EU greenhouse gas inventory

Key trends and drivers in greenhouse gas emissions in the EU in 2015 and over the past 25 years

This briefing summarises the main findings of the EU's 2017 greenhouse gas (GHG) inventory submission under the United Nations Framework Convention on Climate Change (UNFCCC) and of the EEA's analysis of GHG emission trends in the EU between 1990 and 2015. It is underpinned by a more in-depth EEA report analysing the major factors behind changes in GHG emissions in the EU: Analysis of key trends and drivers in greenhouse gas emissions in the EU between 1990 and 2015.

- EU GHG emissions increased by 0.5 % in 2015 compared with 2014, following a 4 % decrease the previous year. This increase can be attributed mainly to road transport and the residential sector. Road transport emissions increased for the second year in a row.
- Over a 25 year period (1990-2015), the EU reduced its GHG emissions by 24 %[1]. This decrease was a combined result of policies (e.g. more renewables and energy efficiency, and less use of coal compared to other fossil fuels), economic factors (e.g. recession and a more service-oriented economy) and climatic conditions (e.g. overall milder winters).

GHG emissions up in 2015 because of road transport and the residential sector

In 2015, total GHG emissions increased by 23 million tonnes (+ 0.5 %) compared with 2014, to reach 4 310 million tonnes of carbon dioxide equivalent ($MtCO_2e$). It was the first increase since 2010 and although modest, it followed a 4 % decrease in 2014 and came alongside an increase in GDP of 2.2 %, the largest GDP increase since the economic crisis began in the second half of 2008. Overall, in 2015, GHG emissions and economic growth continued their two-decade long, uninterrupted decoupling trend.

Spain, Italy and the Netherlands accounted for the largest increases in GHG emissions, in absolute terms, in the EU in 2015, while a very large decrease took place in the United Kingdom (Figure 1).

Total energy consumption (and energy-related emissions) increased overall in 2015, driven by an increased use of natural gas and crude oil. But the reduced use of solid fuels (for the third consecutive year) and the sustained increase in the use of renewables, particularly biomass, wind and solar, offset otherwise higher emissions. Electricity production from hydro and nuclear energy declined in 2015.

The increase in energy use and related emissions was triggered by a higher demand for heat from the residential and commercial sectors, as a result of slightly-colder winter conditions in Europe during 2015 compared with 2014. The year 2014 was the hottest year on record in Europe and the second hottest worldwide, whereas 2015 was the hottest year worldwide and the second hottest in Europe.

Road transport demand, and subsequently road transport GHG emissions, increased for the second year in a row, confirming the upward trend in emissions that started in 2014. In 2015, these emissions accounted for 20 % of total GHG emissions, up 1.6 % over 2014. This increase can be attributed mainly to higher diesel consumption in passenger cars, but also in heavy- and light-duty vehicles.

Neither road transportation nor the residential sectors are covered by the EU emissions trading system (ETS), which explains why overall net emissions increased in spite of the reduction in EU ETS emissions the same year. In fact, ETS emissions for stationary installations decreased by 0.7 %, whereas emissions from the non-trading sectors increased by 1.4 % in 2015.

Despite this increase in emissions in 2015, the carbon intensity of the EU energy system decreased, because of the increased shares of renewables and gas relative to coal in the fuel mix. The EU economy was also less energy intensive overall, as demonstrated by the fact that total energy consumption increased less rapidly than gross domestic product (GDP). The improvement in energy intensity was largely driven by lower transformation losses and better energy efficiency.

Perhaps one of the most positive developments in 2015 was the decrease in emissions from refrigeration and air conditioning, which has halted the almost exponential increase of hydrofluorocarbon (HFC) emissions since 1990. Spain was mostly responsible for this decrease.

EU reduces GHG emissions by 24 % in 25 years

Total GHG emissions in the EU (excluding LULUCF) decreased by 1 337 million tonnes between 1990 and 2015 (an overall reduction of 23.7 %). They reached their lowest level during this period in 2014 before increasing slightly in 2015 to 4 308 $MtCO_2e$. The reduction amounts to 22.1 % compared with 1990 if emissions from international aviation are included. There has been a progressive decoupling of GDP and GHG emissions since 1990, with an increase in GDP of about 50 % alongside a decrease in emissions of almost 24 % over the period.

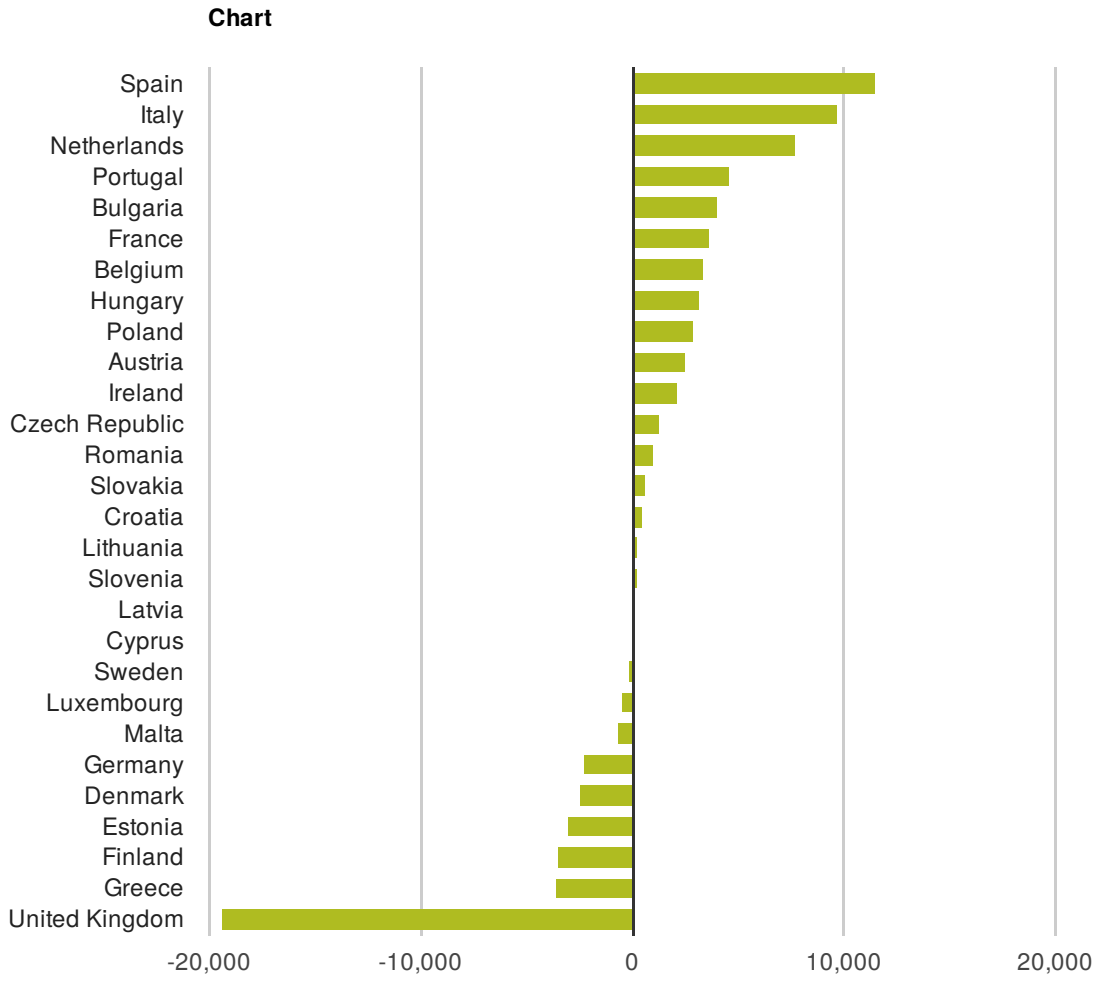
The reduction in greenhouse gas emissions over these 25 years can be put down to a variety of factors, including:

- the effects of a number of policies (both EU and country-specific), including key agricultural and environmental policies in the 1990s, and climate and energy policies in the 2000s. These include, among others:
  - the growing use of energy from renewable sources, in particular the strong increase in the use of biomass for energy purposes,
  - the use of less carbon intensive fossil fuels (e.g. switch from coal to gas), and
  - improvements in energy efficiency;
- structural changes in the economy;
- the effects of economic recession;
- the milder winters experienced in Europe on average since 1990, which has reduced the demand for energy to heat households.

GHG emissions decreased in the majority of sectors between 1990 and 2015, with the notable exception of transport, and refrigeration and air conditioning (Figure 2). The largest emission reductions were related to energy use in sectors such as manufacturing industries and construction, electricity and heat production, and residential combustion. The largest decrease in emissions in relative terms was in waste management (through reduced and better controlled landfilling).

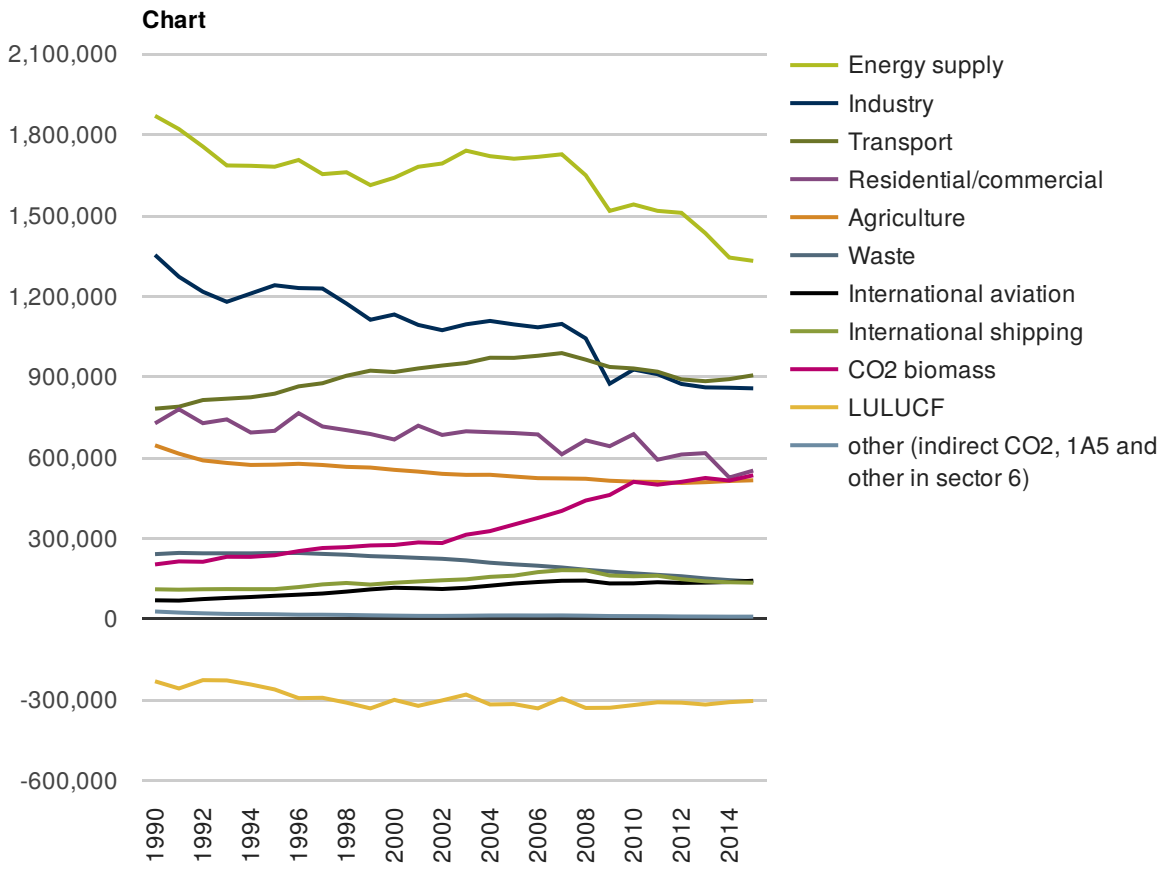
Almost all EU Member States reduced their emissions compared with 1990 and thus contributed to the overall positive EU performance (Figure 3). The United Kingdom and Germany accounted for about 48 % of the total net reduction in the EU over the past 25 years. The main reasons for the favourable trend in Germany were an increase in the efficiency of power and heating plants, and the economic restructuring of the five new Länder after the German reunification, particularly in the iron and steel sector. Lower GHG emissions in the United Kingdom were primarily the result of liberalising energy markets and the subsequent fuel switch from oil and coal to gas in electricity production.

Figure 1. Change in total GHG emissions, excluding land use, land-use change and forestry (LULUCF), between 2014 and 2015



Data sources: EEA. National emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism

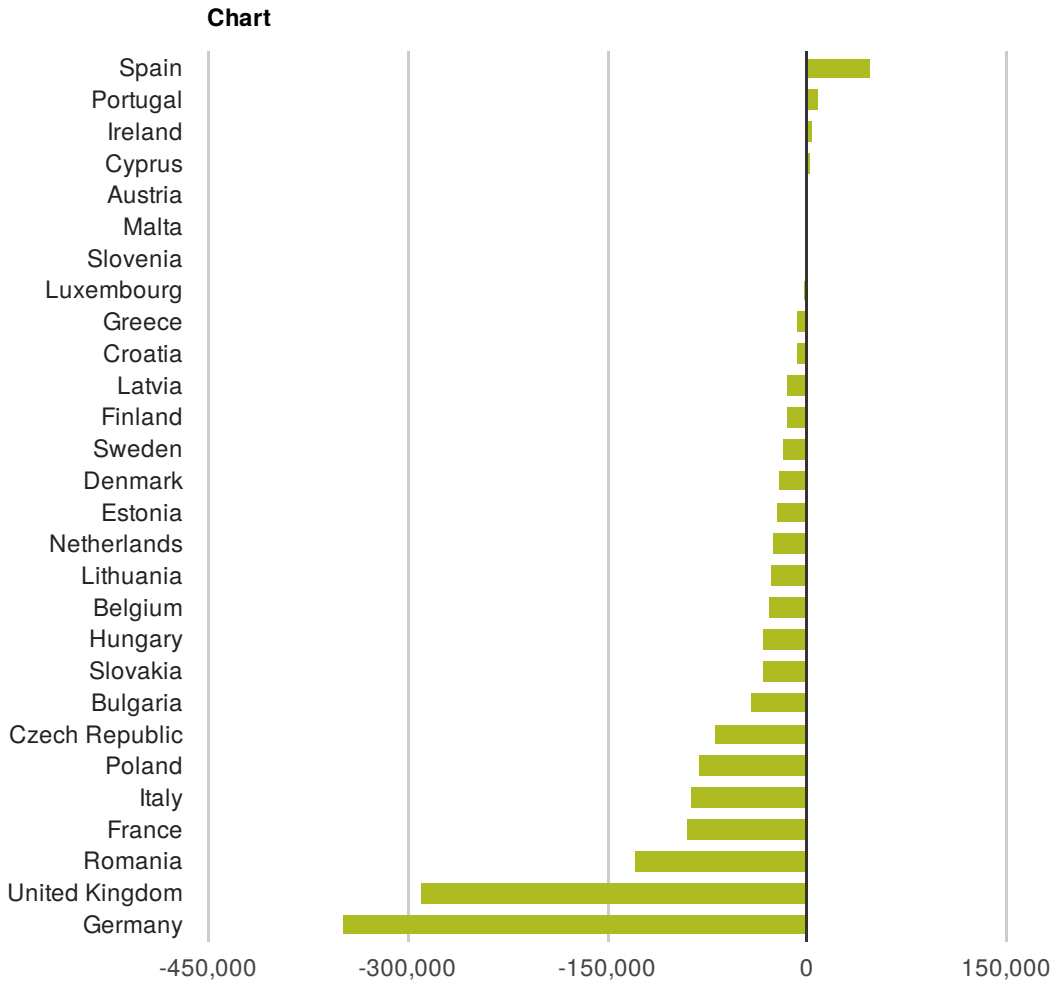
Figure 2. GHG emissions by aggregated sector in the EU-28 (kt CO_2 eq.)



Note: See also sectoral trends in GHG emissions at country level

Data sources: EEA. National emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism

Figure 3 Change in total GHG emissions, excluding LULUCF, 1990-2015



Data sources: EEA. National emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism

Footnote

[1] The figures included in this briefing exclude emissions from international aviation. Total GHG emissions reported under the UNFCCC, exclude net emissions from the land use and forestry sectors, as well as emissions from international aviation and shipping. However, the EU GHG emission targets include emissions from international aviation. If these are taken into account, the GHG reduction compared to 1990 is 22 %.

Climate change mitigation

Identifiers

Briefing no. 3/2017					
Title: Key trends and drivers in greenhouse gas emissions in the EU in 2015 and over the past 25 years					
Linguistic version	**Media/Volume**	**Catalogue number**	**ISBN**	**ISSN**	**DOI**
EN	PDF/Volume_01 HTML/Volume_01	TH-AM-17-003-EN-N TH-AM-17-003-EN-Q	978-92-9213-863-9 978-92-9213-862-2	2467-3196 2467-3196	10.2800/489536 10.2800/98374

Published on 01 Jun 2017