumption in kt for all data sources

Annual Eurostat data is 100%, for comparison of monthly Eurostat data and GHG inventory data, GHG inventory data is 100%

Source: Own compilation based on extraction from Eurostat database in the specific year, GHG inventory submission CRF table 1.A(b)

For Member States that show differences above 3 % in the reporting of liquid fuel consumption in the different data sources for the year 2017 data is further analysed in the following tables. Table 3-7 shows detailed differences on the level of the single fuel categories for liquid fuel consumption. Table 3-8 provides a description of the differences.

Table 3-7: Detailed differences for liquid fuel consumption between monthly and annual Eurostat data and GHG inventory data for 2017

Member State	Fuel Consumption	Monthly Eurostat	Annual Eurostat	GHG inventory data	Difference between monthly-annual Eurostat data		Difference Monthly Eurostat - GHG inventory data		Differences GHG inventory - annual Eurostat data	
					kt	%	kt	%	kt	%
		Apparent fuel consumption in kt			kt	%	kt	%	kt	%
Belgium	Total liquids	21.418	20.595	20.651	823	4%	767	4%	56	0%
	Gas / Diesel Oil	-2.008	-1.881	-1.881	-127		-127		0	
	LPG	1.185	840	840	345		345		0	
	Other oil	-566	-756	-700	190		134		56	
	Motor Gasoline	-3.129	-3.759	-3.759	630		630		0	
Denmark	Total liquids	6.390	6.015	6.053	375	6%	337	6%	38	1%
	Kerosenes - Jet fuels	467	-61	-47	528		514		15	
	Gas / Diesel Oil	251	422	403	-171		-152		-19	
Estonia	Total liquids	6	77	77	-71	-92%	-71	-92%	0	0%
	Bitumen	0	69	69	-69		-69		0	
Ireland	Total liquids	6.336	6.057	6.001	279	5%	335	6%	-56	-1%
	Crude Oil	3.357	3.183	3.183	174		174		0	
	Kerosenes - Jet fuels	359	257	270	102		89		13	
France	Total liquids	71.961	71.028	73.383	933	1%	-1.422	-2%	2.355	3%
	Kerosenes - Jet fuels	-1.151	-3.214	-2.558	2.063		1.407		656	
	LPG	1.897	2.075	2.074	-178		-177		-1	
	Other oil	93	110	2.090	-17		-1.997		1.980	
Croatia	Total liquids	3.225	3.301	3.445	-76	-2%	-220	-6%	144	4%
	NGL	71	64	0	7		71		-64	
	Other hydrocarbons	80	0	0	80		80		0	
	Gas / Diesel Oil	321	437	437	-116		-116		0	
	Refinery feedstocks	191	311	0	-120		191		-311	
	Other oil	91	48	512	44		-421		464	
Lithuania	Total liquids	2.751	2.766	2.941	-15	-1%	-190	-6%	174	6%
	Residual Fuel Oil	-1.619	-1.622	-1.482	3		-137		140	
	Refinery feedstocks	253	254	310	-1		-57		57	
Luxembourg	Total liquids	2.160	2.266	2.148	-106	-5%	12	1%	-118	-5%
	Gas / Diesel Oil	1.820	1.924	1.807	-104		13		-117	
Malta	Total liquids	307	325	309	-18	-5%	-2	-1%	-16	-5%
	LPG	10	27	21	-17		-11		-5	
Netherlands	Total liquids	26.814	27.666	26.645	-852	-3%	169	1%	-1.022	-4%
	LPG	1.395	1.183	1.181	212		214		-1	
	Naphtha	4.221	4.014	4.014	207		207		0	
	Petroleum Coke	0	537	537	-537		-537		0	
	Other oil	-1.901	-1.100	-2.163	-801		262		-1.063	
Romania	Total liquids	9.430	9.395	10.078	35	0%	-648	-6%	684	7%
	Kerosenes - Jet fuels	-375	-484	-191	109		-184		293	
	Petroleum Coke	-177	-49	-45	-128		-132		4	
	Refinery feedstocks	708	673	843	35		-135		170	
	Other oil	278	312	467	-34		-189		155	
Slovenia	Total liquids	2.209	2.268	2.267	-59	-3%	-58	-3%	-1	0%
	Bitumen	0	58	58	-58		-58		0	
Finland	Total liquids	8.071	7.659	7.690	412	5%	381	5%	31	0%
	Crude Oil	11.971	11.150	11.150	821		821		0	
	NGL	481	1.367	1.427	-886		-946		60	
	Gas / Diesel Oil	-1.634	-1.766	-2.220	132		586		-454	
	LPG	124	604	604	-480		-480		0	
	Other oil	327	-474	-128	801		455		346	
Sweden	Total liquids	10.115	10.085	10.463	30	0%	-348	-3%	378	4%
	Crude Oil	19.609	19.609	19.854	0		-245		245	
	Kerosenes - Jet fuels	238	133	99	105		139		-34	
	Residual Fuel Oil	-3.890	-3.890	-3.657	0		-233		233	
	Other oil	-752	-752	-622	0		-130		130	

Note: Apparent consumption (Total) is calculated as production (only for primary fuels) + imports-exports-stock changes-international bunkers; negative numbers in total apparent consumption indicate that exports, stock changes or international bunkers are higher than imports.

The table shows only the fuels that contribute most to the differences. There are other fuels that show also differences and are not shown in this table.

Source: Eurostat database in the specific year, GHG inventory submission 2019 for the year 2017

There are up to seventeen fuel categories reported under liquid fuel consumption by Member States. Thus, the reporting of liquid fuel is complex and fluctuations of data quality between years appear. In some Member States a random levelling out of differences in the reporting of liquid fuels might lead to a reduction of differences in the reporting of aggregated total liquid fuel consumption.

Systematic differences can be found for the reporting of international bunkers in Denmark and France. This might not strongly affect the trend changes but results in large differences in the reporting of apparent consumption for the affected fuels under monthly Eurostat data, in comparison to annual Eurostat data and GHG inventory data. Consumption of international bunker fuels is one area for which some Member States still report much lower quantities in Eurostat monthly compared to annual energy data. The under-reporting of international bunker fuels in a Member State's monthly Eurostat data has the effect that the combined monthly total fuel consumption in the reference approach calculation is higher than in the annual total. This is because international bunker fuels are subtracted from each Member State's total fuel consumption for internal consumption. This becomes obvious if Member States report systematically higher monthly oil consumption than reported under annual Eurostat data – like Denmark (see Table 3-6).

Table 3-8: Description and further explanation of differences for liquid fuel consumption as shown in Table 3-7 for the year 2017

Member state

Belgium	Differences between annual and monthly Eurostat data occur mainly from motor gasoline, gas/diesel oil, other oil and LPG. GHG inventory data and annual Eurostat data match quite well except for other oil.
Denmark	Differences between monthly and annual Eurostat data are related to the reporting of gas/diesel oil. There are systematic differences in the reporting of international bunkers from Jet Kerosene. Differences in the reporting of international bunker fuels do not strongly affect the trend changes, as they are systematic. <i>The reporting of international bunker fuels is not mandatory for monthly energy statistics. However, most Member States report sufficient data for international bunkers under monthly Eurostat data.</i>
Estonia	There are systematic differences in the reporting between monthly Eurostat data and annual Eurostat/GHG inventory data because in monthly data bitumen is not reported under Other oil, while annual and GHG inventory data report consumption figures for bitumen. Changing amounts of carbon stored influence the trend changes from liquid fuel consumption (Table 3-5). The effects of the differences in carbon stored reporting are quite strong. However, the share of CO ₂ emissions from liquid fuel consumption in total CO ₂ emission of Estonia is only 6 %. Thus, the differences in carbon stored reporting have only a small impact on the results of the total early CO ₂ estimates for Estonia.
Ireland	Differences between Eurostat monthly and annual data occur from an overestimation of crude oil and kerosene consumption. Differences between annual Eurostat data and GHG inventory data are only minor.
France	Main differences between monthly and annual Eurostat data and GHG inventory data appear for the reporting of international bunkers from jet kerosene. Further differences can be found in the reporting of other oil between monthly/annual Eurostat data and GHG inventory data.

Croatia	<p>There are systematic differences in the reporting of liquid fuel consumption between monthly and annual Eurostat data and GHG inventory data.</p> <p>Largest differences between monthly/annual Eurostat data and GHG inventory data occur for the reporting of other oil. Further differences are related to the reporting of refinery feedstocks, NGL and other hydrocarbons, which are not reported under GHG inventory data but under monthly and annual Eurostat data.</p> <p>Reporting of gas / diesel oil is consistent between Eurostat annual and GHG inventory data, however significant differences to monthly data were observed.</p>
Lithuania	<p>Eurostat monthly and annual data are quite consistent while liquid fuel consumption from GHG inventory data is significantly larger. Differences between monthly/annual Eurostat data and GHG inventory stay almost at the same level as in 2016. Main differences appear for the reporting residual fuel oil and to a lesser extent from refinery feedstocks.</p>
Luxembourg	<p>Differences between monthly and annual Eurostat data are mainly from gas / diesel oil. A similar difference can be observed between GHG inventory data and annual Eurostat data as monthly Eurostat data and GHG inventory data are quite similar.</p>
Malta	<p>The largest difference can be found with LPG where the reported consumption in Eurostat monthly data is only about half of the Eurostat annual and GHG inventory data.</p>
Netherlands	<p>The reported LPG and Naphtha consumption is overestimated under Eurostat monthly data in comparison to annual Eurostat and GHG inventory data which both match quite well.</p> <p>In contrast there is a significant difference in the reporting of other oil in Eurostat annual data on one side and Eurostat monthly data and GHG inventory data on the other side.</p> <p>Further differences are related to the reporting of petroleum coke, which is not reported under monthly Eurostat data.</p>
Romania	<p>Eurostat monthly and annual data on total liquid consumption are quite consistent. Deviations occur for many fuels but differences for total liquid fuel consumption are levelled out. In comparison to GHG inventory data Eurostat data underestimates liquid fuel consumption with largest deviation occurring in jet kerosene, followed by refinery feedstocks and other oil.</p>
Slovenia	<p>Bitumen is not reported in Eurostat monthly data while it is reported in Eurostat annual data and GHG inventory data.</p>
Finland	<p>There are increasing differences in the reporting of crude oil, NGL, gas/diesel oil, LPG and other oil between monthly and annual Eurostat data and GHG inventory data.</p>
Sweden	<p>Reporting quality of Eurostat monthly data compared to Eurostat annual data improved compared to 2016. Differences between monthly and annual Eurostat data remain for the reporting of jet kerosene.</p> <p>However, between Eurostat data and GHG inventory data differences remain for crude oil, other oil and residual fuel oil consumption.</p>

Source: Own compilation

The comparison shows, that the differences in the reporting of liquid fuel consumption is either based on changes in the data quality or due to systematic reporting issues. This is the case for Estonia where other oil is constantly not reported under Eurostat monthly data or Denmark where international bunkers from jet kerosene are systematically underreported in Eurostat monthly data. Besides this, it also shows that there are Member States (e.g. Finland) that have general problems in the reporting of liquid fuels, as there are differences for many liquid fuel categories.

3.2.2. Analysis of differences for solid fuels

Table 3-9 provides an overview on the trend changes used to calculate CO₂ emissions from solid fuel consumption. The comparison between trend changes calculated with Eurostat monthly data and GHG inventory data shows that more than half of the Member States show differences in trend changes above 2 %. Large differences above 5 % can be found for Belgium, Estonia, Luxembourg, Hungary, Austria; Slovenia and Sweden.

However, Belgium, Luxembourg and Austria show good results on the level of total CO₂ emission (see Table 3-2). Belgium, Luxembourg and Austria have a rather low share of CO₂ emissions from solid fuel consumption in total CO₂ emissions.

Table 3-9: Comparison of trend changes in CO₂ emissions from solid fuel consumption

Member States	Trend changes of early CO ₂ estimates	Trend changes in CO ₂ emissions based on GHG inventory data	Differences trend changes early CO ₂ estimates- GHG inventory	Share of solid fuels in total CO ₂ emission of MS
	2017/2016			
	solid fuels			
Belgium	-2.3%	-14.1%	11.8%	3.3%
Bulgaria	10.3%	7.9%	2.4%	59.2%
Czech Republic	-5.1%	-4.1%	-0.9%	60.1%
Denmark	-21.8%	-22.0%	0.2%	19.8%
Germany	-4.1%	-6.4%	2.4%	40.1%
Estonia	18.1%	-8.7%	26.9%	93.9%
Ireland	-9.6%	-14.1%	4.5%	21.5%
Greece	11.2%	12.8%	-1.6%	37.4%
Spain	18.5%	19.5%	-1.0%	18.7%
France	11.7%	8.7%	3.0%	11.9%
Croatia	-37.5%	-39.5%	2.0%	9.6%
Italy	-11.7%	-16.3%	4.6%	11.3%
Cyprus	NO	NO	NO	-
Latvia	-3.4%	-0.6%	-2.7%	2.7%
Lithuania	8.2%	7.3%	0.9%	7.3%
Luxembourg	-17.2%	-7.0%	-10.2%	2.0%
Hungary	6.0%	-1.1%	7.0%	20.0%
Malta	NO	NO	NO	-
Netherlands	-7.2%	-10.3%	3.1%	23.9%
Austria	6.0%	-2.2%	8.3%	5.9%
Poland	1.0%	1.3%	-0.4%	65.3%
Portugal	14.0%	14.1%	-0.1%	26.5%
Romania	7.1%	3.1%	4.0%	29.5%
Slovenia	11.7%	-1.9%	13.6%	36.5%
Slovakia	6.4%	4.2%	2.2%	34.0%
Finland	-7.5%	-8.0%	0.5%	37.4%
Sweden	-8.8%	4.9%	-13.6%	16.4%
United Kingdom	-19.1%	-22.3%	3.2%	8.2%
EU 28	-1.1%	-3.1%	2.0%	28.4%

Source: Own calculation based on extraction from Eurostat database, MS inventory submission to UNFCCC, CRF table 1.A(b)

For the Czech Republic, Germany, Hungary and Slovakia the trend changes for solid fuels have been corrected for the calculation of the 2017 early estimates. Instead of using the trend changes calculated from the consumption of solid fuels in kilotons, the trend changes are calculated based on consumption in TJ. This was done due to changes in the consumption between solid fuel categories with different NCVs.

Carbon stored/Non-energy use

Trend changes of CO₂ emissions can also be influenced by the share of carbon stored in solid fuels if the share is changing between years. The influence on the trend change is stronger the higher the share of carbon stored in total carbon content from solid fuel consumption. Table 3-10 shows the share of carbon stored in total carbon for Member States with relevant shares of carbon stored in solid fuels.

Table 3-10: Member States with high shares (=> 15 % in 2016 or 2017) of carbon stored in total carbon content of solid fuels consumed in 2016 and 2017

Member States	Carbon content (kt)	Carbon stored (kt C)	Share of carbon stored in total Carbon content (%)	2016		Share of carbon stored in total Carbon content (%)
				Carbon content (kt)	Carbon stored (kt C)	
	2016			2017		
Belgium	3,446	2,662	77%	3,365	2,692	80%
Austria	3,361	2,465	73%	3,514	2,638	75%
Slovakia	3,561	1,127	32%	3,687	1,152	31%
Finland	3,294	585	18%	2,951	513	17%
Sweden	1,936	768	40%	1,953	713	37%
United Kingdom	12,418	2,208	18%	10,133	2,200	22%

Source: GHG inventory data (CRF Table 1.A.(b)) for the year 2016 and 2017 from the 2019 submission to UNFCCC

For Slovakia and Finland the effects of carbon stored on the trend changes of CO₂ emissions from solid fuel consumption are very small as inter annual changes in the share of carbon stored are rather low. Strong influences on the trend changes of solid fuel consumption can be found for Belgium, Austria, Sweden and the United Kingdom.

Differences in the data reported

Besides the effects of carbon stored on the trend changes from the GHG inventory data, trend changes are influenced by the reporting quality of two consecutive years and any changes in the quality of reporting affects the trend changes. Additionally, there are some Member States that show good matches for the level of trend changes calculated with Eurostat monthly data and GHG inventory data, but only due to systematic differences in the reporting of monthly Eurostat data throughout the years. This becomes obvious in Table 3-11 that shows the differences in the reporting of solid fuel consumption between Eurostat monthly data, Eurostat annual data and GHG inventory data for the years 2016 and 2017.

Table 3-11 shows – similarly to liquid fuels – a fluctuating data quality between the years that affect the trend changes from solid fuel consumption in many Member States.

In comparison to the reporting in 2016 Spain, France, Lithuania, Luxembourg, Slovenia and Sweden showed significant improvements in the quality of the monthly Eurostat data in 2017 compared to Eurostat annual data. However, the difference between monthly and annual Eurostat data is still above ±5 % in Estonia, Ireland, Latvia and Austria. As Ireland’s monthly solid data is partly confidential, data has been estimated which strongly affects the data quality. In Belgium, Bulgaria, Ireland, Croatia and Romania the differences between monthly and annual Eurostat data increased

by more than 1 % (see Table 3-9). For those Member States the changing data quality (improvement or deterioration) affect the trend changes.

The highest absolute differences in the reporting of solid fuel consumption between monthly and annual Eurostat data in 2017 are found for Germany, Estonia and Romania in 2017.

The trend changes for the early CO₂ estimates are more affected by differences between monthly Eurostat data and GHG inventory data. More Member States have differences on this level than between monthly and annual Eurostat reporting. Member States that show a good match between monthly and annual reporting but show relevant (> 3 % in 2017) differences between monthly Eurostat reporting and GHG inventory reporting include the Czech Republic, Lithuania, Luxembourg, Poland and Portugal.

Table 3-11 shows that there is no constant good reporting quality for solid fuel consumption under annual Eurostat and GHG inventory. Germany, Estonia, Latvia, and Austria show systematic differences for the reporting of solid fuel consumption, while for some other Member States the differences in 2017 increased. Slovenia improved its reporting of solid fuels in 2017, after reporting systematic differences in the last years.

Table 3-11: Differences in solid fuel consumption between monthly and annual Eurostat data and GHG inventory data for the years 2016 and 2017

Member States	Eurostat monthly vs. Annual Eurostat		Difference monthly-annual Eurostat in kt		Eurostat monthly vs. GHG inventory		GHG inventory vs. Eurostat annual	
	2016	2017	2016	2017	2016	2017	2016	2017
Belgium	-1%	-3%	- 38	- 115	-2%	-5%	1%	2%
Bulgaria	1%	2%	167	785	1%	2%	0%	0%
Czech Republic	-2%	-1%	- 793	- 545	-4%	-6%	2%	5%
Denmark	0%	0%	7	0	1%	0%	0%	0%
Germany	-4%	-3%	- 9,859	- 7,676	-4%	-3%	-1%	-1%
Estonia	-12%	-10%	- 2,206	- 2,157	-12%	-10%	0%	0%
Ireland	3%	6%	148	319	4%	8%	-1%	-2%
Greece	-1%	-1%	- 354	- 401	-1%	-1%	0%	0%
Spain	5%	3%	993	768	5%	3%	0%	0%
France	7%	3%	954	497	-3%	-2%	11%	6%
Croatia	0%	3%	- 3	20	0%	3.0%	0%	0%
Italy	0%	1%	- 32	94	1%	2%	-1%	-1%
Cyprus	NA	0%	1	0	25%	0%	NA	0%
Latvia	-14%	-16%	- 10	- 11	-8%	-18%	-6%	3%
Lithuania	19%	-1%	55	- 3	-3%	-19%	23%	23%
Luxembourg	-7%	2%	- 6	1	-6%	-10%	-1%	13%
Hungary	-1%	1%	- 62	107	-1%	1%	0%	0%
Malta	NO	NO	-	-	NO	NO	4%	NO
Netherlands	0%	1%	42	196	-4%	-2%	4%	4%
Austria	9%	9%	401	421	9%	9%	0%	0%
Poland	-1%	-1%	- 1,562	- 676	-1%	-5%	0%	4%
Portugal	0%	1%	9	80	4%	4%	-3%	-2%
Romania	-1%	-3%	- 295	- 838	2%	3%	-4%	-6%
Slovenia	-11%	0%	- 413	- 15	-11%	0%	0%	0%
Slovakia	-2%	-1%	- 136	- 91	-2%	-1%	0%	0%
Finland	3%	2%	287	184	3%	3%	-1%	-2%
Sweden	9%	2%	281	53	18%	2%	-8%	-1%
United Kingdom	0%	2%	11	233	2%	0%	-2%	1%
EU 28	-2%	-1%	- 12,413	- 8,767	-2%	-2%	0%	1%
<+/- 2%	13 MS	16 MS			8 MS	8 MS	18 MS	17 MS
+/-2-5%	4 MS	7 MS			11 MS	12 MS	5 MS	6 MS
> +/- 5%	9 MS	4 MS			8 MS	7 MS	4 MS	4 MS

Note: The reporting of coal tar and BKB/Patent fuels is not included under the monthly coal Questionnaire. In the annual Eurostat data and in the GHG inventory data coal tar and BKB/Patent fuels are reported. The data presented above does not include coal tar and BKB/Patent fuels, as this is not included under the reporting for monthly Eurostat data.

Differences are based on solid fuel consumption in kt for all data sources

Annual Eurostat data is 100%, for comparison of monthly Eurostat data and GHG inventory data, GHG inventory data is 100%

For Ireland own aggregates for hard coal and peat consumption are included under monthly Eurostat data

Source: Own compilation based on extraction from Eurostat database in the specific year, GHG inventory submission CRF table 1.A(b)

For Member States that show differences above 3 % in the reporting of solid fuel consumption in the different data sources for the year 2017 data is further analysed in the following tables. Table 3-12 shows detailed differences on the level of the single fuel categories for solid fuel consumption. Table 3-13 provides a description of the differences and if available further explanations.

Table 3-12: Detailed differences for solid fuel consumption between monthly and annual Eurostat data and GHG inventory data for 2017

Member State	Fuel Consumption	Monthly Eurostat	Annual Eurostat	GHG inventory data	Difference between monthly-annual Eurostat data		Difference Monthly Eurostat - GHG inventory data		Differences GHG inventory - annual Eurostat data	
					kt	%	kt	%	kt	%
		Apparent fuel consumption in kt			kt	%	kt	%	kt	%
Belgium	Total Solid Fuels	3.702	3.817	3.890	-115	-3%	-188	-5%	73	2%
	Hard Coal	3.451	3.556	3.629	-105		-178		73	
	Anthracite		409	466					57	
	Coking Coal		1.616	1.616					0	
	Other Bituminous Coal		1.531	1.547					16	
Czechia	Total Solid Fuels	43.849	44.393	46.444	-545	-1%	-2.595	-6%	2.051	5%
	Hard Coal	6.595	6.953	8.032	-358		-1.437		1.080	
	Anthracite		58	79					21	
	Coking Coal		3.421	4.434					1.013	
	Other Bituminous Coal		3.474	3.519					45	
	Coke Oven Coke + Gas Coke	-552	-422	-418	-130		-134		4	
	Lignite	37.806	37.863	38.830	-58		-1.024		967	
Brown Coal/Lignite	37.806	37.863	38.830	-58		-1.024		967		
Germany	Total Solid Fuels	218.511	226.187	224.769	-7.676	-3%	-6.258	-3%	-1.418	-1%
	Hard Coal	44.549	53.548	53.388	-8.999		-8.838		-160	
	Anthracite		1.565	0					-1.565	
	Coking Coal		15.825	0					-15.825	
	Other Bituminous Coal		36.158	53.388					17.230	
	Coke Oven Coke + Gas Coke	2.706	1.425	679	1.281		2.027		-746	
Estonia	Total Solid Fuels	19.918	22.074	22.063	-2.157	-10%	-2.146	-10%	-11	0%
	Oil Shale	19.863	21.897	21.897	-2.034		-2.034		0	
Ireland	Total Solid Fuels	5.519	5.200	5.090	319	6%	429	8%	-110	-2%
	Hard Coal	1.923	1.788	1.777	135		146		-11	
	Other Bituminous Coal		1.738	1.738					0	
	Peat	3.596	3.412	3.294	184		302		-118	
Spain	Total Solid Fuels	23.852	23.084	23.172	768	3%	680	3%	88	0%
	Hard Coal	21.494	21.221	21.309	273		185		88	
	Anthracite		1.399	0					-1.399	
	Coking Coal		1.802	1.802					0	
	Other Bituminous Coal		18.020	19.507					1.487	
	Coke Oven Coke + Gas Coke	182	-67	-67	249		249		0	
	Brown Coal/Lignite	2.176	1.930	1.930	246		246		0	
	Sub-bituminous Coal		1.930	1.930					0	
Lignite	2.176	0	0					0		
France	Total Solid Fuels	15.630	15.133	15.981	497	3%	-351	-2%	848	6%
	Hard Coal	15.290	14.814	15.662	476		-372		848	
	Anthracite		468	1.316					848	
	Coking Coal		4.517	4.517					0	
	Other Bituminous Coal		9.829	9.829					0	
Croatia	Total Solid Fuels	685	665	665	20	3%	20	3%	0	0%
	Hard Coal	604	584	584	20		20		0	
	Other Bituminous Coal		584	584					0	
Latvia	Total Solid Fuels	62	73	75	-11	-16%	-13	-18%	2	3%
	Hard Coal	60	70	71	-10		-11		1	
	Other Bituminous Coal		70	71					1	
Lithuania	Total Solid Fuels	319	322	395	-3	-1%	-76	-19%	73	23%
	Peat	52	52	125	0		-74		73	
Luxembourg	Total Solid Fuels	70	68	77	1	2%	-8	-10%	9	13%
	Hard Coal	69	68	68	1		1		0	
	Coking Coal		0	0					0	
	Lignite	0	0	9	0		-9		9	
Netherlands	Total Solid Fuels	14.943	14.747	15.290	196	1%	-347	-2%	544	4%
	Hard Coal	14.679	14.683	15.226	-4		-548		544	
	Coking Coal		4.394	4.992					599	
	Coke Oven Coke + Gas Coke	174	16	14	158		160		-2	
	Brown Coal/Lignite	91	48	50	42		41		2	
	Lignite	91	48	50					2	

Member State	Fuel Consumption	Monthly Eurostat	Annual Eurostat	GHG inventory data	Difference between monthly-annual Eurostat data		Difference Monthly Eurostat - GHG inventory data		Differences GHG inventory - annual Eurostat data	
					kt	%	kt	%	kt	%
		Apparent fuel consumption in kt			kt	%	kt	%	kt	%
Austria	Total Solid Fuels	5.019	4.599	4.599	421	9%	420	9%	0	0%
	Hard Coal	3.634	3.370	3.370	264		264		0	
	Coking Coal		1.764	1.764					0	
	Other Bituminous Coal		1.507	1.507					0	
	Coke Oven Coke + Gas Coke	1.339	1.153	1.153	185		185		0	
Poland	Total Solid Fuels	127.608	128.283	133.881	-676	-1%	-6.274	-5%	5.598	4%
	Hard Coal	72.683	73.290	77.931	-607		-5.248		4.641	
	Anthracite		244	0					-244	
	Coking Coal		13.055	17.247					4.192	
	Other Bituminous Coal		59.992	60.684					692	
Portugal	Total Solid Fuels	5.499	5.420	5.307	80	1%	192	4%	-112	-2%
	Hard Coal	5.492	5.408	5.307	84		184		-100	
	Coke Oven Coke + Gas Coke	8	12	0	-4		8		-12	
Romania	Total Solid Fuels	26.353	27.191	25.604	-838	-3%	749	3%	-1.587	-6%
	Hard Coal	833	190	187	643		646		-2	
	Anthracite		182	179					-3	
	Coking Coal		8	9					0	
	Brown Coal/Lignite	24.783	26.219	24.634	-1.436		149		-1.585	
	Sub-bituminous Coal		644	610					-33	
Lignite	24.783	25.575	24.024	-792		759		-1.551		
Finland	Total Solid Fuels	10.122	9.938	9.781	184	2%	341	3%	-157	-2%
	Coke Oven Coke + Gas Coke	201	108	105	93		95		-3	
	Peat	5.545	5.415	5.345	130		200		-70	

Note: Apparent consumption (Total) is calculated as production (only for primary fuels) + imports – exports - stock changes.

For Ireland own aggregates for hard coal and peat consumption are included under monthly Eurostat data.

The table shows only the fuels that contribute most to the differences. There are other fuels that show also differences and are not shown in this table.

Source: Eurostat database in the specific year, GHG inventory submission 2019 for the year 2017

Big amounts of consumption are mainly reported under hard coal and in some Member States under lignite. According to Table 3-12, in most Member States differences in the reporting of solid fuel consumption are due to differences in the reporting of hard coal.

Table 3-13: Description and further explanation of differences for solid fuel consumption as shown in Table 3-12

Member State	
Belgium	<p>In comparison to 2016 differences in the reporting of solid fuel consumption increased in 2017 from 2% to 3%. Main differences occur due to an overestimation of hard coal exports and an underestimation of stock changes under monthly Eurostat data in comparison to annual Eurostat data and GHG inventory data.</p> <p>Trend changes are affected by the differences in reporting, but also due to slight changes in the share of carbon stored (Table 3-10).</p>
Czech Republic	<p>There are differences on the level of hard coal consumption between all data sources. At the level of lignite consumption differences only appear between Eurostat data and GHG inventory data.</p>
Germany	<p>There are differences in the reporting of hard coal consumption between monthly Eurostat data and annual Eurostat/GHG inventory data. Further differences are related to the reporting of coke oven coke/gas coke, where differences appear for all data sources.</p>
Estonia	<p>Differences between monthly and annual Eurostat data can be largely attributed to the amount reported under annual production of oil shale.</p> <p>There seem to be a systematic underestimation in the reporting of oil shale consumption under monthly Eurostat data.</p> <p>However, differences in the trend changes as outlined in Table 3-9 cannot be explained by differences in the reporting of monthly Eurostat data and are based on recalculation of inventory data for the year 2016.</p>
Spain	<p>In comparison to 2016 differences in the reporting of solid fuels decreased in 2017 from 5 % in 2015 to 3 % for total solid fuel consumption between monthly and annual Eurostat data.</p> <p>Solid fuel consumption under monthly Eurostat data is overestimated in 2017 in comparison to Eurostat annual data and GHG inventory data, mainly due to differences in stock changes for hard coal and lignite.</p>
France	<p>In comparison to 2016 and to earlier years differences in the reporting of solid fuels decreased in 2017 from 7 % in 2015 to 3 % for total solid fuel consumption between monthly and annual Eurostat data.</p> <p>Differences between monthly and annual Eurostat data are related to the reporting of stock changes from hard coal. There are further differences based on the reporting of hard coal imports between GHG inventory data and monthly/annual Eurostat data.</p>
Croatia	<p>The difference in solid fuels is due to the reporting of hard coal, which is slightly overestimated under monthly Eurostat data.</p>
Ireland	<p>Due to confidentiality reasons peat and hard coal consumption are not completely reported under Eurostat monthly data. However, hard coal and peat deliveries to main activity producer power plants are reported under monthly Eurostat data. For the calculation of early CO₂ estimates for Ireland an approximation on the share of peat and hard coal deliveries to power plants was used. For hard coal it was assumed that 74 % of total hard coal consumption is delivered to power plants, while for peat it was assumed that deliveries to power plants represent 80 % of total peat consumption in 2017. For hard coal and peat differences between gap filled monthly data and GHG inventory data remain in 2017.</p>

Latvia	For the year 2017 Latvia shows a difference of -16 % on the level of total solid fuel consumption between the reporting of monthly and annual Eurostat data. This difference is based on the reporting of stock changes from hard coal and make up only 11 kilotons. The share of CO ₂ emissions from solid fuel consumption in Latvia is only 3 % and thus not relevant for the results of the early CO ₂ estimates.
Lithuania	There are differences in the reporting of peat between Eurostat data and GHG inventory data. There are no imports reported under monthly and annual Eurostat data.
Luxembourg	There are differences of 8 kt between annual and monthly Eurostat data for total solid fuel consumption, which make up -10 %. Differences are based on the reporting of lignite, which is only reported under GHG inventory data. The share of CO ₂ emissions from solid fuel consumption in Luxembourg is only 2 % and thus not relevant for the results of the early CO ₂ estimates.
Netherlands	While there is a good match between monthly and annual Eurostat data for solid fuel consumption, differences remain for the reporting of hard coal between Eurostat data and GHG inventory data. Smaller differences can be found for the reporting of lignite between monthly and annual Eurostat data.
Austria	Differences between monthly Eurostat data and GHG inventory and annual Eurostat data remain with 9% at the level of 2016. Differences are related to an overestimation of hard coal and coke oven coke/gas coke under monthly Eurostat data. Trend changes are affected by the differences in reporting, but stronger effects on the trend changes have the changes in the share of carbon stored (Table 3-10). Almost 70 % of total carbon from solid fuels consumed in Austria are stored and do not turn into CO ₂ emissions. Between 2016 and 2017 the share of carbon stored from solid fuels changes from 73 % to 75 %, which affects the trend changes. Due to the high amount of carbon stored the share of CO ₂ emissions from solid fuel consumption in Austria's total CO ₂ emission is only 5.9 %.
Poland	While there is a good match between monthly and annual Eurostat data for solid fuel consumption, differences remain for the reporting of hard coal between Eurostat data and GHG inventory data. Smaller differences can be found for the consumption of lignite between Eurostat and GHG inventory data.
Portugal	While there is a good match between monthly and annual Eurostat data for solid fuel consumption, differences remain for the reporting of hard coal between Eurostat data and GHG inventory data.
Romania	Differences on the level of total solid fuel consumption are below 3% between monthly and annual Eurostat data. Differences appear for the reporting of hard coal between monthly and annual Eurostat data. Differences between annual and GHG inventory data make of 5.6% due to differences in the reporting of lignite. On the level of monthly Eurostat data differences for the reporting of lignite also appear but are levelled out at total solid fuel consumption due to further differences on the level of hard coal consumption.
Finland	There are small differences in the reporting of coke oven coke/gas coke between monthly Eurostat data and annual Eurostat and GHG inventory data. Further differences occur for the reporting of peat with differences between all data sources. Trend changes are affected by the differences in reporting, but also due to slight changes in the share of carbon stored (Table 3-10).

Source: Own compilation

3.2.3. Analysis of differences for gaseous fuels

Table 3-14 shows the results and the differences for the trend changes calculated based on monthly Eurostat data and GHG inventory data for the year 2017/2016. Differences above 5 % are found for four Member States (Lithuania, Netherlands, Slovakia and Sweden).

Table 3-14: Comparison of trend changes in CO₂ emission from gaseous fuel consumption

Member States	Trend changes of early CO ₂ estimates	Trend changes in CO ₂ emissions based on GHG inventory data	Differences trend changes early CO ₂ estimates-GHG	Share of gaseous fuels in total CO ₂ emission of MS
	2017/2016			
	gaseous fuels			
Belgium	1.6%	0.1%	1.5%	41.8%
Bulgaria	1.3%	4.1%	-2.8%	11.8%
Czech Republic	2.6%	2.8%	-0.2%	17.9%
Denmark	-4.4%	-4.6%	0.1%	21.2%
Germany	3.3%	5.9%	-2.5%	23.6%
Estonia	-5.0%	-7.7%	2.7%	5.6%
Ireland	3.1%	1.5%	1.5%	28.2%
Greece	20.5%	17.1%	3.4%	13.5%
Spain	8.9%	9.0%	-0.1%	25.2%
France	0.5%	0.6%	-0.1%	27.2%
Croatia	13.1%	16.5%	-3.4%	29.8%
Italy	6.0%	5.8%	0.2%	45.5%
Cyprus	NO	NO	NO	-
Latvia	-9.6%	-11.7%	2.2%	35.3%
Lithuania	4.1%	-7.7%	11.8%	19.5%
Luxembourg	-2.3%	-2.2%	0.0%	19.4%
Hungary	6.3%	5.6%	0.7%	42.7%
Malta	NO	NO	NO	-
Netherlands	9.7%	2.4%	7.3%	44.3%
Austria	7.7%	9.5%	-1.8%	33.2%
Poland	7.2%	5.9%	1.3%	10.0%
Portugal	22.2%	26.4%	-4.2%	24.7%
Romania	7.3%	6.0%	1.3%	31.4%
Slovenia	4.9%	4.8%	0.1%	12.9%
Slovakia	-0.6%	4.8%	-5.4%	30.3%
Finland	-6.8%	-11.3%	4.5%	9.1%
Sweden	-17.7%	-27.8%	10.1%	4.9%
United Kingdom	-2.3%	-2.1%	-0.2%	45.0%
EU 28	3.8%	3.6%	0.2%	28.4%

Note: Malta started reporting of natural gas consumption only in 2017. Thus, there is no trend change calculated for natural gas consumption for Malta.

Source: Own calculation based on extraction from Eurostat database, MS inventory submission to UNFCCC, CRF table 1.A(b)

Carbon stored/Non-energy use

Trend changes of CO₂ emissions can also be influenced by the share of carbon stored in gaseous fuels if the share is changing between years. The influence on the trend change is stronger the higher the share of carbon stored in total carbon content. Table 3-15 shows the share of carbon stored in total carbon from gaseous fuel consumption for Member States with relevant shares of carbon stored in gaseous fuels.

Table 3-15: Member States with high (=>15 % in 2016 or 2017) shares of carbon stored in total carbon content of gaseous fuels consumed in 2016 and 2017

Member States	Carbon content (kt)	Carbon stored (kt C)	Share of carbon stored in total Carbon content (%)	2016		Share of carbon stored in total Carbon content (%)
				Carbon content (kt)	Carbon stored (kt C)	
	2016			2017		
Bulgaria	1,707	310	18%	1,750	296	17%
Croatia	1,387	264	19%	1,592	284	18%
Lithuania	1,172	535	46%	1,219	632	52%
Finland	1,299	205	16%	1,207	236	20%
Sweden	634	69	11%	618	210	34%

Source: GHG inventory data (CRF Table 1.A.(b)) for the year 2016 and 2017 from the 2019 submission to UNFCCC

Trend changes of gaseous fuel consumption are strongly influenced in Lithuania, Finland and Sweden which explain part of the differences found in Table 3-14, but also in the other listed Member States CO₂ emissions are influenced by changes of carbon stored from natural gas.

Differences in the data reported

According to Table 3-16 the differences in the reporting of natural gas under different data sources are rather small in most Member States. The comparison on the level of consumption of natural gas shows, that there are eight Member States that show differences in the reporting of natural gas of above 2 % in 2017. In comparison to 2016 reporting improved in Germany, Croatia, the Netherlands and Portugal, while for Slovakia and Sweden differences in the reporting between monthly and annual Eurostat data significantly increased. The highest absolute differences between Eurostat monthly and annual natural gas consumption are found for Germany, followed by the Romania in 2017.

Table 3-16: Differences in natural gas consumption between monthly and annual Eurostat data and GHG inventory data for the years 2016 and 2017

Member States	Eurostat monthly vs. Annual Eurostat		Difference monthly-annual Eurostat in TJ NCV		Eurostat monthly vs. GHG inventory		GHG inventory vs. Eurostat annual	
	2016	2017	2016	2017	2016	2017	2016	2017
Belgium	-3%	-3%	- 17,563	- 16,342	-3%	-3%	0%	0%
Bulgaria	-3%	-4%	- 2,958	- 4,749	-3%	-4%	0%	0%
Czech Republic	0%	0%	- 4	9	0%	0%	0%	0%
Denmark	0%	0%	- 529	- 360	0%	0%	0%	0%
Germany	5%	2%	156,901	66,763	2%	-1%	3%	3%
Estonia	0%	0%	-	35	0%	0%	0%	0%
Ireland	-1%	0%	- 2,229	173	-1%	0%	0%	0%
Greece	0%	0%	- 401	- 465	0%	0%	0%	0%
Spain	0%	0%	14	222	0%	-10%	0%	11%
France	0%	0%	575	278	0%	0%	0%	0%
Croatia	7%	5%	6,142	5,322	7%	5%	0%	0%
Italy	0%	0%	- 34	- 37	0%	0%	0%	0%
Cyprus	NO		-	-	NO		NO	
Latvia	3%	4%	1,339	1,541	2%	3%	1%	0%
Lithuania	0%	0%	3	- 207	-1%	0%	1%	0%
Luxembourg	0%	0%	-	- 1	0%	0%	0%	0%
Hungary	0%	0%	105	- 67	0%	0%	0%	0%
Malta	NO	0%	-	13	NO	0%	NO	0%
Netherlands	-5%	0%	- 67,360	5,019	-5%	0%	0%	0%
Austria	0%	-1%	- 313	- 2,094	0%	-1%	0%	0%
Poland	0%	1%	- 1,949	7,996	0%	1%	0%	0%
Portugal	4%	1%	7,259	2,154	3%	0%	1%	1%
Romania	6%	6%	21,875	25,320	6%	6%	0%	0%
Slovenia	2%	2%	534	597	2%	2%	0%	0%
Slovakia	1%	-5%	2,391	- 8,646	0%	-5%	1%	0%
Finland	0%	-1%	- 181	- 959	1%	2%	-1%	-3%
Sweden	0%	-28%	- 36	- 11,149	-1%	-30%	1%	2%
United Kingdom	0%	0%	- 6,832	- 6,860	0%	0%	0%	0%
EU 28	1%	0%	96,749	63,505	0%	-1%	1%	1%
<+/- 2%	18 MS	19 MS			19 MS	19 MS	25 MS	24 MS
+/-2-5%	4 MS	5 MS			4 MS	4 MS	1 MS	2 MS
> +/- 5%	4 MS	3 MS			3 MS	4 MS	0 MS	1 MS

Note: Differences are based on natural gas consumption in TJ for all data sources

Annual Eurostat data is 100%, for comparison of monthly Eurostat data and GHG inventory data, GHG inventory data is 100%

Source: Own compilation based on extraction from Eurostat database in the specific year, GHG inventory submission CRF table 1.A(b)

In comparison to liquid and solid fuel consumption natural gas is already a single fuel. Thus, the following Table 3-17 describes the differences.

Table 3-17: Description and further explanation of differences for gaseous fuel consumption as shown in Table 3-16

Member State

Bulgaria	Systematic over reporting of natural gas imports and exports under Eurostat monthly data. On the level of total natural gas consumption this level out, but some uncertainties remain.
Spain	There are large differences in the reporting of natural gas exports and imports between GHG inventory data and monthly/annual Eurostat data for the first time in 2017. Natural gas consumption under Eurostat data is underestimated compared to GHG inventory data.
Croatia	In 2017 differences between monthly and annual Eurostat data decreased slightly to 5%. Further differences in trend changes can be explained by changes in carbon stored, where the share of carbon stored decreases from 19 % in 2016 to 18 % in 2017.
Latvia	In 2017 differences between monthly and annual Eurostat data increased to 3.7%. There are differences in the reporting of all flows.
Slovakia	In 2017 differences between monthly and annual Eurostat/GHG inventory data increased to 5% due to differences in the reporting of exports and imports.
Sweden	Natural gas consumption under Eurostat monthly data was underestimated in 2017 in comparison to annual Eurostat data and GHG inventory data. It seems that only parts of natural gas imports were reported under monthly Eurostat data.

Source: Own compilation

3.3. Priorities

Table 3-18 indicates, based on the results of the early CO₂ estimates and the GHG inventory for the year 2017, for which Member States differences in the reporting between monthly and annual Eurostat data and GHG inventory data reveal. For some Member States that show systematic inconsistencies in the reporting of monthly Eurostat data the results do not reflect the reporting quality in Table 3-18. Differences based on changes in the share of carbon stored or due to improved reporting of monthly Eurostat data in 2017 will not be explained.

Table 3-18: Results and differences for the trend changes of CO₂ emissions for the year 2017 and priorities

Member States	Trend changes of early CO ₂ estimates	Trend changes in CO ₂ emissions based on GHG inventory data	Differences trend changes early estimates-GHG inventory	MS share in EU 28 total emission from fuel combustion	Priorities
	2017/2016		%	2017	
Belgium	-2.4%	-1.0%	-1.4%	2.4%	
Bulgaria	8.3%	6.6%	1.7%	1.4%	
Czech Republic	1.0%	-1.9%	3.0%	2.9%	Differences due to changes in the share of carbon stored in liquid fuels
Denmark	-5.8%	-4.2%	-1.6%	1.0%	
Germany	-0.2%	-0.8%	0.5%	23.2%	
Estonia	11.3%	-13.4%	24.7%	0.5%	Priority - liquid and solid fuels
Ireland	-2.9%	-4.2%	1.3%	1.1%	
Greece	4.0%	4.5%	-0.4%	2.1%	
Spain	7.4%	9.4%	-2.0%	7.8%	
France	3.2%	3.0%	0.2%	10.1%	
Croatia	1.2%	0.6%	0.6%	0.5%	
Italy	3.2%	-0.9%	4.1%	10.1%	Improved reporting of liquid fuels 2017
Cyprus	1.7%	3.5%	-1.8%	0.2%	
Latvia	-0.7%	1.1%	-1.8%	0.2%	
Lithuania	3.7%	3.4%	0.3%	0.3%	
Luxembourg	1.8%	1.6%	0.3%	0.3%	
Hungary	6.9%	3.6%	3.3%	1.4%	Calculation of solid fuels in TJ
Malta	12.8%	9.4%	3.3%	0.05%	Calculation of liquid fuels in TJ
Netherlands	2.3%	-2.2%	4.5%	4.8%	Improved reporting of natural gas 2017
Austria	3.0%	4.2%	-1.2%	1.7%	
Poland	3.8%	5.2%	-1.4%	9.7%	
Portugal	7.3%	8.7%	-1.4%	1.5%	
Romania	6.8%	7.5%	-0.6%	2.2%	
Slovenia	3.1%	-2.1%	5.2%	0.4%	Improved reporting of solid fuels 2017
Slovakia	3.7%	7.7%	-4.0%	0.9%	Improved reporting of liquid fuels 2017, Priority - natural gas
Finland	-5.9%	-7.7%	1.8%	1.2%	
Sweden	-7.0%	-3.4%	-3.6%	1.0%	Improved reporting of liquid and solid fuels 2017, Priority - natural gas
United Kingdom	-3.2%	-3.3%	0.1%	11.1%	

Note: Green: difference $\leq \pm 2\%$, Yellow: difference $\pm >2$ and $\leq 5\%$, Red: difference $> \pm 5\%$.

Source: Eurostat early CO₂ estimates, MS GHG inventory submissions to UNFCCC

3.3.1. Estonia

For Estonia the trend changes for CO₂ emissions from fossil fuel combustion for the year 2017/2016 between Eurostat early CO₂ estimates and GHG inventory calculation show a difference of 24.7 %.

- The trend change calculated with Eurostat monthly data is +11.3 % and GHG inventory data calculated a trend change of -13.4 %.
- Estonia contributes with a share of 0.5 % to EU 28 total CO₂ emissions and is therefore a very small country.
- In Estonia, liquid fuels have a share of less than 1 %, solid fuels 94 % and gaseous fuels 6 % in the total CO₂ emissions from fossil fuel combustion.
- The trend changes for liquid fuels show a difference of 327 %, the trend changes for solid fuels show differences of 26.9 % and the trend changes for gaseous fuels show differences of 2.7 %.

Liquid fuels

- Differences in the trend changes for liquid fuel consumption are mainly based on changes in the share of carbon stored between 2016 and 2017.

Solid fuels

- Differences in trend changes for solid fuel consumption are partly based on underestimation of monthly Eurostat data for oil shale in 2017.
- Differences are also based on recalculation of solid fuel consumption data for the year 2016 under 2019 inventory submission, where changes in the activity data but also in conversion factors appeared. The positive trend changes of +3% turned into a negative trend change of -8% when using recalculated data for 2016.

Table 3-19: Reporting of solid fuel consumption in Estonia from different data sources for the years 2016 and 2017

Estonia		2016	2017	Trend change 2017/2016
Fuel	Data sources	kt		%
Oil shale	Monthly Eurostat	16,737	19,863	119%
	Annual Eurostat	18,840	21,897	116%
	GHG Inventory	18,840	21,897	116%
	GHG Inventory recalculation	19,894	21,897	110%
		kt CO ₂		%
	GHG Inventory CO ₂ emissions recalculation (2016 = 2018 inventory submission)	14,636	15,109	103%
GHG Inventory CO ₂ emissions recalculation (2016 = 2019 inventory submission)	16,566	15,109	91%	

Source: Extraction from Eurostat database, GHG inventory data, CRF table 1.A(b),

3.3.2. Hungary

For Hungary the trend changes for CO₂ emissions from fossil fuel combustion for the year 2017/2016 between Eurostat early CO₂ estimates and GHG inventory calculation show a difference of 3.3 %.

- The trend change calculated with Eurostat monthly data is 6.9 %. With GHG inventory data a trend changes of 3.6 % is calculated.
- Hungary contributes with a share of 1.4 % to EU 28 total CO₂ emissions.
- In Hungary, liquid fuels have a share of 37 %, solid fuels 20 % and gaseous fuels 43 % in the total CO₂ emissions from fossil fuel combustion.
- The trend changes for liquid fuels show a difference of 4.1 %, the trend changes for solid fuels show differences of 7 % and the trend changes for gaseous fuels show differences of 0.7 %.

Liquid fuels

- Differences are due to changes in the share of carbon stored and not related to the reporting of monthly Eurostat data.

Solid fuels

- Hard coal consumption under monthly Eurostat data is underestimated in 2016 and overestimated in 2017 in comparison to GHG inventory data.
- Lignite is slightly overestimated in 2016 and underestimated in 2017.
- The conversion of solid fuel into TJ to calculate the trend change was contradictory, as this increased the consumption of hard coal due to the use of an NCV of 26.8 for hard coal and reduced the consumption of lignite due to the use of an NCV of 6.7.
- Differences between monthly Eurostat data and GHG inventory data increases for the trend change of total solid fuel, due to the conversion of solid fuel data to TJ.

Table 3-20: Reporting of solid fuel consumption in Hungary from different data sources for the years 2016, 2017

Hungary		2016	2017	Trend change 2017/2016	2016	2017	Trend change 2017/2016
Fuel	Data sources	kt		%	TJ		%
Hard Coal	Monthly Eurostat	1,357	1,636	121%	36,368	43,851	121%
	Annual Eurostat	1,535	1,518	99%	41,138	40,682	99%
	GHG Inventory	1,535	1,518	99%	41,138	40,682	99%
Lignite	Monthly Eurostat	9,160	8,131	89%	61,372	54,479	89%
	Annual Eurostat	9,046	8,143	90%	60,608	54,558	90%
	GHG Inventory	9,046	8,143	90%	60,608	54,558	90%
Total Solid fuels	Monthly Eurostat	10,134	9,535	94%	97,740	98,330	101%
	Annual Eurostat	10,195	9,428	92%	101,746	95,241	94%
	GHG Inventory	10,195	9,428	92%	101,746	95,241	94%

Note NCV for Hard Coal = 26.8, NCV for Lignite = 6.7

Source: Extraction from Eurostat database, GHG inventory data, CRF table 1.A(b)

3.3.3. Malta

For Malta the trend changes for CO₂ emissions from fossil fuel combustion for the year 2017/2016 between Eurostat early CO₂ estimates and GHG inventory calculation show a difference of 3.3 %.

- The trend change calculated with Eurostat monthly data is 12.8 % and GHG inventory data calculated a trend change of 9.4 %.
- Malta contributes with a share of 0.05 % to EU 28 total CO₂ emissions and is a very small country.
- In Malta, liquid fuels have a share of 63.5 % and gaseous fuel 36.5% in the total CO₂ emissions from fossil fuel combustion.
- The trend changes for liquid fuels show a difference of 2.9 %.
- In 2016 Malta reported a small amount of natural gas consumption for the first time under Eurostat data, while no natural gas consumption was reported under GHG inventory data for 2016. Natural gas consumption was not calculated based on trend changes.

Liquid fuels

The differences for the trend changes on liquid fuel consumption can be explained by calculation of trend changes in TJ instead of kt.

Table 3-21: Reporting of liquid fuel consumption in Malta from different data sources for the years 2016, 2017

Malta		2016	2017	Trend change 2017/2016
Fuel	Data sources	kt		
Liquid fossils	Monthly Eurostat	431	307	71.2%
	Annual Eurostat	446	325	72.8%
	GHG Inventory	442	309	69.9%
	<i>Monthly Eurostat in TJ</i>	<i>18,106</i>	<i>13,121</i>	<i>72.5%</i>

Source: Extraction from Eurostat database, GHG inventory data, CRF table 1.A(b)

3.3.4. Slovakia

For Slovakia the trend changes for CO₂ emissions from fossil fuel combustion for the year 2017/2016 between Eurostat early CO₂ estimates and GHG inventory calculation show a difference of -4.0 %.

- The trend change calculated with Eurostat monthly data is 3.7 %. With GHG inventory data a trend changes of 7.7 % is calculated.
- Slovakia contributes with a share of 0.9 % to EU 28 total CO₂ emissions.
- In Slovakia, liquid fuels have a share of 36 %, solid fuels 34 % and gaseous fuels 30 % in the total CO₂ emissions from fossil fuel combustion.
- The trend changes for liquid fuels show a difference of -8.2 %, the trend changes for solid fuels show differences of 2.2 % and the trend changes for gaseous fuels show differences of -5.4 %.

Liquid fuels

- Differences in trend changes are due to improved reporting of liquid fuel consumption under monthly Eurostat data and decreased share of carbon stored in 2018.

Natural gas

- Increasing differences in the reporting of natural gas in 2017 due to differences in stock changes.

Table 3-22: Reporting of natural gas consumption in Slovakia from different data sources for the years 2016, 2017

Slovakia		2016	2017	Trend change 2017/2016
Fuel	Data sources	TJ NCV		%
Natural gas	Monthly Eurostat	165,481	164,549	99%
	Annual Eurostat	163,090	173,195	106%
	GHG Inventory	165,065	173,955	105%

Source: Extraction from Eurostat database, GHG inventory data, CRF table 1.A(b)

3.3.5. Sweden

For Sweden the trend changes for CO₂ emissions from fossil fuel combustion for the year 2017/2016 between Eurostat early CO₂ estimates and GHG inventory calculation show a difference of -3.6 %.

- The trend change calculated with Eurostat monthly data is -7.0 %. With GHG inventory data a trend changes of -3.4 % is calculated.
- Sweden contributes with a share of 1 % to EU 28 total CO₂ emissions.
- In Sweden, liquid fuels have a share of 79 %, solid fuels 16 % and gaseous fuels 5 % in the total CO₂ emissions from fossil fuel combustion.
- The trend changes for liquid fuels show a difference of -3.1 %, the trend changes for solid fuels show differences of 16.4 % and the trend changes for gaseous fuels show differences of 10.1 %.

Liquid and solid fuels

- Improved reporting in 2017 and small differences in the share of carbon stored

Natural gas

- Increasing differences in the reporting of monthly Eurostat data. Monthly Eurostat data is underestimated in comparison to annual Eurostat data and GHG inventory data, as imports are only partly reported.
- Further differences are related with changing shares of carbon stored in 2017 and inventory recalculation.

Table 3-23: Reporting of natural gas consumption in Sweden from different data sources for the years 2016, 2017

Sweden		2016	2017	Trend change 2017/2016
Fuel	Data sources	TJ NCV		%
Natural gas	Monthly Eurostat	34,222	28,149	82%
	Annual Eurostat	34,258	39,299	115%
	GHG Inventory	34,434	40,068	116%
		kt CO ₂		%
	GHG Inventory CO ₂ emissions (2016 = 2018 submission)	1,861	1,496	80%
	GHG Inventory CO ₂ emissions recalculation (2016 = 2019 submission)	2,072	1,496	72%

Source: Extraction from Eurostat database, GHG inventory data, CRF table 1.A(b)

3.4. Early CO₂ emission estimates for the year 2018

3.4.1. Data improvements to correct trend changes of Eurostat monthly data

For calculating early CO₂ estimates for the year 2018 Eurostat monthly energy data for the year 2017 (as available in April 2018) and Eurostat monthly energy data for the year 2018 (as available in April 2019) have been used.

For improving the trend change analysis used to calculate 2018 CO₂ emissions the following adaptations were made:

- The trend changes were calculated based on physical units (kt) and energy units (TJ). For most countries the results are very similar. However, for **Hungary, Poland, Romania** and **Slovakia** the two approaches resulted in small differences for the trend changes for **solid fuels**. For these countries, trend changes for solid fuels calculated with energy units (TJ) have been used for the 2018 calculation of early CO₂ estimates.
- For **Estonia** the CO₂ emissions from **liquid fuel** consumption are based on direct calculation of the reference approach for 2018 and not based on trend changes as trend changes calculated from Eurostat data for liquid fuel consumption show unreliable trends.
- For **Finland** trend changes from gross inland deliveries observed of **hard coal** and **liquid fuels** were used for the 2018 calculation of early CO₂ estimates.
- As for **Sweden** monthly and annual data on **natural gas** differed notably for 2017 the emission change was calculated using the 2017 annual data.
- For **Malta** no CO₂ emissions from **natural gas** are reported in the reference approach of last UNFCCC submission (table 1.A(b)). However, in the sectoral approach (table 1.A(a)) of the UNFCCC submission natural gas consumption and CO₂ emissions from natural gas are reported. Malta commissioned a new gas-fired power station combined an LNG terminal in 2017. Therefore, the CO₂ emission value for 2017 from table 1.A(a) was used to calculate CO₂ emissions from natural gas.

3.4.2. Calculation of early CO₂ estimates for the year 2018

This chapter presents the calculation of early CO₂ emission estimates for the year 2018.

The following steps are taken to calculate early CO₂ emissions for 2018:

1. Calculation of trend changes of the fuel consumption for the aggregated fuel categories (liquid, solid, peat and natural gas) from Eurostat monthly energy data 2017 and 2018;
2. Calculation of CO₂ emissions for the four fuel categories by multiplying the trend changes with the CO₂ emissions of the GHG inventory data of the Reference Approach (CRF table 1.A(b) for the year 2017 (as available in April 2019).

Table 3-24 and Table 3-25 show the calculation of the early CO₂ emissions according to the different steps.

Table 3-24: Calculation of trend changes for liquid, solid and gaseous fuel consumption, 2018/2017

Member States	Monthly Eurostat data for liquid fuel consumption		Trend change liquids	Monthly Eurostat data for solid fuels without peat consumption		Trend change solids w.o.peat	Monthly Eurostat data for peat consumption		Trend change peat	Monthly Eurostat data for natural gas fuel consumption		Trend change natural gas
	2017	2018	2018/2017	2017	2018	2018/2017	2017	2018	2018/2017	2017	2018	2018/2017
			%			%			%			%
Belgium	21 418	20 745	97%	3 702	3 937	106%	NO	NO	-	590 158	606 920	103%
Bulgaria	4 344	4 308	99%	35 402	31 064	88%	NO	NO	-	110 901	105 021	95%
Czech Republic	9 037	8 973	99%	43 849	44 607	102%	NO	NO	-	301 500	285 469	95%
Denmark	6 390	6 400	100%	2 663	2 701	101%	NO	NO	-	114 664	111 493	97%
Germany	100 559	93 939	93%	218 511	211 287	97%	NO	NO	-	3 204 874	2 973 718	93%
Estonia	6	-94	-1567%	19 908	21 230	107%	9	0	0%	17 032	17 317	102%
Ireland	6 336	6 240	98%	2 200	1 272	58%	3 719	2 955	79%	180 732	187 226	104%
Greece	11 346	10 865	96%	38 037	36 751	97%	NO	NO	-	175 534	172 379	98%
Spain	50 927	51 573	101%	23 852	19 153	80%	NO	NO	-	1 141 812	1 133 960	99%
France	71 961	70 897	99%	15 630	13 860	89%	NO	NO	-	1 611 843	1 539 712	96%
Croatia	3 225	3 175	98%	685	624	91%	NO	NO	-	109 710	100 412	92%
Italy	50 993	49 867	98%	15 645	14 247	91%	NO	NO	-	2 576 897	2 491 753	97%
Cyprus	2 049	2 019	99%	5	23	446%	NO	NO	-	NO	NO	-
Latvia	1 349	1 380	102%	60	77	128%	1	13	1043%	43 114	50 067	116%
Lithuania	2 751	2 753	100%	267	287	107%	52	52	100%	80 240	80 592	100%
Luxembourg	2 160	2 274	105%	70	64	92%	NO	NO	-	29 020	28 624	99%
Hungary	7 257	7 528	104%	9 535	9 374	98%	NO	NO	-	357 555	345 820	97%
Malta	307	304	99%	NO	NO	-	NO	NO	-	10 133	11 894	117%
Netherlands	26 814	25 951	97%	15 347	13 074	85%	NO	NO	-	1 299 317	1 297 243	100%
Austria	11 520	11 718	102%	5 019	4 524	90%	NO	NO	-	323 490	308 095	95%
Poland	28 072	28 848	103%	127 608	129 472	101%	NO	NO	-	654 638	671 592	103%
Portugal	9 016	8 561	95%	5 499	4 555	83%	NO	NO	-	228 885	210 676	92%
Romania	9 430	9 593	102%	26 353	25 887	98%	NO	NO	-	428 090	415 982	97%
Slovenia	2 209	2 226	101%	3 769	3 713	99%	NO	NO	-	31 523	30 998	98%
Slovakia	3 682	3 813	104%	6 275	6 459	103%	NO	NO	-	164 549	159 136	97%
Finland	8 071	9 155	113%	4 651	4 268	92%	5 545	6 277	113%	80 130	89 301	111%
Sweden	10 115	9 710	96%	2 872	2 856	99%	403	462	115%	28 149	40 379	143%
United Kingdom	58 142	58 518	101%	15 373	12 714	83%	NO	NO	-	2 833 439	2 885 359	102%
EU 28	519 486	511 239	98%	642 787	618 079	96%	9 730	9 759	100%	16 727 927	16 351 135	98%

Source: Extraction from Eurostat database in the specific year

For calculating the early CO₂ emission estimates for the year 2018 some of the trend changes shown in Table 3-24 need to be adapted as explained in Chapter 3.4.1. Table 3-25 shows the final calculation of the early CO₂ estimates for the year 2018.

Table 3-25: Calculation of early CO₂ emissions for the year 2018

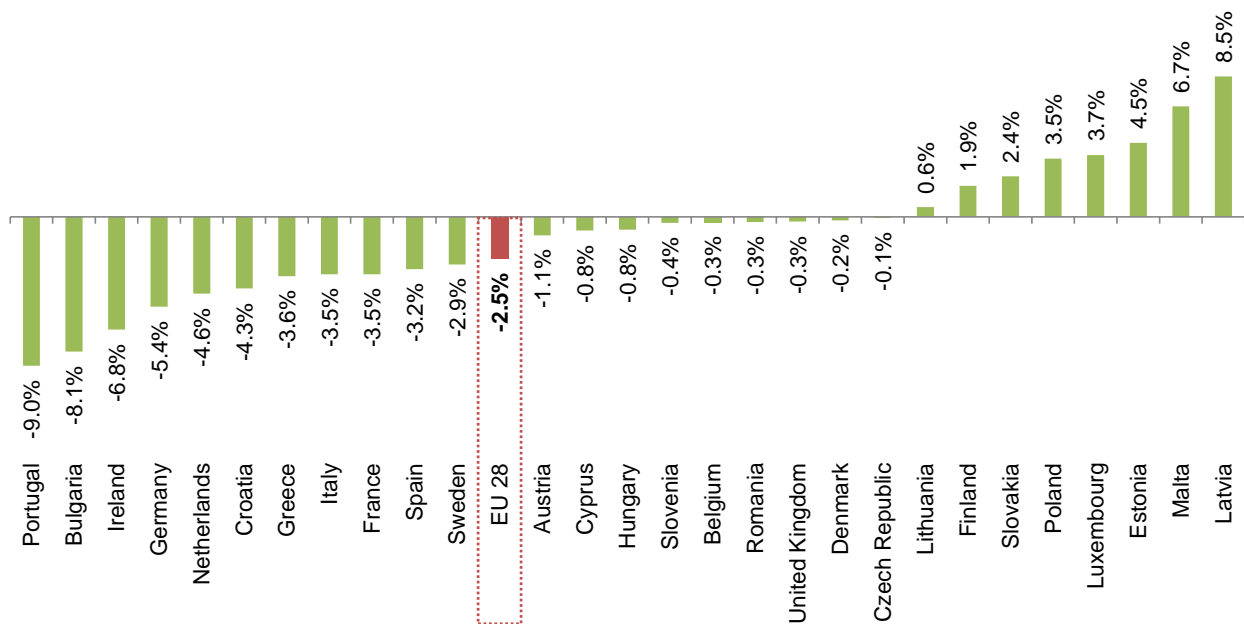
Member States	GHG Inventory data CO ₂ emissions from liquid fuels (UNFCCC 2019)	Trend change liquids without biofuels	CO ₂ emissions liquid fuels calculated with monthly Eurostat data	GHG Inventory data CO ₂ emissions from solid fuels without peat (UNFCCC 2019)	Trend change solids without peat	CO ₂ emissions solid fuels calculated with monthly Eurostat data	GHG Inventory data CO ₂ emissions from peat (UNFCCC 2019)	Trend change peat	CO ₂ emissions from peat calculated with monthly Eurostat data	GHG Inventory data CO ₂ emissions from natural gas (UNFCCC 2019)	Trend change natural gas	CO ₂ emissions natural gas calculated with monthly Eurostat data	CO ₂ emissions without waste and other fossils calculated with monthly Eurostat data		Trend change
	2017	2018/2017	2018	2017	2018/2017	2018	2017	2018/2017	2018	2017	2018/2017	2018	2017	2018	2018/2017
	Liquid Fossil Totals			Solid Fossil Totals			Peat ^(5,6)			Gaseous Fossil Totals					
	kt CO ₂	%	kt CO ₂	kt CO ₂	%	kt CO ₂	kt CO ₂	%	kt CO ₂	kt CO ₂	%	kt CO ₂	kt CO ₂	kt CO ₂	%
Belgium	41 328	97%	40 029	2 468	106%	2 625	NO	-	NO	31 500	103%	32 394	75 296	75 048	-0.3%
Bulgaria	13 027	99%	12 919	26 638	88%	23 374	NO	-	NO	5 330	95%	5 048	44 995	41 340	-8.1%
Czech Republic	20 430	99%	20 285	55 561	102%	56 521	NO,NA	-	NO,NA	16 530	95%	15 651	92 521	92 458	-0.1%
Denmark	18 175	100%	18 204	6 123	101%	6 209	NO	-	NO	6 556	97%	6 375	30 854	30 788	-0.2%
Germany	267 663	93%	250 042	295 409	97%	285 642	NO,NA	-	NO,NA	174 301	93%	161 729	737 372	697 413	-5.4%
Estonia ²	76	-298%	-226	15 151	107%	16 157	0	0%	0	915	102%	930	16 142	16 861	4.5%
Ireland	18 060	98%	17 787	4 361	58%	2 521	3 337	79%	2 651	10 093	104%	10 455	35 850	33 415	-6.8%
Greece	32 924	96%	31 528	25 011	97%	24 166	NO	-	NO	9 006	98%	8 844	66 941	64 538	-3.6%
Spain	138 654	101%	140 413	46 374	80%	37 238	NO,NA	-	NO,NA	62 406	99%	61 976	247 434	239 628	-3.2%
France	195 896	99%	192 999	38 292	89%	33 956	NO,NE	-	NO,NE	87 345	96%	83 436	321 532	310 392	-3.5%
Croatia	9 722	98%	9 571	1 549	91%	1 411	NO	-	NO	4 795	92%	4 389	16 067	15 371	-4.3%
Italy	139 196	98%	136 122	36 596	91%	33 326	NO	-	NO	146 841	97%	141 989	322 633	311 437	-3.5%
Cyprus	6 410	99%	6 316	12	446%	52	NO	-	NO	NO	-	NO	6 422	6 368	-0.8%
Latvia	4 070	102%	4 164	171	128%	219	4	1043%	44	2 318	116%	2 692	6 563	7 118	8.5%
Lithuania	8 100	100%	8 106	657	107%	706	146	100%	145	2 154	100%	2 164	11 057	11 121	0.6%
Luxembourg	6 656	105%	7 007	168	92%	154	NO,NA	-	NO,NA	1 642	99%	1 619	8 466	8 781	3.7%
Hungary ³	16 092	104%	16 693	8 633	96%	8 302	NO	-	NO	18 450	97%	17 844	43 175	42 840	-0.8%
Malta ⁴	775	99%	768	NO,NE	NA	NO,NE	NO	-	NO	552	117%	648	1 328	1 416	6.7%
Netherlands	48 245	97%	46 692	36 212	85%	30 849	NO	-	NO	67 190	100%	67 083	151 647	144 624	-4.6%
Austria	32 234	102%	32 788	3 149	90%	2 839	NO	-	NO	17 570	95%	16 734	52 954	52 361	-1.1%
Poland ³	76 175	103%	78 281	201 519	104%	209 396	NO	-	NO	30 818	103%	31 617	308 513	319 293	3.5%
Portugal	23 748	95%	22 550	12 862	83%	10 653	NO	-	NO	11 978	92%	11 025	48 588	44 227	-9.0%
Romania ³	26 926	102%	27 391	20 238	100%	20 168	53	100%	53	21 638	97%	21 026	68 855	68 638	-0.3%
Slovenia	6 656	101%	6 707	4 806	99%	4 734	NO,NA	-	NO,NA	1 697	98%	1 669	13 159	13 110	-0.4%
Slovakia ³	9 760	104%	10 108	9 295	106%	9 886	NO,NA	-	NO,NA	8 296	97%	8 023	27 352	28 017	2.4%
Finland ⁵	20 893	99%	20 649	8 850	98%	8 658	5 742	113%	6 500	3 559	111%	3 966	39 044	39 773	1.9%
Sweden ¹	24 213	96%	23 244	4 546	99%	4 521	480	115%	551	1 496	103%	1 537	30 736	29 852	-2.9%
United Kingdom	165 730	101%	166 802	29 085	83%	24 055	5	100%	5	159 634	102%	162 559	354 454	353 421	-0.3%
EU 28	1 371 834	98%	1 347 938	893 739	96%	858 339	9 766	102%	9 948	904 611	98%	883 424	3 179 949	3 099 648	-2.5%

Note: ¹ Correction of natural gas consumption, using annual data for 2017; ² Calculation of CO₂ emissions from liquid fuel consumption is based on direct calculation of the reference approach for 2018 and not based on trend changes; ³ Trend changes based on TJ are used for solid fuel consumption; ⁴ Emissions from natural gas consumption for 2017 are taken from table 1.A(a) as they are not reported under 1.A(b); ⁵ For liquid fuels and hard coal gross inland deliveries observed is used to calculate the trend changes.

Source: Eurostat database and Member States' inventory submissions UNFCCC 2019

Table 3-25 shows the results for early CO₂ estimates for the year 2018 based on the method described in section 2.1. These early estimates suggest that the CO₂ emissions from fuel combustion decreased for twenty Member States and increased in only eight Member States in 2018 in comparison to the year 2017 (see Figure 3-1). The calculations do not include CO₂ emissions from the new categories waste fuels and other fossil fuels, as there are no Eurostat monthly energy data available that could indicate the trend changes.

Figure 3-1: Relative changes in total fossil fuel consumption for all Member States for 2018/2017



Source: Eurostat early estimates

The early estimates indicate that CO₂ emissions from the energy sector decreased by 2.5 % for the EU-28 between 2017 and 2018.

To check if calculated trend changes are reliable, trend developments in net electricity generation, and of heating degree days as available in the Eurostat database has been used. A short explanation for decreases or increases in emissions in 2018 for Member States with emission changes larger than ± 5 % is provided below:

- Better conditions for generation of hydroelectricity in **Portugal** and **Bulgaria** led to substantial decreases of electricity generation from fossil fuels.
- Increases of electricity generation from wind and electricity imports led to decreased electricity generation from solid fuels in **Ireland**.
- In **Germany**, decreasing electricity generation from fossil fuels are compensated by increasing electricity generation from wind and solar and increased electricity imports. The strong decrease in natural gas consumption can also be explained by decreased heating degree days in comparison to 2017.
- **Estonia** increased the oil shale production in 2018 and increased the production of shale oil, which is mainly exported.

- In comparison to 2017 **Malta** further decreased electricity imports from Italy and uses the new gas-fired power station, thus electricity generation from natural gas increases.
- The decrease of electricity generation from hydro in **Latvia** led to increased electricity generation from natural gas combustion.

3.5. Summary and conclusion

The report verifies the results of the 2017 CO₂ estimates and shows the differences between the calculation of early CO₂ emission estimates and final GHG inventory CO₂ emission for the year 2017. It provides an analysis of the differences in the data sources used to calculate early CO₂ estimates and the final GHG inventory and finally presents the results of the early CO₂ estimates for the year 2018.

Results of the comparison of the early CO₂ estimates and final inventory data for the year 2017 show a good match on the level of the EU-28. Trend changes for total CO₂ emissions from energy consumption from the early CO₂ estimates show an increase between 2016 and 2017 by 1.7 % on the level of EU-28. Trend changes calculated with final GHG inventory data increased by 1.0 %. There are eighteen Member States with differences to final inventory data below 2 %, which contribute 70 % to total EU-28 emissions. Eight Member States show differences to final GHG inventory between 2 % and 5 % and contribute 29 % to final EU-28 emissions. Only two Member States show differences above 5 % contributing only 1 % to total EU-28 emissions. Thus, the early CO₂ estimates give an early and good indication on the development of the CO₂ emissions on the level of EU-28 and for most MS also on individual country level.

Most differences in the trend changes between early CO₂ estimates and final GHG inventory data can be explained by the quality of monthly Eurostat data. Improved data quality for the year 2017 affected the trend changes as well as deterioration of data quality in 2017. This might be caused by the fluctuation in monthly Eurostat data showing an over reporting in one year and an underreporting in the next year. Trend changes for the calculation of the early CO₂ estimates are only influenced by the data quality of monthly Eurostat data. The trend changes of the final GHG inventory data are further affected by changing shares in the amount of carbon stored in liquid, solid and gaseous fuels. This affects the results of the trend changes in Member States that show a high share of carbon stored in total fuel consumption. For carbon stored no data sources are available at the level of monthly energy statistics. Thus, this uncertainty will further remain in the methodology.

In Chapter 3.2 the differences between monthly Eurostat data, annual Eurostat data and GHG inventory data are analysed. This is done for each Member State and for the aggregated fuel categories liquid, solid and natural gas. The analysis starts at the most aggregated level of trend changes for CO₂ emissions from liquid, solid and gaseous fuels, followed by the level of aggregated liquid (in kt), solid (in kt) and gaseous fuel (in TJ NCV) consumption and ends up with explanations on the level of single fuel categories for differences above ± 3 % in total liquid, solid or gaseous fuel consumption. The analysis shows that on Member State level and on the level of aggregated fuel categories the differences are much larger than the results of the early CO₂ estimates propose. On the level of liquid, solid and gaseous fuel consumption the reporting quality is still fluctuating and thus influences the trend changes. However, for 2017 reporting of monthly Eurostat data seem to have improved, as differences to annual Eurostat data decreased in many Member States.

For the calculation of the 2018 early CO₂ estimates no large outliers or gaps could be identified in the monthly Eurostat data for 2018. Most Member States that were asked to confirm data or send corrected values confirmed their data. The early CO₂ estimates 2018 include corrections for some Member States as outlined in Chapter 3.4.1.

Finally, the application of the trend method to estimate early CO₂ emissions for all EU Member States represents a robust procedure that adjusts systematic errors of under- or over reporting in Eurostat monthly data. The advantage of the method is the simplicity that ensures a fast and straightforward calculation for each Member State. By applying the trend change method, inconsistencies in the reporting of Eurostat monthly energy data compared to Eurostat annual or GHG inventory data can be levelled out, if these inconsistencies persist throughout the entire time series of Eurostat monthly

energy data. For many Member States that show differences above 3 % between monthly Eurostat data and the other data sources (annual Eurostat data and GHG inventory data), the use of the trend change method levels out the differences and leads to good results for the early CO₂ estimates.

4. References

Eurostat data:

- Data from Eurostat database for monthly and annual fuel consumption for the years 2016 – 2018 normally extracted between mid and end April in the year after the reference year
- Monthly data on net electricity generation

Inventory data: Data as reported by Member States to the UNFCCC in CRF table

1.A.(b).Submissions 2019 for the year 2017: <https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2018>

IPCC 2006, *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, Prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). IGES, Japan.

5. Annex

5.1. Data tables

Table 5-1: Differences between monthly, annual Eurostat and GHG inventory data for fuel consumption

Member States	Year	Liquid fuels									Solid fuels									Natural gas										
		Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data		Difference Monthly Eurostat - GHG inventory data		Differences GHG inventory - annual Eurostat data		Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data		Difference Monthly Eurostat - GHG inventory data		Differences GHG inventory - annual Eurostat data		Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data		Difference Monthly Eurostat - GHG inventory data		Differences GHG inventory - annual Eurostat data			
		kt	kt	kt	%	kt	%	kt	%	kt	%	kt	%	kt	%	kt	%	kt	%	kt	%	kt	%	kt	%	kt	%	kt	%	
Belgium	2013	21,984	21,497	21,965	487	2%	19	0%	468	2%	3,994	4,970	4,917	-976	-20%	-923	-19%	-53	-1%	594,578	602,704	602,704	-8,126	-1%	-8,126	-1%	0	0%		
	2014	22,469	21,794	22,395	675	3%	74	0%	601	3%	4,678	4,848	4,849	-170	-4%	-171	-4%	1	0%	520,738	527,506	524,869	-6,768	-1%	-4,130	-1%	-2,638	0%		
	2015	22,943	22,384	22,379	559	2%	564	3%	-5	0%	4,618	4,660	4,690	-42	-1%	-72	-2%	30	1%	571,535	584,775	584,775	-13,240	-2%	-13,240	-2%	0	0%		
	2016	22,662	21,930	21,727	732	3%	935	4%	-203	-1%	4,246	4,284	4,314	-38	-1%	-68	-2%	30	1%	581,147	598,711	598,711	-17,563	-3%	-17,563	-3%	0	0%		
	2017	21,418	20,595	20,651	823	4%	767	4%	56	0%	3,702	3,817	3,890	-115	-3%	-188	-5%	73	2%	590,158	606,500	606,500	-16,342	-3%	-16,342	-3%	0	0%		
Bulgaria	2013	3,509	3,481	3,473	28	1%	36	1%	-8	0%	30,409	30,585	30,585	-176	-1%	-176	-1%	0	0%	96,513	99,977	99,977	-3,464	-3%	-3,464	-3%	0	0%		
	2014	3,680	3,858	3,847	-178	-5%	-167	-4%	-11	0%	33,281	33,369	33,370	-88	0%	-89	0%	1	0%	95,599	98,917	98,917	-3,318	-3%	-3,318	-3%	0	0%		
	2015	3,914	4,179	4,148	-265	-6%	-234	-6%	-31	-1%	37,020	36,926	36,926	94	0%	94	0%	0	0%	105,557	108,637	108,637	-3,081	-3%	-3,081	-3%	0	0%		
	2016	4,051	4,141	4,131	-90	-2%	-80	-2%	-10	0%	32,110	31,943	31,943	167	1%	167	1%	0	0%	109,521	112,479	112,479	-2,958	-3%	-2,958	-3%	0	0%		
	2017	4,344	4,328	4,317	16	0%	27	1%	-10	0%	35,402	34,617	34,617	785	2%	785	2%	0	0%	110,901	115,650	115,650	-4,749	-4%	-4,749	-4%	0	0%		
Czech Republic	2013	7,996	7,992	7,955	4	0%	41	1%	-37	0%	46,801	45,945	46,747	856	2%	54	0%	802	2%	289,558	290,832	291,435	-1,274	0%	-1,877	-1%	602	0%		
	2014	8,490	8,477	8,455	13	0%	35	0%	-22	0%	45,718	45,494	45,697	224	0%	21	0%	203	0%	258,585	258,833	259,389	-247	0%	-804	0%	556	0%		
	2015	8,305	8,415	8,376	-110	-1%	-71	0%	-39	0%	45,516	45,633	47,309	-117	0%	-1,793	-4%	1,676	4%	271,380	271,420	272,007	-40	0%	-628	0%	587	0%		
	2016	7,707	7,763	7,786	-56	-1%	-79	-1%	23	0%	45,189	45,982	47,006	-793	-2%	-1,817	-4%	1,024	2%	293,756	293,759	294,457	-4	0%	-701	0%	698	0%		
	2017	9,037	9,093	8,975	-56	-1%	62	1%	-118	-1%	43,849	44,393	46,444	-545	-1%	-2,595	-6%	2,051	5%	301,500	301,491	302,188	9	0%	-688	0%	697	0%		
Denmark	2013	6,303	5,950	5,930	353	6%	373	6%	-20	0%	5,485	5,364	5,479	121	2%	6	0%	115	2%	139,353	138,833	138,833	520	0%	520	0%	0	0%		
	2014	6,152	5,765	5,686	387	7%	466	8%	-79	-1%	4,447	4,041	4,293	406	10%	154	4%	252	6%	116,431	117,789	117,790	-1,358	-1%	-1,358	-1%	0	0%		
	2015	6,120	5,669	5,711	451	8%	409	7%	42	1%	2,952	3,154	3,154	-202	-6%	-202	-6%	0	0%	118,427	119,426	119,425	-999	-1%	-998	-1%	-1	0%		
	2016	6,328	5,748	5,792	580	10%	536	9%	44	1%	3,406	3,399	3,387	7	0%	19	1%	-12	0%	119,971	120,500	120,499	-529	0%	-528	0%	-1	0%		
	2017	6,390	6,015	6,053	375	6%	337	6%	38	1%	2,663	2,662	2,667	0	0%	-4	0%	4	0%	114,664	115,024	115,024	-360	0%	-360	0%	0	0%		
Germany	2013	98,991	99,857	100,479	-866	-1%	-1,488	-1%	622	1%	237,599	247,279	246,447	-9,680	-4%	-8,848	-4%	-832	0%	3,075,491	3,051,546	3,178,642	23,944	1%	-103,151	-3%	127,096	4%		
	2014	97,508	97,958	98,196	-450	0%	-688	-1%	238	0%	233,670	240,308	238,777	-6,638	-3%	-5,107	-2%	-1,531	-1%	2,738,165	2,681,949	2,688,044	56,216	2%	50,120	2%	6,095	0%		
	2015	98,438	98,201	95,370	237	0%	3,068	3%	-2,831	-3%	228,927	239,848	239,333	-10,921	-5%	#####	-4%	-515	0%	2,823,782	2,727,882	2,811,535	95,900	4%	12,247	0%	83,653	3%		
	2016	98,277	98,323	97,494	-46	0%	783	1%	-829	-1%	222,170	232,029	230,866	-9,859	-4%	-8,696	-4%	-1,163	-1%	3,101,490	2,944,589	3,035,561	156,901	5%	65,929	2%	90,972	3%		
	2017	99,870	99,577	100,965	293	0%	-1,095	-1%	1,388	1%	218,511	226,187	224,769	-7,676	-3%	-6,258	-3%	-1,418	-1%	3,221,126	3,154,364	3,241,764	66,763	2%	-20,638	-1%	87,400	3%		
Estonia	2013	310	415	413	-105	-25%	-103	-25%	-2	0%	20,649	20,770	20,770	-121	-1%	-121	-1%	0	0%	23,233	23,233	23,083	0	0%	0	0%	149	1%	-149	-1%
	2014	269	351	351	-82	-23%	-82	-23%	0	0%	20,556	20,906	20,906	-350	-2%	-350	-2%	0	0%	18,236	18,236	17,808	0	0%	428	2%	-428	-2%		
	2015	125	229	229	-104	-45%	-104	-45%	0	0%	17,381	18,052	18,061	-671	-4%	-680	-4%	9	0%	16,348	16,348	15,826	0	0%	522	3%	-522	-3%		
	2016	229	372	376	-143	-38%	-147	-39%	4	1%	16,774	18,980	18,982	-2,206	-12%	-2,208	-12%	2	0%	17,931	17,931	17,931	0	0%	0	0%	0	0%		
	2017	6	77	77	-71	-92%	-71	-92%	0	0%	19,818	22,074	22,063	-2,157	-10%	-2,146	-10%	-11	0%	17,032	16,997	17,031	35	0%	1	0%	34	0%		
Ireland	2013	5,792	5,946	5,762	-154	-3%	30	1%	-184	-3%	6,021	5,890	6,043	131	2%	-22	0%	153	3%	168,227	161,940	162,109	6,287	4%	6,118	4%	170	0%		
	2014	5,733	5,699	5,536	34	1%	197	4%	-163	-3%	6,270	5,707	5,688	563	10%	582	10%	-19	0%	162,531	155,855	155,787	6,676	4%	6,744	4%	-68	0%		
	2015	6,014	5,982	5,869	32	1%	145	2%	-113	-2%	6,567	5,840	5,981	727	12%	586	10%	141	2%	157,111	157,100	157,447	12	0%	-336	0%	348	0%		
	2016	6,522	6,344	6,163	178	3%	359	6%	-181	-3%	5,936	5,788	5,725	148	3%	211	4%	-63	-1%	175,372	177,602	177,983	-2,229	-1%	-2,610	-1%	381	0%		
	2017	6,336	6,057	6,001	279	5%	335	6%	-56	-1%	5,519	5,200	5,090	319	6%	429	8%	-110	-2%	180,732	180,559	180,680	173	0%	52	0%	121	0%		

Fuel		Liquid fuels										Solid fuels									Natural gas									
Member States	Year	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data					
		kt			kt	%	kt	%	kt	%	kt			kt	%	kt	%	kt	%	kt	%	TJ NCV			TJ NCV	%	TJ NCV	%	kt	%
Greece	2013	11,180	10,669	10,687	511	5%	493	5%	18	0%	53,193	54,688	54,688	-1,495	-3%	-1,495	-3%	0	0%	135,392	135,497	135,497	-104	0%	-104	0%	0	0%		
	2014	10,993	11,017	11,014	-24	0%	-21	0%	-3	0%	49,200	52,152	52,152	-2,952	-6%	-2,952	-6%	0	0%	103,783	104,013	104,013	-230	0%	-230	0%	0	0%		
	2015	11,493	11,729	11,502	-236	-2%	-9	0%	-227	-2%	41,372	44,548	44,548	-3,176	-7%	-3,176	-7%	0	0%	111,881	112,077	112,077	-196	0%	-196	0%	0	0%		
	2016	11,853	11,788	11,771	65	1%	82	1%	-17	0%	34,209	34,563	34,563	-354	-1%	-354	-1%	0	0%	145,707	146,108	146,108	-401	0%	-400	0%	0	0%		
	2017	11,346	11,356	11,283	-10	0%	63	1%	-73	-1%	38,037	38,438	38,438	-401	-1%	-401	-1%	0	0%	175,534	175,999	175,999	-465	0%	-465	0%	0	0%		
Spain	2013	46,235	46,305	45,467	-70	0%	768	2%	-838	-2%	20,420	20,633	20,633	-213	-1%	-213	-1%	0	0%	1,092,011	1,092,028	1,093,235	-16	0%	-1,223	0%	1,207	0%		
	2014	45,406	45,248	44,507	158	0%	899	2%	-741	-2%	21,961	21,477	21,477	484	2%	484	2%	0	0%	990,950	990,860	991,961	90	0%	-1,011	0%	1,101	0%		
	2015	46,844	47,782	47,024	-938	-2%	-180	0%	-758	-2%	21,520	24,641	24,653	-3,121	-13%	-3,133	-13%	12	0%	1,028,018	1,027,362	1,027,362	656	0%	656	0%	0	0%		
	2016	49,251	49,005	48,008	246	1%	1,243	3%	-997	-2%	20,129	19,136	19,136	993	5%	993	5%	0	0%	1,048,379	1,048,364	1,050,694	14	0%	-2,315	0%	2,330	0%		
	2017	50,927	51,749	50,745	-822	-2%	182	0%	-1,004	-2%	23,852	23,084	23,172	768	3%	680	3%	88	0%	1,141,812	1,141,590	1,268,433	222	0%	-126,621	-10%	126,843	11%		
France	2013	72,138	70,725	73,018	1,413	2%	-880	-1%	2,293	3%	20,052	18,824	21,317	1,228	7%	-1,265	-6%	2,493	13%	1,570,531	1,633,145	1,629,936	-62,614	-4%	-59,405	-4%	-3,209	0%		
	2014	71,208	69,896	73,144	1,312	2%	-1,936	-3%	3,248	5%	14,774	13,796	15,879	978	7%	-1,105	-7%	2,083	15%	1,364,721	1,364,669	1,355,461	52	0%	9,260	1%	-9,208	-1%		
	2015	71,180	70,628	73,722	552	1%	-2,542	-3%	3,094	4%	14,367	13,520	15,113	847	6%	-746	-5%	1,593	12%	1,477,662	1,467,062	1,434,662	10,600	1%	43,001	3%	-32,400	-2%		
	2016	69,994	68,242	70,810	1,752	3%	-816	-1%	2,568	4%	14,064	13,110	14,558	954	7%	-494	-3%	1,448	11%	1,603,653	1,603,078	1,603,079	575	0%	575	0%	1	0%		
	2017	71,961	71,028	73,383	933	1%	-1,422	-2%	2,355	3%	15,630	15,133	15,981	497	3%	-351	-2%	848	6%	1,611,843	1,611,565	1,612,881	278	0%	-1,037	0%	1,315	0%		
Croatia	2013	3,083	3,014	3,073	69	2%	10	0%	59	2%	1,146	1,139	1,138	7	1%	8	1%	-1	0%	87,207	95,537	95,537	-8,330	-9%	-8,329	-9%	0	0%		
	2014	2,903	2,955	3,044	-52	-2%	-141	-5%	89	3%	1,099	1,103	1,103	-4	0%	-4	0%	0	0%	79,616	84,549	84,620	-4,933	-6%	-5,005	-6%	72	0%		
	2015	2,982	3,142	3,174	-160	-5%	-192	-6%	32	1%	1,008	1,021	1,020	-13	-1%	-12	-1%	-1	0%	89,085	87,165	87,164	1,920	2%	1,920	2%	-1	0%		
	2016	3,022	3,074	3,324	-52	-2%	-302	-9%	250	8%	1,096	1,099	1,099	-3	0%	-3	0%	0	0%	97,018	90,877	90,877	6,142	7%	6,141	7%	0	0%		
	2017	3,225	3,301	3,445	-76	-2%	-220	-6%	144	4%	685	665	665	20	3%	20	3%	0	0%	109,710	104,388	104,689	5,322	5%	5,021	5%	301	0%		
Italy	2013	53,495	53,455	55,913	40	0%	-2,418	-4%	2,458	5%	21,783	21,632	21,330	151	1%	453	2%	-302	-1%	2,402,257	2,402,667	2,402,951	-410	0%	-694	0%	284	0%		
	2014	51,314	51,525	53,552	-211	0%	-2,238	-4%	2,027	4%	20,975	21,057	21,458	-82	0%	-483	-2%	401	2%	2,122,967	2,122,962	2,121,784	5	0%	1,183	0%	-1,178	0%		
	2015	52,175	53,492	53,821	-1,317	-2%	-1,646	-3%	329	1%	20,083	19,894	20,735	189	1%	-652	-3%	841	4%	2,315,403	2,315,363	2,314,079	40	0%	1,324	0%	-1,284	0%		
	2016	48,490	51,208	53,653	-2,718	-5%	-5,163	-10%	2,445	5%	17,723	17,755	17,541	-32	0%	182	1%	-214	-1%	2,431,642	2,431,676	2,431,965	-34	0%	-323	0%	289	0%		
	2017	50,993	51,669	52,172	-676	-1%	-1,179	-2%	503	1%	15,645	15,551	15,409	94	1%	236	2%	-142	-1%	2,576,897	2,576,934	2,577,241	-37	0%	-344	0%	307	0%		
Cyprus	2013	1,816	1,826	1,830	-10	-1%	-14	-1%	4	0%	NA	1	13	-	-	-	-	12	1200%	NO	NO	NO								
	2014	1,864	1,877	1,887	-13	-1%	-23	-1%	10	1%	4	4	4	0	0%	0	-4%	0	4%	NO	NO	NO								
	2015	1,882	1,891	1,901	-9	0%	-19	-1%	10	1%	6	6	6	0	0%	0	0%	0	0%	NO	NO	NO								
	2016	2,018	2,021	2,031	-3	0%	-13	-1%	10	0%	1	0	1	1	1	1	1	1	1	25%	NO	NO	NO							
	2017	2,049	2,063	2,083	-14	-1%	-34	-2%	19	1%	5	5	5	0	0%	0	0%	0	0%	0%	NO	NO	NO							

Fuel		Liquid fuels									Solid fuels									Natural gas																
Member States	Year	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data											
		kt			%		kt		%		kt		%		kt		%		kt		%		TJ NCV		TJ NCV		TJ NCV		%		%		kt		%	
Latvia	2013	1,105	1,254	1,192	-149	-12%	-87	-7%	-62	-5%	132	131	131	1	1%	1	1%	0	0%	50,200	50,438	50,544	-238	0%	-344	-1%	106	0%								
	2014	1,197	1,291	1,213	-94	-7%	-16	-1%	-78	-6%	100	105	98	-5	-5%	2	2%	-7	-7%	45,274	45,286	45,386	-13	0%	-112	0%	100	0%								
	2015	1,232	1,340	1,254	-108	-8%	-22	-2%	-86	-6%	70	82	83	-12	-15%	-13	-15%	1	1%	46,009	45,987	46,096	22	0%	-87	0%	109	0%								
	2016	1,276	1,323	1,230	-47	-4%	46	4%	-93	-7%	64	74	70	-10	-14%	-6	-8%	-4	-6%	47,678	46,338	46,935	1,339	3%	743	2%	597	1%								
	2017	1,349	1,378	1,355	-29	-2%	-6	0%	-23	-2%	62	73	75	-11	-16%	-13	-18%	2	3%	43,114	41,573	41,670	1,541	4%	1,444	3%	97	0%								
Lithuania	2013	2,193	2,189	2,372	4	0%	-179	-8%	183	8%	513	513	427	0	0%	86	20%	-86	-17%	90,554	90,624	90,608	-69	0%	-54	0%	-16	0%								
	2014	2,384	2,353	2,542	31	1%	-158	-6%	189	8%	428	367	443	61	17%	-15	-3%	76	21%	86,157	86,437	86,450	-280	0%	-293	0%	13	0%								
	2015	2,455	2,570	2,603	-115	-4%	-148	-6%	33	1%	328	288	346	40	14%	-18	-5%	58	20%	86,536	86,561	86,562	-25	0%	-26	0%	1	0%								
	2016	2,667	2,670	2,858	-3	0%	-191	-7%	188	7%	347	292	358	55	19%	-11	-3%	66	23%	77,107	77,104	77,542	3	0%	-435	-1%	438	1%								
	2017	2,751	2,766	2,941	-15	-1%	-190	-6%	174	6%	319	322	395	-3	-1%	-76	-19%	73	23%	80,240	80,447	80,447	-207	0%	-208	0%	1	0%								
Luxembourg	2013	2,365	2,372	2,363	-7	0%	2	0%	-9	0%	76	80	81	-4	-5%	-5	-6%	1	1%	37,259	37,258	37,258	1	0%	1	0%	0	0%								
	2014	2,209	2,232	2,225	-3	-1%	-16	-1%	-7	0%	78	90	91	-12	-13%	-13	-14%	1	1%	35,302	35,302	35,302	0	0%	0	0%	0	0%								
	2015	2,151	2,143	2,134	8	0%	17	1%	-9	0%	79	84	84	-5	-6%	-5	-6%	0	0%	32,193	32,194	32,194	-1	0%	-1	0%	0	0%								
	2016	2,088	2,089	2,091	-1	0%	-3	0%	2	0%	84	90	89	-6	-7%	-5	-6%	-1	-1%	29,689	29,689	29,689	0	0%	0	0%	0	0%								
	2017	2,160	2,266	2,148	-106	-5%	12	1%	-118	-5%	70	68	77	1	2%	-8	-10%	9	13%	29,020	29,020	29,020	-1	0%	-1	0%	0	0%								
Hungary	2013	5,784	5,524	5,662	260	5%	122	2%	138	2%	10,796	10,736	10,720	60	1%	76	1%	-16	0%	320,365	322,601	322,601	-2,237	-1%	-2,237	-1%	0	0%								
	2014	6,044	6,222	6,137	-178	-3%	-93	-2%	-85	-1%	10,359	10,314	10,299	45	0%	60	1%	-15	0%	292,156	292,307	292,307	-150	0%	-150	0%	0	0%								
	2015	6,583	6,700	6,669	-117	-2%	-86	-1%	-31	0%	10,329	10,448	10,493	-119	-1%	-164	-2%	45	0%	312,136	313,622	313,622	-1,486	0%	-1,486	0%	0	0%								
	2016	6,711	6,693	6,693	18	0%	18	0%	0	0%	10,140	10,202	10,202	-62	-1%	-62	-1%	0	0%	336,209	336,104	336,104	105	0%	105	0%	0	0%								
	2017	7,257	7,233	7,193	24	0%	64	1%	-40	-1%	9,535	9,428	9,428	107	1%	107	1%	0	0%	357,563	357,629	357,629	-67	0%	-67	0%	0	0%								
Malta	2013	712	733	773	-21	-3%	-61	-8%	40	5%	NO	NO	NO	-	-	-	-	-	NO	NO	NO	-	-	-	-	-	-	-	-	-	-					
	2014	730	769	762	-39	-5%	-32	-4%	-7	-1%	NO	NO	NO	-	-	-	-	-	NO	NO	NO	-	-	-	-	-	-	-	-	-	-					
	2015	527	533	548	-6	-1%	-21	-4%	15	3%	NO	NO	NO	-	-	-	-	-	NO	NO	NO	-	-	-	-	-	-	-	-	-	-					
	2016	431	446	442	-15	-3%	-11	-3%	-4	-1%	NO	NO	NO	-	-	-	-	-	-	NO	NO	NO	-	-	-	-	-	-	-	-	-	-				
	2017	307	325	309	-18	-5%	-2	-1%	-16	-5%	NO	NO	NO	-	-	-	-	-	-	NO	NO	NO	-	-	-	-	-	-	-	-	-	-				
Netherlands	2013	27,926	28,178	28,739	-252	-1%	-813	-3%	561	2%	12,890	13,056	13,668	-166	-1%	-778	-6%	612	5%	1,394,339	1,383,983	1,396,200	10,355	1%	-1,862	0%	12,217	1%								
	2014	26,657	29,664	26,397	-3,007	-10%	260	1%	-3,267	-11%	13,183	14,659	15,242	-1,476	-10%	-2,059	-14%	583	4%	1,217,665	1,207,294	1,207,180	10,371	1%	10,485	1%	-114	0%								
	2015	24,297	26,295	26,569	-1,998	-8%	-2,272	-9%	274	1%	14,005	17,984	18,602	-3,979	-22%	-4,597	-25%	618	3%	1,203,719	1,210,647	1,210,533	-6,928	-1%	-6,814	-1%	-114	0%								
	2016	26,776	26,863	27,366	-87	0%	-590	-2%	503	2%	16,540	16,498	17,153	42	0%	-613	-4%	655	4%	1,184,584	1,251,943	1,251,900	-67,360	-5%	-67,316	-5%	-43	0%								
	2017	26,814	27,666	26,645	-852	-3%	169	1%	-1,022	-4%	14,943	14,747	15,290	196	1%	-347	-2%	544	4%	1,299,317	1,294,298	1,294,200	5,019	0%	5,117	0%	-98	0%								
Austria	2013	12,032	11,448	11,680	584	5%	352	3%	232	2%	4,449	4,869	4,835	-420	-9%	-386	-8%	-34	-1%	290,772	293,567	293,566	-2,795	-1%	-2,794	-1%	-1	0%								
	2014	11,149	11,218	11,421	-69	-1%	-272	-2%	203	2%	4,563	4,441	4,441	122	3%	122	3%	0	0%	267,122	269,832	269,832	-2,710	-1%	-2,710	-1%	1	0%								
	2015	11,252	11,330	11,523	-78	-1%	-271	-2%	193	2%	4,998	4,802	4,802	196	4%	196	4%	0	0%	284,576	287,931	287,931	-3,355	-1%	-3,355	-1%	0	0%								
	2016	11,478	11,517	11,765	-39	0%	-287	-2%	248	2%	4,868	4,467	4,468	401	9%	400	9%	1	0%	300,378	300,691	300,691	-313	0%	-314	0%	0	0%								
	2017	11,520	11,663	11,636	-143	-1%	-116	-1%	-27	0%	5,019	4,599	4,599	421	9%	420	9%	0	0%	323,490	325,584	325,584	-2,094	-1%	-2,094	-1%	0	0%								

Fuel		Liquid fuels									Solid fuels									Natural gas										
Member States	Year	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data											
		kt			kt	%	kt	%	kt	%	kt			kt	%	kt	%	kt	%	kt	%	TJ NCV			TJ NCV	%	TJ NCV	%	kt	%
Poland	2013	21,781	21,538	21,593	243	1%	188	1%	55	0%	137,563	137,871	137,827	-308	0%	-264	0%	-44	0%	574,372	574,674	574,674	-302	0%	-302	0%	0	0%		
	2014	21,375	21,299	21,536	76	0%	-161	-1%	237	1%	129,964	130,418	131,324	-454	0%	-1,360	-1%	906	1%	562,338	561,217	561,217	1,121	0%	1,121	0%	0	0%		
	2015	22,927	22,674	22,979	253	1%	-52	0%	305	1%	129,973	128,034	129,398	1,939	2%	575	0%	1,364	1%	572,716	576,764	576,764	-4,048	-1%	-4,048	-1%	0	0%		
	2016	25,410	25,057	25,488	353	1%	-78	0%	431	2%	126,379	127,941	127,328	-1,562	-1%	-949	-1%	-613	0%	610,722	612,671	612,671	-1,949	0%	-1,949	0%	0	0%		
	2017	28,072	28,285	28,630	-213	-1%	-558	-2%	346	1%	127,608	128,283	133,881	-676	-1%	-6,274	-5%	5,598	4%	654,638	646,642	646,642	7,996	1%	7,996	1%	0	0%		
Portugal	2013	10,569	9,214	9,341	1,355	15%	1,228	13%	127	1%	4,450	4,449	4,410	1	0%	40	1%	-39	-1%	162,206	157,251	157,799	4,955	3%	4,407	3%	549	0%		
	2014	9,725	8,802	8,890	923	10%	835	9%	88	1%	4,519	4,526	4,377	-7	0%	142	3%	-149	-3%	149,900	145,422	146,369	4,478	3%	3,531	2%	947	1%		
	2015	9,918	9,083	9,322	835	9%	596	6%	239	3%	5,499	5,427	5,326	72	1%	173	3%	-101	-2%	166,504	170,575	172,791	-4,072	-2%	-6,287	-4%	2,216	1%		
	2016	9,102	9,212	9,250	-110	-1%	-148	-2%	38	0%	4,822	4,813	4,648	9	0%	174	4%	-165	-3%	187,278	180,019	181,806	7,259	4%	5,472	3%	1,787	1%		
	2017	9,016	8,920	8,907	96	1%	109	1%	-13	0%	5,499	5,420	5,307	80	1%	192	4%	-112	-2%	228,885	226,732	228,339	2,154	1%	546	0%	1,607	1%		
Romania	2013	8,095	7,987	8,139	108	1%	-44	-1%	152	2%	25,754	26,669	26,663	-915	-3%	-909	-3%	-6	0%	430,846	410,052	410,052	20,794	5%	20,794	5%	0	0%		
	2014	8,227	8,035	8,325	192	2%	-98	-1%	290	4%	25,840	26,979	26,929	-1,139	-4%	-1,089	-4%	-50	0%	404,690	392,065	392,065	12,625	3%	12,625	3%	0	0%		
	2015	8,617	8,730	8,859	-113	-1%	-242	-3%	129	1%	27,359	27,897	27,855	-538	-2%	-496	-2%	-42	0%	389,761	373,685	373,685	16,076	4%	16,076	4%	0	0%		
	2016	8,888	8,777	8,956	111	1%	-68	-1%	179	2%	24,592	24,887	24,004	-295	-1%	588	2%	-883	-4%	399,032	377,157	377,157	21,875	6%	21,875	6%	0	0%		
	2017	9,430	9,395	10,078	35	0%	-648	-6%	684	7%	26,353	27,191	25,604	-838	-3%	749	3%	-1,587	-6%	428,090	402,771	402,771	25,320	6%	25,320	6%	0	0%		
Slovenia	2013	2,163	2,332	2,330	-169	-7%	-167	-7%	-2	0%	4,045	4,487	4,487	-442	-10%	-442	-10%	0	0%	28,954	28,967	28,967	-13	0%	-13	0%	0	0%		
	2014	2,188	2,275	2,273	-87	-4%	-85	-4%	-2	0%	3,163	3,617	3,617	-454	-13%	-454	-13%	0	0%	26,241	26,210	26,210	31	0%	31	0%	0	0%		
	2015	2,161	2,228	2,228	-67	-3%	-67	-3%	0	0%	3,209	3,628	3,614	-419	-12%	-405	-11%	-14	0%	27,788	27,814	27,814	-25	0%	-26	0%	1	0%		
	2016	2,286	2,345	2,345	-59	-3%	-59	-3%	0	0%	3,373	3,786	3,786	-413	-11%	-413	-11%	0	0%	30,053	29,519	29,519	534	2%	533	2%	0	0%		
	2017	2,209	2,268	2,267	-59	-3%	-58	-3%	-1	0%	3,769	3,784	3,784	-15	0%	-15	0%	0	0%	31,523	30,925	30,927	597	2%	596	2%	2	0%		
Slovakia	2013	3,042	3,105	3,134	-63	-2%	-92	-3%	29	1%	6,657	6,902	6,902	-245	-4%	-245	-4%	0	0%	203,223	201,571	201,628	1,651	1%	1,595	1%	57	0%		
	2014	2,919	2,851	3,027	68	2%	-108	-4%	176	6%	6,522	6,524	6,305	-2	0%	217	3%	-219	-3%	133,253	157,940	157,818	-24,687	-16%	-24,565	-16%	-122	0%		
	2015	3,278	3,126	3,156	152	5%	122	4%	30	1%	6,350	6,413	6,413	-63	-1%	-63	-1%	0	0%	161,427	162,425	162,154	-998	-1%	-728	0%	-270	0%		
	2016	3,515	3,331	3,363	184	6%	152	5%	32	1%	6,124	6,260	6,260	-136	-2%	-136	-2%	0	0%	165,481	163,090	165,065	2,391	1%	416	0%	1,975	1%		
	2017	3,682	3,697	3,729	-15	0%	-47	-1%	32	1%	6,275	6,366	6,366	-91	-1%	-91	-1%	0	0%	164,549	173,195	173,955	-8,646	-5%	-9,406	-5%	760	0%		

Fuel		Liquid fuels									Solid fuels									Natural gas								
Member States	Year	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data	Cumulated Monthly Eurostat data	Annual Eurostat data	GHG inventory data	Difference Monthly Eurostat - Annual Eurostat data	Difference Monthly Eurostat - GHG inventory data	Differences GHG inventory - annual Eurostat data			
		kt			kt	%	kt	%	kt	%	kt			kt	%	kt	%	kt	%	TJ NCV			TJ NCV	%	TJ NCV	%	kt	%
Finland	2013	7,196	7,187	7,647	9	0%	-451	-6%	460	6%	11,337	11,507	11,719	-170	-1%	-382	-3%	212	2%	118,526	119,611	119,622	-1,085	-1%	-1,096	-1%	11	0%
	2014	8,196	8,598	8,117	-402	-5%	79	1%	-481	-6%	10,755	10,849	11,059	-94	-1%	-304	-3%	210	2%	104,086	105,223	105,243	-1,137	-1%	-1,157	-1%	20	0%
	2015	7,838	7,713	7,274	125	2%	564	8%	-439	-6%	9,712	10,002	10,154	-290	-3%	-442	-4%	152	2%	92,214	93,628	93,647	-1,414	-2%	-1,433	-2%	19	0%
	2016	8,461	8,431	8,240	30	0%	221	3%	-191	-2%	11,016	10,729	10,667	287	3%	349	3%	-62	-1%	86,014	86,195	85,029	-181	0%	985	1%	-1,166	-1%
	2017	8,071	7,659	7,690	412	5%	381	5%	31	0%	10,122	9,938	9,781	184	2%	341	3%	-157	-2%	80,130	81,089	78,866	-959	-1%	1,263	2%	-2,223	-3%
Sweden	2013	11,558	11,404	12,178	154	1%	-620	-5%	774	7%	3,252	3,669	3,669	-417	-11%	-417	-11%	0	0%	40,068	39,996	39,996	72	0%	72	0%	0	0%
	2014	11,471	11,325	11,746	146	1%	-275	-2%	421	4%	3,398	3,372	3,308	26	1%	90	3%	-64	-2%	33,245	33,245	33,396	0	0%	-150	0%	150	0%
	2015	9,558	9,642	9,894	-84	-1%	-336	-3%	252	3%	3,259	3,324	2,686	-65	-2%	573	21%	-638	-19%	30,279	30,296	30,450	-17	0%	-171	-1%	154	1%
	2016	10,770	11,403	10,470	-633	-6%	300	3%	-933	-8%	3,526	3,245	2,989	281	9%	537	18%	-256	-8%	34,222	34,258	34,434	-36	0%	-212	-1%	176	1%
	2017	10,115	10,085	10,463	30	0%	-348	-3%	378	4%	3,275	3,222	3,202	53	2%	74	2%	-20	-1%	28,149	39,299	40,068	-11,149	-28%	-11,919	-30%	769	2%
United Kingdom	2013	65,925	55,371	56,009	10,554	19%	9,916	18%	638	1%	61,027	60,778	61,270	249	0%	-244	0%	492	1%	2,747,482	2,750,037	2,756,655	-2,555	0%	-9,173	0%	6,618	0%
	2014	55,470	56,339	56,882	-869	-2%	-1,412	-2%	543	1%	48,781	48,722	49,559	59	0%	-778	-2%	837	2%	2,511,757	2,503,045	2,500,355	8,712	0%	11,402	0%	-2,690	0%
	2015	57,373	57,559	57,597	-186	0%	-224	0%	38	0%	39,005	38,629	38,066	376	1%	939	2%	-563	-1%	2,567,078	2,565,661	2,574,227	1,418	0%	-7,149	0%	8,566	0%
	2016	58,414	58,529	58,872	-115	0%	-458	-1%	343	1%	18,998	18,987	18,614	11	0%	384	2%	-373	-2%	2,899,030	2,905,862	2,904,152	-6,832	0%	-5,122	0%	-1,710	0%
	2017	58,142	58,612	59,125	-470	-1%	-983	-2%	513	1%	15,373	15,139	15,331	233	2%	42	0%	191	1%	2,833,439	2,840,300	2,838,442	-6,860	0%	-5,003	0%	-1,858	0%
EU 28	2013	515,278	500,968	509,118	14,310	3%	6,160	1%	8,150	2%	750,492	763,437	766,917	-12,945	-2%	#####	-2%	3,480	0%	16,163,517	16,188,567	16,334,109	-25,051	0%	-170,593	-1%	145,542	1%
	2014	497,930	499,693	503,107	-1,763	0%	-5,177	-1%	3,414	1%	718,286	729,245	732,747	-10,959	-2%	#####	-2%	3,502	0%	14,441,507	14,386,962	14,379,572	54,545	0%	61,935	0%	-7,390	0%
	2015	502,582	505,389	505,834	-2,807	-1%	-3,252	-1%	445	0%	695,512	714,785	719,449	-19,273	-3%	#####	-3%	4,664	1%	15,059,121	14,972,405	15,033,466	86,716	1%	25,655	0%	61,061	0%
	2016	508,677	508,645	512,496	32	0%	-3,819	-1%	3,851	1%	647,926	660,339	659,758	-12,413	-2%	#####	-2%	-581	0%	16,113,062	16,016,313	16,113,036	96,749	1%	26	0%	96,723	1%
	2017	573,486	574,738	585,161	-1,252	0%	-11,675	-2%	10,423	2%	651,639	660,406	666,331	-8,767	-1%	#####	-2%	5,924	1%	16,744,188	16,680,682	16,896,759	63,505	0%	-152,572	-1%	216,077	1%

Note: Green: difference ≤ ± 2%, Yellow: difference ± >2 and ≤ 5%, Red: difference > ± 5%

Differences for comparison of monthly and annual Eurostat data and annual Eurostat data and GHG inventory data: annual Eurostat data = 100 %, a positive value indicates that monthly data is higher than annual data; a negative value indicates that monthly data is lower than annual data. For comparison of monthly Eurostat data and GHG inventory data: GHG inventory data = 100%, a positive value indicates that monthly Eurostat data is higher than GHG inventory data; a negative value indicates that monthly Eurostat data is lower than GHG inventory data.

Source: Own compilation based on extraction from Eurostat database in the specific year, GHG inventory submission CRF table 1.A(b)

Table 5-2: Net calorific values used for the purposes of converting GHG inventory data in physical units and for calculating trend changes in TJ for the year 2017

			AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	HR	HU	IE	IT	
			2017															
			TJ/kt															
FUEL TYPYS																		
Liquid fossil	Primary fuels	Crude Oil	42.5	42.2	42.5		42.4	42.5	43.0		41.9	42.7	42.8	42.7	41.8	42.8	42.7	
		Orimulsion			50.0					27.7	39.0		42.5		49.4	27.5		
		Natural gas liquids	42.5	45.2									45.2	42.0	46.1	43.0		
	Secondary fuels	Gasoline	40.5	44.0	42.3	44.3	44.2	42.3	43.8	44.0	43.2	43.0	44.0	44.6	44.0	44.6	44.3	
		Kerosenes - Jet fuels	43.3	43.0	43.0	44.1	43.3	42.8	43.5	43.0	43.2	43.3	43.0	44.0	43.3	44.1	43.0	
		Other Kerosenes	43.3	43.0	43.0	44.1	43.3	42.8	43.5	43.0	43.2	43.3	43.0	44.0	43.3	44.1	43.0	
		Gas / Diesel Oil	42.4	42.6	42.0	43.0	42.8	42.5	42.7	42.3	43.0	43.1	42.6	42.7	43.0	43.3	42.6	
		Residual Fuel Oil	41.2	40.0	40.0	40.4	39.5	40.7	40.7	39.2	40.4	40.8	40.0	40.2	40.2	41.2	40.4	
		Liquefied Petroleum Gas (LPG)	46.1	46.0	46.0	47.3	45.9	45.4	46.0	45.5	45.2	46.2	46.0	46.9	46.2	47.2	46.0	
		Ethane												46.4		46.4		
		Naphtha	45.0	44.0	44.0		43.6	44.0	44.5		47.3	44.3	44.0	44.6	44.6	42.0	44.0	44.0
		Bitumen	41.8	39.0	37.7	40.2	40.2	39.0	39.8	40.2	40.2	40.2	39.0	33.5	37.7	37.7	39.0	
		Lubricants	41.8	42.0	42.3	40.2	39.2	41.8	41.9	40.2	40.2	40.2	42.0	33.5	39.8	42.3	42.0	
		Petroleum coke	30.8	32.0	31.4	32.5	39.4	32.0	31.4		32.6	33.5	32.0	31.0	34.2	32.0	32.0	
		Refinery feedstocks	42.7	42.2	40.4		40.3	42.5	42.7		43.0	42.5	41.9	42.7	41.8	44.6	41.9	
Other liquid fossil	Other oil + bitumen + lubricants		41.8	41.8	40.4	40.2	40.9	41.8	47.8		44.1	42.0	40.2	42.7	38.0	43.6	40.0	
Liquid fossil totals																		
Solid fossil	Primary fuels	Anthracite + Coking Coal + Other Bitu	28.3	26.3	26.7	25.7	22.3	27.0	24.3	27.2	22.4	25.5	26.0	25.1	26.8	25.3	25.3	
		Lignite	9.9		6.8		12.1	9.0		8.3	11.6		17.0	10.5	6.7	19.8	10.3	
		Oil Shale	9.9		6.8		12.1	9.0		8.3	11.6		17.0	10.5	6.7	19.8	10.3	
	Secondary fuels	BKB ⁽³⁾ and Patent Fuel	19.3	20.0	11.6		20.1	20.8	18.3						19.0	20.0		
		Coke Oven/Gas Coke	28.9	29.3	28.5		28.7	28.7	29.3	28.5	28.1	28.1	41.9	29.3	29.9		28.5	
Other Solid Fossil																		
Solid fossil totals																		
Gaseous fossil	Natural Gas (Dry)																	
Other Gaseous Fossil																		
Gaseous fossil totals																		
Waste (non-biomass fraction)																		
Other fossil fuels																		
Peat			9.8							10.4		10.1				8.8		
Total																		

			LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EL	
			2017													
FUEL TYPYS			TJ/kt													
Liquid fossil	Primary fuels	Crude Oil	42.8	42.3	42.3		42.7	42.3	42.6	41.3	41.6	42.9	42.0	43.4	42.3	
		Orimulsion					27.5	42.5	28.0	48.0	27.5		41.5	42.5		
		Natural gas liquids	44.2				44.0			49.5			42.4	45.5	41.6	
	Secondary fuels	Gasoline	44.8	43.0	44.0	44.3	43.0	44.0	43.8	44.0	44.0	43.9	43.9	44.8	42.8	
		Kerosenes - Jet fuels	43.2	43.1	43.2	43.8	43.5	43.0	43.0	48.6	43.0	43.5	43.3	43.9	44.1	
		Other Kerosenes	43.2	43.1	43.2	43.8	43.5	43.0	43.0	48.6	43.0	43.5	43.3	43.9	44.1	
		Gas / Diesel Oil	43.1	42.5	42.5	43.0	43.5	43.3	43.3	42.4	42.9	42.6	42.1	42.6	42.8	
		Residual Fuel Oil	43.1	40.0	40.6	40.0	41.0	40.4	40.2	40.4	40.4	41.4	40.4	40.7	40.6	
		Liquefied Petroleum Gas (LPG)	46.4	46.0	45.5	46.0	45.2	46.0	46.0	48.1	46.1	46.1	46.0	46.0	47.3	
		Ethane					45.2				49.5				45.9	
		Naphtha					44.0	44.0	44.0	44.0	44.0			44.0	45.3	44.5
		Bitumen	39.0	40.2	41.9		41.9	39.0	39.0	35.2	39.0	40.2	40.2	40.2	40.5	40.2
		Lubricants	42.0	40.2	41.9	42.0	41.4	42.0	42.0	35.2	42.0	40.2	39.2	42.9	40.2	
		Petroleum coke		32.5			35.2	32.0	32.0	34.3	34.8	33.6	35.0	34.0	32.1	
		Refinery feedstocks	42.2				43.0	42.5	44.0	43.0	44.2		42.0	42.0	43.0	
Other liquid fossil	Other oil + bitumen + lubricants		40.0	42.5	41.9	40.2	43.6	38.5	43.7	39.8	40.2	34.0	41.9	43.6	40.2	
Liquid fossil totals																
Solid fossil	Primary fuels	Anthracite + Coking Coal + Other Bitu	25.1	24.4	23.7		25.2	22.4	25.6	26.0	27.4	27.3	26.4	25.8	25.2	
		Lignite	15.0	22.2			20.0	8.2	16.4	7.7		11.7	10.7		5.3	
		Oil Shale	15.0	22.2			20.0	8.2	16.4	7.7		11.7	10.7		5.3	
	Secondary fuels	BKB ⁽³⁾ and Patent Fuel	15.0	22.2			20.7	20.0					28.0	20.7		
		Coke Oven/Gas Coke	29.3	28.5	26.8		28.5	28.5	29.4	26.4	28.1	30.0	28.7	29.8		
Other Solid Fossil																
Solid fossil totals																
Gaseous fossil	Natural Gas (Dry)															
Other Gaseous Fossil																
Gaseous fossil totals																
Waste (non-biomass fraction)																
Other fossil fuels																
Peat			11.7		10.1		9.8				8.8	10.8		9.8		
Total																

Note: There might be small differences for NCVs used for calculating early CO₂ estimates in TJ and for converting GHG inventory data in physical units. This is due to inconsistencies that could only be identified after comparison of GHG inventory data with annual Eurostat data

Source: Database Eurostat annual data, GHG inventory data, IPCC 2006 GL

5.2. Data gaps and Outliers in 2018 monthly Eurostat data

Table 5-3: List of gaps for individual months examined in the monthly fuel data for the year 2018

Country	Product	Flow	2018M01	2018M02	2018M03	2018M04	2018M05	2018M06	2018M07	2018M08	2018M09	2018M10	2018M11	2018M12	Summe
BE	Gas / Diesel Oil	Total Imports	1,413	1,010	916	785	918	614	822	571	797	655	645	754	9,900
BG	Crude Oil	Total Imports	590	403	0	312	478	558	631	644	474	654	549	559	5,852
BG	Gas / Diesel Oil	Total Exports	58	53	14	23	45	67	89	104	74	130	104	202	963
BG	Gas / Diesel Oil	Total Imports	63	58	83	38	50	44	84	80	56	78	79	79	792
BG	Residual Fuel Oil	Total Exports	44	85	47	73	68	163	84	42	85	42	85	35	853
BG	Motor Gasoline	Total Exports	130	101	9	9	10	163	146	142	131	143	139	139	1,262
CZ	Crude Oil	Total Imports	588	633	609	343	561	636	733	663	614	685	671	703	7,439
DE	Naphtha	Total Imports	607	704	364	514	632	432	567	508	495	483	464	639	6,409
DK	Other Kerosene	Total Imports	0	0	0	0	0	0	0	0	0	0	0	0	0
DK	Refinery Feedstox	Total Exports	11	38	20	72	90	21	116	46	129	35	88	11	677
ES	Residual Fuel Oil	Total Imports	547	551	834	624	528	463	494	560	663	468	579	502	6,813
FI	NGL	Total Imports	31	31	225	35	36	36	49	136	121	106	14	106	926
FI	Residual Fuel Oil	Total Imports	41	35	54	27	0	0	24	49	44	47	74	39	434
FI	Motor Gasoline	Total Exports	279	232	323	107	151	151	225	322	228	287	304	82	2,691
FR	Jet Kerosene	International bunkers	350	350	350	350	350	350	350	350	350	350	350	350	4,200
FR	Gas / Diesel Oil	Total Exports	139	148	173	146	133	135	195	189	104	214	111	401	2,088
FR	Gas / Diesel Oil	Total Imports	1,869	1,867	1,648	2,124	1,936	2,067	1,774	2,148	1,312	1,634	1,740	2,168	22,287
HU	Crude Oil	Total Imports	533	512	576	468	517	553	778	639	510	498	568	525	6,677
IE	Crude Oil	Total Exports	0	0	0	0	0	0	0	0	0	0	0	0	0
IE	Motor Gasoline	Total Imports	33	61	72	28	37	39	31	25	37	31	34	128	556
IE	Natural Gas	Stock Changes	0	0	0	0	0	0	0	0	0	0	0	0	0
LT	Crude Oil	Total Imports	848	888	684	399	798	882	882	902	748	1,023	798	801	9,653
LT	Gas / Diesel Oil	Total Exports	257	208	225	87	244	214	209	285	211	240	288	259	2,727
LT	Residual Fuel Oil	Total Exports	161	132	151	10	155	169	120	130	80	151	154	226	1,639
LV	Natural Gas	Total Imports	681	21	283	359	1,220	2,173	10,656	14,232	17,119	6,651	1,962	1,416	56,772
LV	Natural Gas	Stock Changes	-8,460	-9,468	-8,803	-2,867	-563	42	5,744	11,197	14,291	2,515	-4,639	-5,679	-6,689
SK	Naphtha	Total Exports	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	Crude Oil	Total Exports	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	Gas / Diesel Oil	International bunkers	10	0	0	39	46	41	51	49	34	39	39	37	385
SE	Residual Fuel Oil	International bunkers	6	0	0	111	120	117	100	123	117	176	161	241	1,272
UK	Crude Oil	Total Imports	3,440	1,765	3,304	3,255	3,465	3,534	3,815	4,018	3,549	3,639	3,638	4,040	41,462

Note: This table shows the most relevant gaps and outlier found in the 2018 monthly Eurostat data. Stock changes are not included here.

Source: Extraction from Eurostat database March/April 2019

5.3. Differences for calculation of 2018 early CO₂ estimates for trend changes calculated in TJ and in kt

Table 5-4: Differences for calculation of 2018 early CO₂ estimates for trend changes calculated in TJ and kt for liquid and solid fuels

	Trend changes Liquid fuels kt	Trend changes Liquid fuels TJ	Differences	Trend changes Solid fuels kt	Trend changes Solid fuels TJ	Differences
	2018/2017			2018/2017		
Belgium	-3.1%	-3.0%	0.1%	6.3%	6.4%	0.1%
Bulgaria	-0.8%	-0.9%	-0.1%	-12.3%	-12.9%	-0.7%
Czech Republic	-0.7%	-0.7%	0.0%	1.7%	0.9%	-0.8%
Denmark	0.2%	0.2%	0.0%	1.4%	1.4%	0.0%
Germany	-6.6%	-6.6%	0.0%	-3.3%	-3.7%	-0.4%
Estonia	-397.8%	-97.9%	299.9%	6.6%	6.5%	-0.1%
Ireland	-1.5%	-1.6%	0.0%	-42.2%	-42.2%	0.0%
Greece	-4.2%	-4.1%	0.2%	-3.4%	-2.7%	0.7%
Spain	1.3%	0.9%	-0.4%	-19.7%	-18.9%	0.8%
France	-1.5%	-1.5%	0.0%	-11.3%	-10.2%	1.1%
Croatia	-1.6%	-1.1%	0.5%	-8.9%	-8.3%	0.6%
Italy	-2.2%	-2.2%	0.0%	-8.9%	-9.0%	-0.1%
Cyprus	-1.5%	-1.2%	0.3%	346.2%	346.2%	0.0%
Latvia	2.3%	2.2%	-0.1%	28.0%	28.0%	0.0%
Lithuania	0.1%	0.4%	0.4%	7.4%	7.7%	0.3%
Luxembourg	5.3%	5.2%	-0.1%	-8.3%	-8.4%	-0.1%
Hungary	3.7%	3.5%	-0.3%	-1.7%	-3.8%	-2.1%
Malta	-1.0%	0.0%	1.0%	-	-	-
Netherlands	-3.2%	-3.0%	0.2%	-14.8%	-15.2%	-0.4%
Austria	1.7%	1.8%	0.0%	-9.9%	-10.2%	-0.3%
Poland	2.8%	2.8%	0.0%	1.5%	4.0%	2.5%
Portugal	-5.0%	-5.0%	0.1%	-17.2%	-17.2%	0.0%
Romania	1.7%	1.4%	-0.4%	-1.8%	-0.3%	1.4%
Slovenia	0.8%	0.7%	0.0%	-1.5%	-1.5%	0.0%
Slovakia	3.6%	4.1%	0.5%	2.9%	6.4%	3.4%
Finland	13.4%	14.2%	0.8%	-8.2%	-8.2%	0.0%
Sweden	-4.0%	-3.8%	0.2%	-0.6%	-0.6%	0.0%
United Kingdom	0.6%	0.7%	0.0%	-17.3%	-17.3%	0.0%

Source: Own calculation based on monthly Eurostat data 2017 and 2018 and GHG inventory data 2019 submission for the year 2017