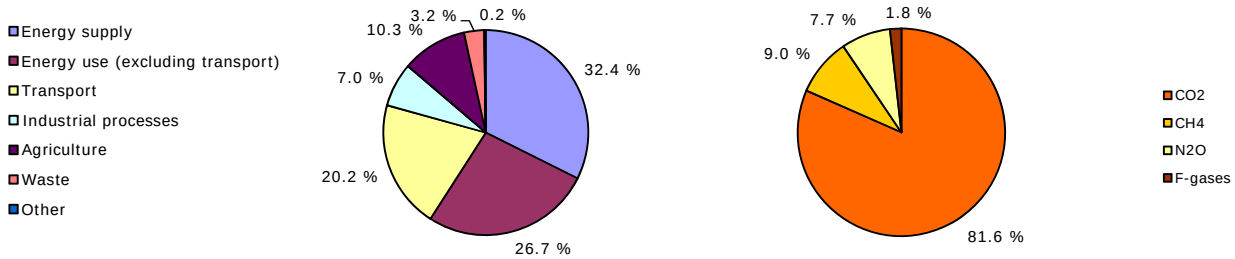
GHG trends and projections in the EU-27

European Environment Agency

Key GHG data (1)	1990	2008	2009	2010 (2)	Unit	Rank in EU-27 (3)	Rank in EU-15 (3)
Total greenhouse gas emissions (GHG)	5 588.8	4 969.1	4 614.5	4 724.1	Mt CO_2-eq.	n.a.	n.a.
GHG from international bunkers (4)	179.8	319.9	292.5	n.a.	Mt CO_2-eq.	n.a.	n.a.
GHG per capita	11.8	10.0	9.2	9.4	t CO_2-eq. / capita	n.a.	n.a.
GHG per GDP (constant prices) (5)	735	462	448	450	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	n.a.	n.a.	n.a.	n.a.	%		
EU ETS verified emissions - all installations (6)		2 100.2	1 860.1	1 913.2	Mt CO_2-eq.	n.a.	n.a.
EU ETS verified emissions - constant scope (7)		2 098.5	1 856.1	1 894.4	Mt CO_2-eq.		
Share of EU ETS verified emissions (all installations) in total GHG		42.3 %	40.3 %	40.5 %	%		
ETS verified emissions compared to annual allowances (8)		5.3 %	– 8.5 %	– 7.4 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2009 (1) (9)



Key GHG trends	1990–2009		2008–2009		1990–2010 (2)		2009–2010 (2)	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 974.3	– 17.4 %	– 354.5	– 7.1 %	– 864.7	– 15.5 %	109.6	2.4 %
GHG per capita	– 2.6	– 22.0 %	– 0.7	– 7.5 %	– 2.4	– 20.5 %	0.2	2.0 %
EU ETS verified emissions - all installations (6)			– 240.2	– 11.4 %			53.1	2.9 %
EU ETS verified emissions - constant scope (7)			– 242.4	– 11.6 %			– 242.4	– 11.6 %

Assessment of long-term GHG trend (1990–2009)

Leaving aside the 2009 economic recession, a wide range of factors and policies (climatic and non climatic) have contributed to the long-term decline in GHG emissions in the EU, particularly for CO2. These include improvements in the efficiency of transformation of primary energy into heat and electricity, the shift to less carbon-intensive fossil fuels (e.g. coal to gas) and the strong increase in renewable energy use. The largest changes occurred in the 1990s, during the period of restructuring of eastern Europe economies. However, emissions from road transportation, particularly the combustion of diesel in passenger cars and freight transport, have increased very rapidly. CO2emissions from international aviation and shipping, excluded from Kyoto targets, also increased very rapidly during the 20-year period. Consistent with warmer climatic conditions and higher comfort standards, the consumption of HFCs in air conditioning equipment and refrigeration were the only group of greenhouse gases that increased overall since 1990. The direct effects of the Montreal Protocol in reducing emissions of ozone-depleting substances have also indirectly contributed to significant reductions in emissions of some potent greenhouse gases such as CFCs. Other EU policies such as the Nitrates Directive, the Common Agriculture Policy (CAP) and the Landfill Waste Directive have also been successful in indirectly reducing greenhouse gas emissions from non- CO2 gases such as methane and nitrous oxides.

Assessment of short-term GHG trend (2008–2009)

The strength of the 2009 recession affected all economic sectors in the EU. Despite the relatively colder winter of 2009 emissions fell in the residential sector. In relative terms, the largest emission reductions occurred in industrial processes reflecting lower activity levels in the cement, chemical and iron and steel industries. Carbon intensity continued its downward trend in 2009, not so much because of fossil fuel switching but because coal use fell significantly more than oil or gas did. Along with the strong decline of primary consumption of fossil fuels (gas, coal, oil) the energy balances also show a very strong increase in renewable energy, particularly of wind and solar for electricity generation. In absolute terms, biomass still represented over 75 % of the increase in renewables in 2009. Overall, decreased demand for energy linked to the economic recession was accompanied by a strong increase in renewable energy use, which also contributed to lower emissions. Nuclear electricity production fell in 2009. HFCs from industrial processes were the only group of greenhouse gases that increased in 2009, continuing the long trend observed since 1990.

Source and additional information

Greenhouse gas emission data and EU ETS data www.eea.europa.eu/themes/climate/data-viewers

(1) Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

(2) Based on EEA estimate of 2010 emissions.

(3) Comparison of 2009 values, 1 = highest value among EU countries.

(4) International bunkers: international aviation and international maritime transport.

(5) GDP in constant 2000 prices - not suitable for a ranking or quantitative comparison between countries for the same year. 1990 information not available for some countries, replaced by later years: 1991 (Bulgaria, Germany, Hungary and Malta), 1992 (Slovakia), 1993 (Estonia) and 1995 (Croatia). Source GDP: Eurostat, 2011; Ameco database, 2011.

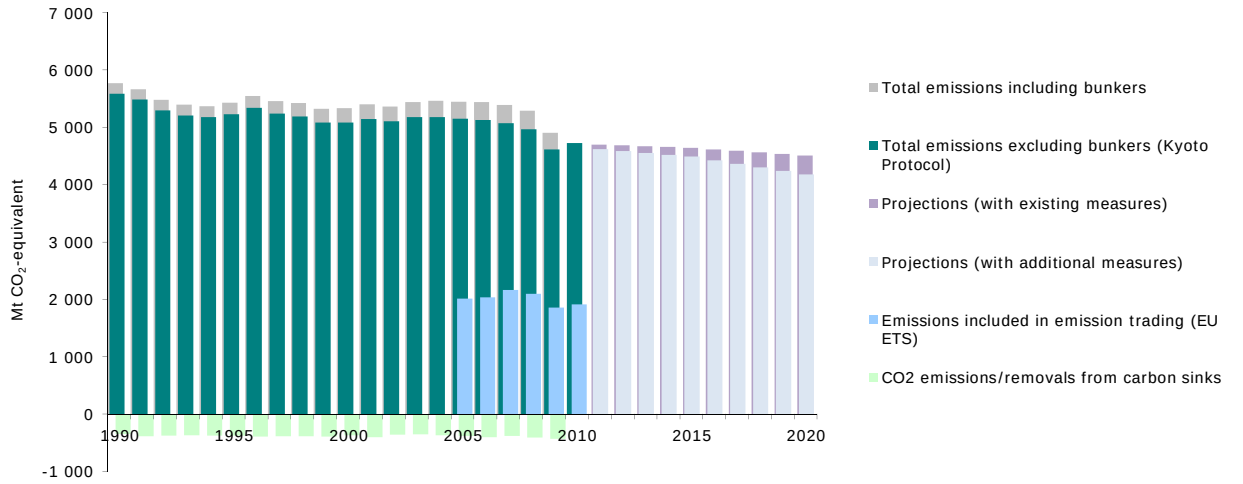
(6) All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) as of 29 April 2009 for the reporting years 2005 and 2006, 11 May 2009 for the reporting year 2007, 17 May 2010 for the reporting year 2008 and 23 May for the reporting years 2009 and 2010. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

(7) Constant scope: includes only those installations with verified emissions available for 2008, 2009 and 2010.

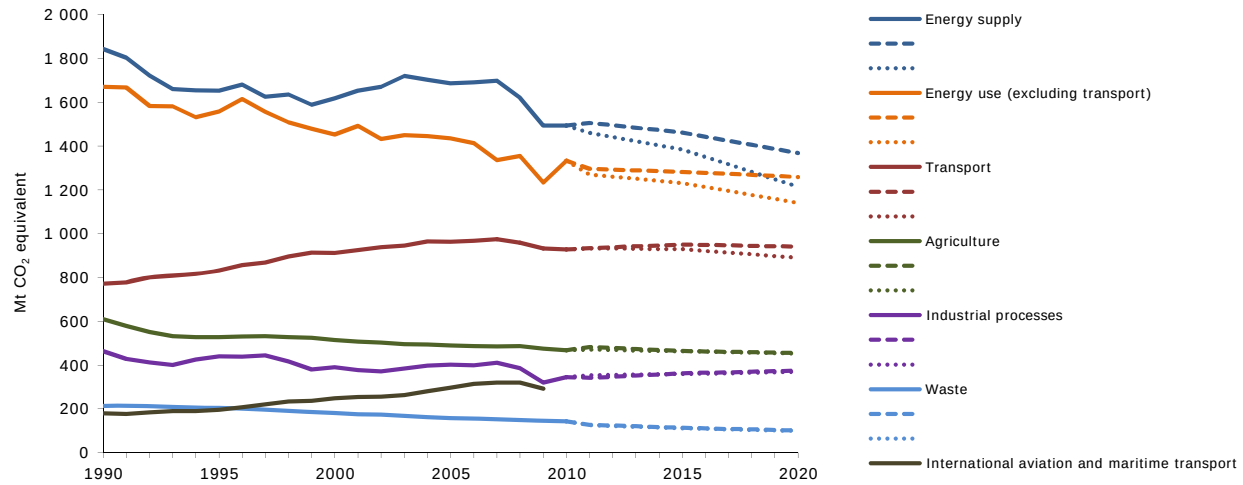
(8) "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

(9) LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums may not necessarily add up.

GHG trends and projections 1990–2020 — total emissions



GHG trends and projections 1990–2020 — emissions by sector



Note: GHG emission projections are represent either through dashed lines (with existing measures) or dotted lines (additional measures).

Source: National inventory, 2011; EEA proxy estimate; 2011; national projection data.

Progress towards Kyoto target

The EU-27 does not have a target under the Kyoto Protocol. Although recent estimates indicate a + 2.4 % emission increase in 2010, projections from Member States indicate that the long-term reduction trend observed since 1990 is expected to continue until 2020 and after. With the current set of measures in place, Member States do not project sufficient emission reductions to allow the EU to meet its unilateral 20 % reduction commitment by 2020. Additional measures, currently planned by Member States, will help in achieving this target but further policies will be needed to achieve even more important emission cuts in the long term.