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Climate and energy country profiles — Key facts and figures for EEA member countries

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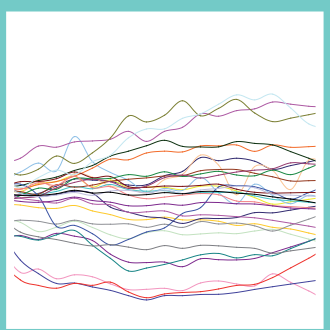

European Environment Agency

Climate and energy country profiles — Key facts and figures for EEA member countries

European Environment Agency

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European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark
Tel.: + 45 33 36 71 00
Fax: + 45 33 36 71 99
Web: eea.europa.eu
Enquiries: eea.europa.eu/enquiries

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1 Introduction

The following country profiles contain key quantitative and qualitative information about greenhouse gas emission, renewable energy and energy efficiency for each individual member country of the EEA. The country profiles are consistent with the information presented in the EEA report: 'Trends and projections in Europe – 2013' ([1]), which tracks progress towards climate and energy targets in European countries.

The information presented in the country profiles originates mainly from the information submitted under the EU Monitoring Mechanism Decision ([2]), the UNFCCC, the Renewable Energy Directive (RED) ([3]), the Energy Efficiency Directive (EED) ([4]) as well as from Eurostat and national action plans and progress reports on renewable energy and on energy efficiency.

Each profile includes a brief assessment of progress towards the country's progress towards its individual targets concerning GHG, renewable energy and energy efficiency, where applicable. In the EU:

- Legally binding targets under the Kyoto Protocol's first commitment period (2008–2012)
- Annual legally binding GHG targets for the period from 2013 to 2020 concerning emissions not covered by the EU Emissions Trading System (ETS)
- Legally binding targets on the 2020 share of renewable energy sources (RES) in gross final energy consumption
- Non-binding targets for energy efficiency

A detailed overview of the definitions, sources and scope of the information used in the country profiles is presented in Chapter 2.

The country profiles (see Chapter 4) are divided into two main parts:

1. A quantitative two-page summary of key country data, trends, and targets for GHG emissions, renewable energy and energy efficiency.
2. A short, mainly qualitative, three-page overview of main policies and measures in key sectors addressing GHG emissions, including renewable energy and energy efficiency.

([1]) EEA report 10/2013 'Trends and projections in Europe 2013' (www.eea.europa.eu/publications/ghg-trends-and-projections-2013)

([2]) Council Decision 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol. The MMD was replaced by the Monitoring Mechanism Regulation (MMR), which entered into force on 8 July 2013 (Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC).

([3]) Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

([4]) Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

2 Definitions and sources

Data on greenhouse gas emissions

Total GHG emissions (UNFCCC, Kyoto Protocol)

1990-to-2011 GHG emissions: total emissions as reported in 2013 national inventories under the UNFCCC, excluding net effects of land use, land-use change and forestry (LULUCF) and excluding emissions from international aviation and maritime transport. This scope is consistent with the Kyoto Protocol.

2012 GHG emissions: approximated inventory of 2012 GHG emissions as reported by 18 Member States ([5]) and complemented by EEA[6].

Source: EEA greenhouse gas data viewer (www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer)

GHG per capita

Ratio between total GHG emissions (see above) and national population on 1 January.

Source for population: Eurostat, 2013, last update 17.07.13. (http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tps00001) accessed 24.08.13.

GHG per GDP

Ratio between total GHG emissions (see above) and EEA's estimate of gross domestic product (GDP) at 2005 market prices (in billion EUR). The estimate of GDP chain-linked volumes by reference year 2005 is based on GDP data at current market prices (in billion EUR) and GDP at 2005 market prices in national currency (in annual percentage change). 1990 GDP not available for Cyprus, the Czech Republic, Latvia, Lithuania, Poland, Romania and Slovenia; 1990–1991 GDP data not available for Bulgaria, Germany, Hungary and Malta; 1990–1992 GDP data not available for Slovakia; 1990–1993 GDP data not available for Estonia; 1990–1995 GDP data not available for Croatia.

Source: Annual macro-economic (Ameco) database of the European Commission, 2013 (http://ec.europa.eu/economy_finance/db_indicators/ameco/); EEA.

[5] Preliminary emission inventory information for the year 2012 available from Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Poland, Slovenia, Spain, Sweden and the United Kingdom. Information on estimated emissions in 2012 have been publicly available for Norway and Switzerland.

([6]) Estonia corrected its energy statistics in September and emissions in non-ETS sectors appear to be overestimated in the EEA GHG proxy report for 2012. The EEA has neither received nor been able to incorporate Estonia's late data revision in the Proxy GHG estimates and therefore it is not taken into account for in the progress assessments in this report.

EU ETS verified emissions

Verified emissions of stationary installations covered by the EU Emissions Trading Scheme (ETS). Emissions from aviation (which entered the ETS in 2012) are not included.

Source: EEA EU ETS data viewer, 2013 (www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer), based on the EU transaction log (EUTL) and additional information on allowance sales and auctions at national level.

EU ETS verified emissions vs. allowances

The data on allowances includes freely allocated allowances, sold and auctioned allowances.

Source: EEA EU ETS data viewer (www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer)

GHG projections

GHG projection data until 2020 in two separate scenarios: 'with existing measures' (WEM), which considers the implementation of existing (already implemented) measures only, and 'with additional measures' (WAM), which considers in addition the implementation of additional (at planning stage) measures.

Assessment of progress towards 2008–2012 Kyoto targets

The assessment of progress towards Kyoto (or burden-sharing) targets for the period 2008–2012 is based on historic data for GHG emissions and for carbon sink emissions and removals. It also takes into account information provided by Member States on their expected use of flexible mechanisms under the KP. This assessment provides an indication of where all countries stood at the end of 2012 with respect to their 2008–2012 targets. It does not aim to predict whether a country will finally achieve its targets or not, as data for 2012 is preliminary. It provides policymakers with a clear picture of where countries stand at the end of 2012. This may give an indication of whether the efforts to achieve Kyoto objectives by the end of 2012 were sufficient, and of whether countries need to modify their plans regarding the use of flexible mechanisms under the KP.

The assessment is based on the following calculations. A result with a negative sign indicates an overachievement of the country's target. A positive sign indicates a shortfall.

Progress towards 2008–2012 Kyoto target	
2008–2012 average non-ETS emissions	(1)
2008–2012 average non-ETS target	(2)
Gap to target (domestic emissions-target)	**(3) = (1) – (2)**
Expected effect of carbon sinks	(4)
Planned use of flexible mechanisms	(5)
Issued emission reduction units	(6)
Overall gap to target	**(7) = (3) + (4) – (5) – (6)**

Assessment of progress towards annual ESD targets

The assessment of progress towards climate and energy targets for 2020 is two-fold:

- The assessment of **current** progress towards 2013 ESD targets is based on a comparison between estimated domestic non-ETS emissions in 2012 and ESD targets (AEAs) for 2013. It does not take into account the possible use of flexibility options as allowed under the ESD. All the data used for this assessment are consistent with the scope of the EU ETS for the period 2008–2012.
    - 2012 non-ETS emissions were calculated based on approximated estimates of 2012 total GHG emissions (excluding LULUCF) available from 18 Member States and the EEA as of September 2013.
    - 2012 verified emissions from installations covered by the ETS (stationary installations only) and CO2 emissions from domestic aviation were subtracted from these national totals.
    - The absolute annual ESD targets (AEAs) considered for the assessment of current progress are consistent with the scope of the EU ETS during the second trading period (2013–2020). These targets are defined in Commission Decision 2013/162/EU determining Member States' AEAs annual emission allocations for the period from 2013 to 2020, adopted in March 2013.
- The assessment of **projected** progress towards 2020 ESD targets is based on a comparison between projections of domestic non-ETS emissions the under WEM and WAM scenarios and ESD targets (AEAs) for 2020. It does not take into account the possible use of flexibility options as allowed under the ESD. All the data used for this assessment are consistent with the scope of the EU ETS for the period 2013–2020.
    - The non-ETS projection data used for the assessment of projected progress towards 2020 targets were reported by Member States on a voluntary basis. 23 Member States provided a split of their projections between ETS and non-ETS emissions until 2020. 18 Member States reported non-ETS emission projections consistent with the scope of the ETS for the third trading period 2013–2020. For two Member States, quality checks indicated that the reported projections were consistent with the scope of the ETS for the second trading period 2008–2012. These projections were therefore adjusted by the EEA, based on the annual ratio between AEAs consistent with the two different scopes of the EU ETS. Four Member States reported incomplete or no projections of non-ETS emissions. These projections were gap filled by the EEA, by applying the share of non-ETS emissions in total emissions by 2020 available from the European Commission's 2013 baseline 'with adopted measures' scenario to the total emissions for 2020 as reported by the Member States. In the case of Croatia, the 2005–2020 relative growth of non-ETS emissions available from the Commission's baseline was applied to Croatia's 2005 base-year emissions.
    - The absolute annual ESD targets (AEAs) considered for the assessment of projected progress are consistent with the scope of the EU ETS during the third trading period (2013–2020). They represent tentative estimates by the EEA of ESD targets consistent with the ESD/EU ETS scope for the period 2013–2020. While ESD targets consistent with the EU ETS scope 2008–2012 were published in the Commission Decision of March 2013 determining Member States' AEAs, ESD targets consistent with the EU ETS scope 2013–2020 will only be available after the Commission publishes a Decision on the adjustments to be made to AEAs under Article 10 of the ESD (i.e. related to changes in EU ETS scope). Such Decision is expected to be published in autumn 2013. The EEA estimates are based on ESD targets as included in the Decision determining Member States' AEAs from March 2013 and preliminary data on adjustments under Article 10 of the ESD, as provided by the European Commission. This data should be considered as preliminary.

The assessment is based on the following calculations. A result with a negative sign indicates an overachievement of the country's target. A positive sign indicates a shortfall.

Progress towards annual ESD targets	
2012 non-ETS emissions	(1)
2013 ESD target	(2)
Gap to target (domestic emissions-target)	**(3) = (1) – (2)**
2020 ESD target (with art. 10 adjustment)	(4)
2020 non-ETS projections WEM	(5)
Gap to target WEM	**(6) = (5) – (4)**
2020 non-ETS projections WAM	(7)
Gap to target WAM	**(8) = (7) – (4)**

Data on energy consumption and energy efficiency

Primary energy consumption (PEC)

Primary energy consumption means the Gross Inland Consumption excluding all non-energy use of energy carriers (e.g. natural gas used not for combustion but for producing chemicals). This quantity is relevant for measuring the true energy consumption and for comparing it to the Europe 2020 targets.

Source: Eurostat, 2013.

Final energy consumption (FEC)

Final energy consumption includes all energy delivered to the final consumer's door (in the industry, transport, households and other sectors) for all energy uses. It excludes deliveries for transformation and/or own use of the energy producing industries, as well as network losses.

Source: Eurostat, 2013.

Assessment of progress in the area of energy efficiency

This assessment was based on:

- national progress reports submitted by EU Member States in 2013 in compliance with requirements laid out in Art 24 of the EED;
- national reports prepared within the framework of the EU project Energy Efficiency Watch and the final report assessing the quality of the second national energy efficiency action plans;
- national reports prepared within the framework of the ODYSSEE‑MURE project by national experts.

Source: Eurostat, 2013, accessed 17 August 2013; National reports; DG ENERwebsite accessed 13.09.2013.

Data on renewable energy sources

Gross final energy consumption (FEC)

Gross FEC means the energy commodities delivered for energy purposes to industry, transport, households, services (including public services), agriculture, forestry and fisheries; this includes the consumption of electricity and heat by the energy branch for electricity and heat production, as well as losses of electricity and heat in distribution and transmission (Directive 2009/28/EC).

Source: Eurostat, 2013.

Share of renewable energy in gross FEC (%)

The share of energy from renewable sources, calculated as the final consumption of renewable energy divided by the gross final consumption of energy from all energy sources, expressed as a percentage. The calculation of the share includes flexibility mechanisms and aviation cap adjustments, in accordance with Article 5 of Directive 2009/28/EC.

Source: Eurostat, 2013; Eurostat SHARES 2011 (version of 22 July 2013).

Share of renewable energy in gross FEC — electricity (%)

Gross final consumption of electricity from renewable energy sources (RES-E) (Directive 2009/28/EC). RES-E is calculated as the electricity generated from renewable energy sources (with normalised hydro and wind) divided by total gross electricity consumption (excluding electricity from pumped storage).

Source: Eurostat, 2013; Eurostat SHARES 2011 (version of 22 July 2013).

Share of renewable energy in gross FEC — heating & cooling (%)

Gross final consumption of energy from renewable sources for heating and cooling (RES-H&C) (Directive 2009/28/EC). RES-H/C is calculated as the renewable energy consumed for heating and cooling of all energy commodities in industry and in other sectors, divided by the gross FEC for heating and cooling (i.e. the FEC for heating and cooling of all energy commodities in industry and in other sectors, plus consumption of electricity and heat of the energy branch, for electricity and heat production, plus distribution losses for electricity and heat).

Source: Eurostat, 2013; Eurostat SHARES 2011 (version of 22 July 2013).

Share of renewable energy in gross FEC — transport (%)

Final consumption of energy from renewable sources in transport (RES-T) (Directive 2009/28/EC). RES-T is calculated as the renewable energy consumed in transport, divided by the total gross energy consumed in transport. The former includes the following: biofuels that comply with the sustainability criteria; renewable electricity in electric road vehicles, which is accounted for with 2.5 times the energy content of the input of electricity from renewable energy sources; and the contribution of biofuels produced from wastes, residues, non-food cellulosic material, and ligno-cellulosic material, which is considered twice that of other biofuels (Directive 2009/28/EC).

Source: Eurostat, 2013; Eurostat SHARES 2011 (version of 22 July 2013).

Normalisation rules for hydro and wind

In accordance with the accounting rules in Directive 2009/28/EC, electricity generated by hydro and wind were normalised for annual variations (hydro for 15 years, and wind for 5 years).

Source: Eurostat, 2013; Eurostat SHARES 2011 (version of 22 July 2013); EurObserv'ER (2007–2009).

Main contributing technologies

The breakdown of the share of renewable energy in gross FEC by renewable energy technologies assesses the contributions of individual RES technologies in the year 2011, based on Eurostat (2013) and EurObserv'ER (2007–2009). Only sustainable biofuels were accounted for in the technology breakdown. The reduction from 'all biofuels' (Eurostat, 2013) to 'sustainable biofuels only' (Eurostat, SHARES2011) is applied in equal terms to all biofuel categories (biodiesel, biogasoline and other biofuels), although this breakdown is not provided by Eurostat). The expected breakdown for the year 2020 corresponds to the expected national penetration of RES technologies according to the National Renewable Energy Action Plans (NREAPs).

Source: Eurostat, 2013; Eurostat SHARES 2011 (version of 22 July 2013); EurObserv'ER (2007–2009); NREAP (2010); Progress Reports, 2012; EEA.

Hydropower

This refers to normalised hydropower. In accordance with the normalisation rules provided under Directive 2009/28/EC, shares have been calculated against 'Final consumption of renewable energy including flexibility mechanisms'. This assumes normalised hydropower and wind power, and includes renewable energy captured by heat pumps (ERES) and FEC of biomethane blended with natural gas.

Source: Eurostat, 2013; Eurostat SHARES 2011 (version of 22 July 2013); EurObserv'ER (2007–2009); National Renewable Energy Action Plans, 2010; Progress Reports, 2012; EEA.

Offshore/onshore wind

'Offshore wind' refers to (estimated) actual data, and 'onshore wind' to (estimated) normalised data (calculated from total wind normalised minus the estimated actual offshore wind). In accordance with the normalisation rules provided under Directive 2009/28/EC, shares have been calculated against 'Final consumption of renewable energy including flexibility mechanisms', which assumes normalised hydropower and wind power and includes renewable energy captured by heat pumps (ERES) and FEC of biomethane blended with natural gas.

Source: Eurostat, 2013; Eurostat SHARES 2011 (version of 22 July 2013); EurObserv'ER (2007–2009); NREAP (2010); Progress Reports, 2012; EEA.

Average annual growth rate

The average increase in the share of renewable energy over a period of a year. The average annual growth rate was used to compare the achieved average annual increase in the share of renewable energy over the period from 2005 to 2011 (Eurostat, 2013; Eurostat, SHARES2011) with the average annual growth rate required for the 2011-to-2012 period, to reach the legally binding renewable energy target (Part A of Annex I of Directive 2009/28/EC).

Source: Eurostat, 2013; Eurostat SHARES 2011 (version of 22 July 2013); EEA.

2020 target/Legally binding renewable energy targets

Targets for the share of renewable energy in gross FEC by 2020 (in accordance with Part A of Annex I of Directive 2009/28/EC).

Source: Eurostat, 2013.

Indicative trajectory

The share of energy from renewable sources that equals the indicative trajectory for the years from 2011 to 2018 set out in Part B of Annex I of Directive 2009/28/EC. The indicative EU trajectory is represented as the sum of the indicative national trajectories and uses Eurostat (2013) data for the share of renewable energy in gross FEC in 2005.

Source: RED (Directive 2009/28/EC); Eurostat, 2013.

Expected trajectory

The share of energy from renewable sources that corresponds to the expected national trajectories until 2020, outlined by Member States in their NREAPs. The expected EU trajectory is represented as the sum of the expected national trajectories. (The trajectories use gross FEC after reduction for aviation in the NREAP–energy efficiency scenarios. The share of renewable energy in gross FEC in 2005 is given by Eurostat (2013).

Source: RED (Directive 2009/28/EC); Eurostat, 2013; National Renewable Energy Action Plans.

Qualitative information on policies and measures

Climate and energy strategy, sectoral policies and measures

For all EU Member States, the information presented was based on the 2013 national submission of EU Member States under the MMD. All 2013 deliveries for projections and national programmes are available from the Eionet Central Data Repository (CDR) (http://cdr.eionet.europa.eu/ReportekEngine/resultsdataflow?dataflow_uris=http%3A%2F%2Frod.eionet.europa.eu%2Fobligations%2F385&years%3Aint%3Aignore_empty=&partofyear=&country=&sort_on=reportingdate&sort_order=reverse). This information was complemented from other sources, where relevant.

For the other EEA member countries which are not EU Member States, the information was mostly based on national communications under the UNFCCC.

Country	Source
Austria	• 2013 submission under Art. 3(2) of the MMD
Belgium	• 2013 submission under Art. 3(2) of the MMD
Bulgaria	• 2013 submission under Art. 3(2) of the MMD • NEEAP (http://ec.europa.eu/energy/efficiency/end-use_en.htm) • NREAP (http://ec.europa.eu/energy/renewables/action_plan_en.htm) • RES LEGAL EUROPE (www.res-legal.eu/search-by-country/bulgaria/) • World Nuclear Association (www.world-nuclear.org/info/Country-Profiles/Countries-A-F/Bulgaria/) • European Renewable Energy Council (www.erec.org/fileadmin/erec_docs/Documents/Publications/EREC-roadmap-V4_final.pdf)
Croatia	• 2013 submission under Art. 3(2) of the MMD
Cyprus	• 2013 submission under Art. 3(2) of the MMD • Cyprus National Reform Programme 2013 • National renewable energy action plan 2010 • 2nd National energy efficiency action plan of Cyprus 2011
Czech Republic	• 2013 submission under Art. 3(2) of the MMD
Denmark	• 2013 submission under Art. 3(2) of the MMD
Estonia	• 2013 submission under Art. 3(2) of the MMD
Finland	• 2013 submission under Art. 3(2) of the MMD • NEEAP (http://ec.europa.eu/energy/efficiency/end-use_en.htm) • NREAP (http://ec.europa.eu/energy/renewables/action_plan_en.htm) • ABB (www.abb.com/cawp/db0003db002698/66b9ec138b642523c12579c000537637.aspx) • European Renewable Energy Council (www.erec.org/fileadmin/erec_docs/Documents/Publications/EREC-roadmap-V4_final.pdf)
France	• 2013 submission under Art. 3(2) of the MMD • NEEAP (http://ec.europa.eu/energy/efficiency/end-use_en.htm) • NREAP (http://ec.europa.eu/energy/renewables/action_plan_en.htm) • European Renewable Energy Council (www.erec.org/fileadmin/erec_docs/Documents/Publications/EREC-roadmap-V4_final.pdf)
Germany	• 2013 submission under Art. 3(2) of the MMD • additional background information from: www.kfw.de/kfw.de.html and www.bafa.de/bafa/de/energie/index.html
Greece	• 2013 submission under Art. 3(2) of the MMD • National Renewable Energy Action Plan Greece 2010
Hungary	• 2013 submission under Art. 3(2) of the MMD • NEEAP (http://ec.europa.eu/energy/efficiency/end-use_en.htm) • NREAP (http://ec.europa.eu/energy/renewables/action_plan_en.htm) • RES LEGAL EUROPE (www.res-legal.eu/search-by-country/hungary/) • World Nuclear Association (www.world-nuclear.org/info/Country-Profiles/Countries-G-N/Hungary/) • European Renewable Energy Council (www.erec.org/fileadmin/erec_docs/Documents/Publications/EREC-

Country	Source
	roadmap-V4_final.pdf)
Iceland	• 2013 submission under Art. 3(2) of the MMD
Ireland	• 2013 submission under Art. 3(2) of the MMD
Italy	• 2013 submission under Art. 3(2) of the MMD • Italy's National Energy Strategy: for a more competitive and sustainable energy 2012 • background information on the green certificates scheme from: http://globalmandatoolkit.cliffordchance.com/downloads/The-new-incentive-system.pdf
Latvia	• 2013 submission under Art. 3(2) of the MMD • Latvian energy long term strategy 2030 - Competitive energy for society
Liechtenstein	• 5th National Communication under the UNFCCC • Report of the in-depth review of the fifth national communication of Liechtenstein • Energy Strategy 2020 (www.regierung.li/fileadmin/dateien/downloads/Energiestrategie_Langfassung.pdf) • National Climate Mitigation Strategy 2007 (www.llv.li/pdf-llv-aus-nationale_klimaschutzstrategie_07.pdf)
Lithuania	• NEEAP (http://ec.europa.eu/energy/efficiency/end-use_en.htm) • NREAP (http://ec.europa.eu/energy/renewables/action_plan_en.htm) • RES LEGAL EUROPE (www.res-legal.eu/search-by-country/lithuania/) • World Nuclear Association (www.world-nuclear.org/info/Country-Profiles/Countries-G-N/Lithuania/) • European Renewable Energy Council (www.erec.org/fileadmin/erec_docs/Documents/Publications/EREC-roadmap-V4_final.pdf)
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Norway	• NREAP (http://ec.europa.eu/energy/renewables/action_plan_en.htm) • NC5 (http://unfccc.int/resource/docs/natc/nor_nc5.pdf) • IEA PAM database (www.iea.org/policiesandmeasures/)

Country	Source
	• Norwegian National Allocation Plan (www.regjeringen.no/upload/MD/Vedlegg/Planer/NAP_FINAL_ESA_260308.pdf)
Poland	• 2013 submission under Art. 3(2) of the MMD
Portugal	• 2013 submission under Art. 3(2) of the MMD
Romania	• 2013 submission under Art. 3(2) of the MMD • ABB (www.abb.com/cawp/db0003db002698/66b9ec138b642523c12579c000537637.aspx) • European Renewable Energy Council (www.erec.org/fileadmin/erec_docs/Documents/Publications/EREC-roadmap-V4_final.pdf) • Energy efficiency watch (www.energy-efficiency-watch.org/)
Slovakia	• 2013 submission under Art. 3(2) of the MMD • National Energy Efficiency Action Plan • National Reform Programme of the Slovak Republic 2013 • National Renewable Energy Action Plan 2010
Slovenia	• 2013 submission under Art. 3(2) of the MMD
Spain	• 2013 submission under Art. 3(2) of the MMD
Sweden	• 2013 submission under Art. 3(2) of the MMD • NEEAP (http://ec.europa.eu/energy/efficiency/end-use_en.htm) • NREAP (http://ec.europa.eu/energy/renewables/action_plan_en.htm) • ABB (www.abb.com/cawp/db0003db002698/66b9ec138b642523c12579c000537637.aspx) • European Renewable Energy Council (www.erec.org/fileadmin/erec_docs/Documents/Publications/EREC-roadmap-V4_final.pdf)
Switzerland	• ABB (www.abb.com/cawp/db0003db002698/66b9ec138b642523c12579c000537637.aspx) • EnergieSchweiz 2011–2020 - Detailkonzept (www.energieschweiz.ch/de-ch/utilities/ueber-energieschweiz.aspx)
Turkey	• 1st national Communication • Report of the in-depth review of the first national communication of Turkey • Climate Change Action Plan 2011–2023 (http://iklim.cob.gov.tr/iklim/Files/IDEP/%C4_%B0DEP_ENG.pdf) • Climate Change Strategy 2010–2020 (http://iklim.cob.gov.tr/iklim/Files/Stratejiler/%C4_%B0DES_ENG.pdf)
United Kingdom	• 2013 submission under Art. 3(2) of the MMD

Key policies and measures

The final section of each profile concerns individual policies and measures. This information was reported by EU Member States as part of the 2013 submissions under Article 3(2) of the Monitoring Mechanism Decision. Where estimated by the Member State, the estimated effect of these policies and measures is provided.

This information is available from the EEA database on policies and measures (www.eea.europa.eu/data-and-maps/pam).

3 Commonly used acronyms and abbreviations

AD	anaerobic digestion
BAT	best available technique
CAP	Common Agricultural Policy
CCS	carbon capture and storage
CHP	combined heat and power
E	electricity
EED	Energy Efficiency Directive (Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC)
EOR	enhanced oil recovery
ESD	Effort Sharing Decision
EU	European Union
ETS	Emissions Trading System
FEC	final energy consumption
GDP	gross domestic product
GHG	greenhouse gas
H&C	heating and cooling
ICT	information and communication technologies
ktoe	thousand tonnes of oil equivalent
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LULUCF	Land Use, Land-Use Change and Forestry
MMD	Monitoring Mechanism Decision (Council Decision 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol
MMR	Monitoring Mechanism Regulation (Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national

	and Union level relevant to climate change and repealing Decision No 280/2004/EC)
MSW	municipal solid waste
Mt CO_2 eq.	million tonnes of carbon dioxide equivalent
Mtoe	million tonnes of oil equivalent
NREAP	National Renewable Energy Action Plan
PV	photovoltaic(s)
RD&D	research, development and demonstration
RED	Renewable Energy Directive (Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC)
RES	renewable energy sources
RUE	rational use of energy
SNCR	selective non-catalytic reduction
T	transport
toe	tonne of oil equivalent
ULEV	ultra-low emission vehicle
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
VOC	volatile organic compound
WAM	with additional measures
WEM	with existing measures

4 Country profiles

Key climate- and energy-related data — Austria

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	78.2	80.2	85.0	82.8	80.0
GHG per capita (t CO_2 eq./cap.)	10.2	10.0	10.2	9.9	9.5
GHG per GDP (g CO_2 eq./EUR)	451.5	355.4	323.7	307.2	294.3
Share of GHG emissions in total EU-28 emissions (%)	1.4 %	1.6 %	1.8 %	1.8 %	1.8 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	30.9	30.6	28.4
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	36 %	37 %	35 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 0.2 %	– 1.2 %	– 8.4 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	3.9 %	6.5 %	32.9 %

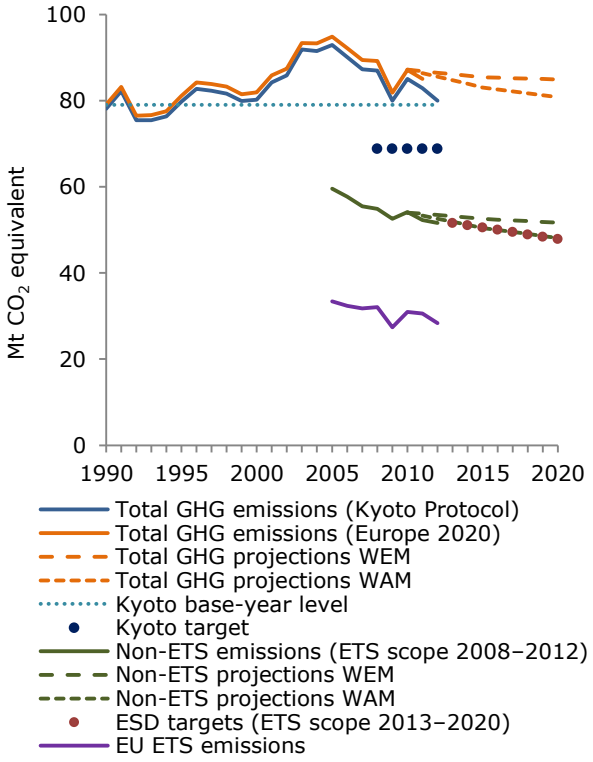
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	53.1
2008–2012 average non-ETS target	37.9
Gap to target (domestic emissions-target)	**15.2**
Expected effect of carbon sinks	– 1.2
Planned use of flexible mechanisms	16.0
Issued emission reduction units	0.0
Overall gap to target	**– 2.0**

Austria is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 20 % of base-year emissions per year.

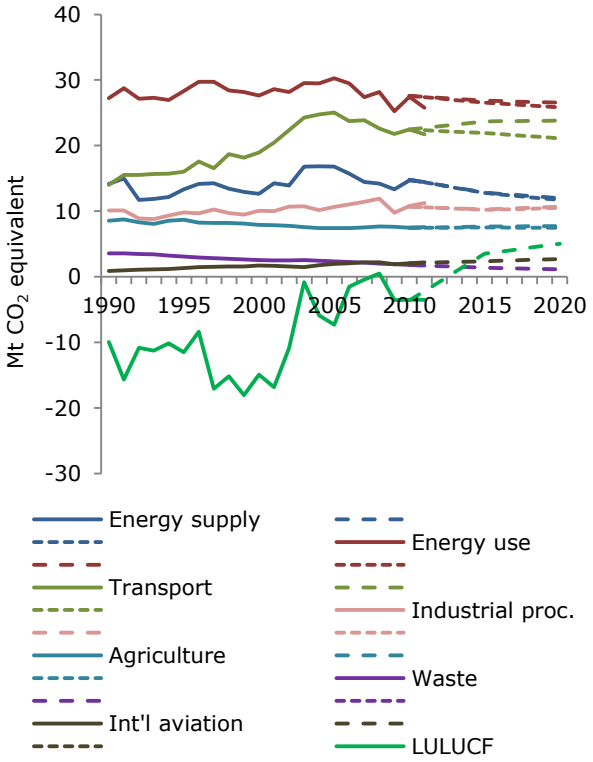
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	51.6
2013 ESD target	53.6
Gap to target (domestic emissions-target)	**– 2.0**
2020 ESD target (with art. 10 adjustment)	47.9
2020 non-ETS projections WEM	51.7
Gap to target WEM	**3.8**
2020 non-ETS projections WAM	48.1
Gap to target WAM	**0.3**

Austria is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

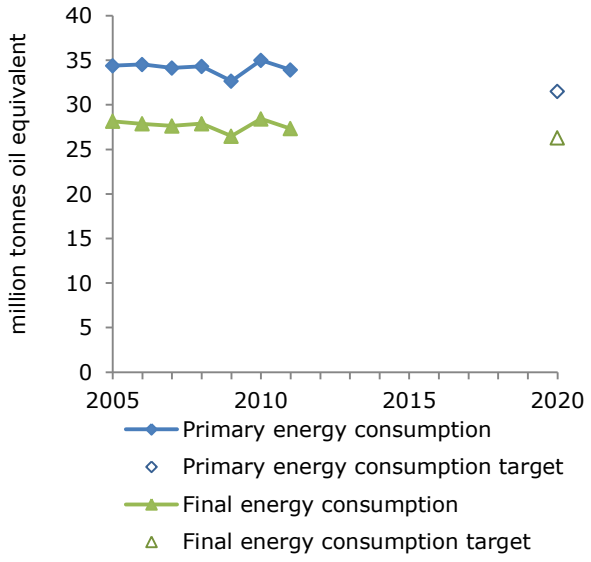


Sectoral GHG trends and projections

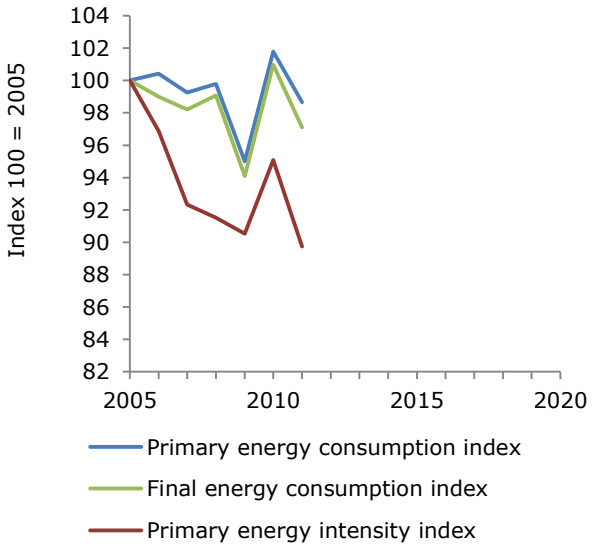


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	34.4	32.7	35.0	33.9	31.5
Final energy consumption (FEC) (Mtoe)	28.1	26.5	28.4	27.3	26.3
Austria is making some progress in reducing energy consumption, but further improvements are necessary in either energy efficiency policy implementation, the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	23.7 % (23.8 %)	28.4 % (30.2 %)	30.4 % (30.6 %)	30.9 %	34.0 %
Share of renewable energy in gross FEC — electricity (%)	62.3 %	67.8 %	65.7 %	66.1 %	
Share of renewable energy in gross FEC — heating and cooling (%)	22.5 %	28.7 %	30.4 %	31.1 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	2.2 % (2.8 %)	2.4 % (8.8 %)	7.6 % (8.5 %)	7.6 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 30.9 % (8 545 ktoe), which is higher than the indicative target for the 2011-to-2012 period (25.4 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (45 %), hydropower (40 %) and solid biomass for electricity (4 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 4.0 %. In order to reach the 2020 target, an average annual growth rate of 0.9 % is needed for the period from 2011 to 2020. This corresponds to 0.3 times the cumulative effort up to 2011.					

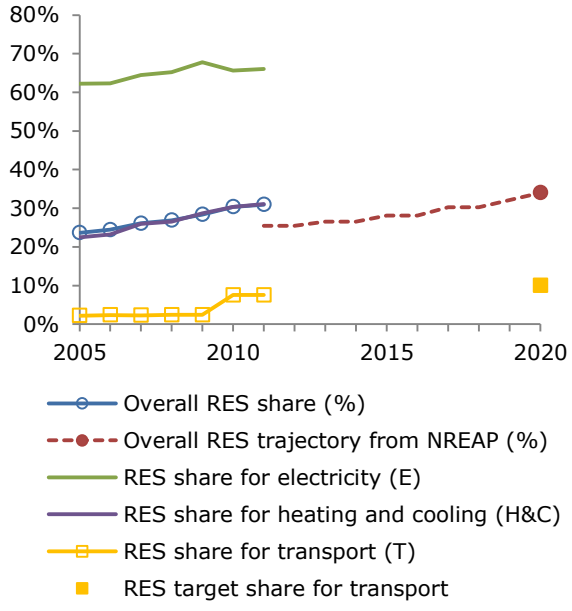
Primary and final energy consumption



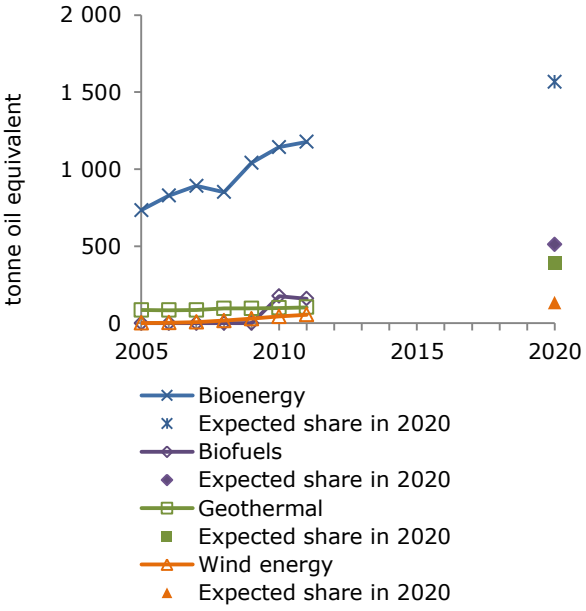
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

In 2002, the national climate change programme known as the Austrian Climate Strategy 2010 was released as part of the effort to meet the Kyoto target. The Austrian Climate Strategy 2010 was adapted and the revised Climate Strategy II was published in 2007. The climate strategy focuses on three pillars: the use of existing technologies especially in the fields of energy efficiency and renewable energies; the promotion and development of new technologies; and the use of the flexible Kyoto instruments (JI/CDM). A stakeholder process was initiated to establish a new Energy Strategy for Austria in response to the legally binding European commitments on renewable energy and climate change by 2020, and was concluded in 2010; for final energy consumption a target is formulated in the report (stabilization on 1.100 PJ in 2020).

In November 2011, the Austrian Climate Protection Act became effective in law, regulating the maximum emissions of GHG and enabling targets to be split into different sectors. The act also created the National Climate Protection Committee, with responsibility for continuous development of strategies and long-term reduction targets.

Main economic instruments for renewable energy and energy efficiency

The Green Electricity Act serves to harmonise the system for promoting electricity production from renewable energy sources by granting fixed feed-in tariffs for various forms of biomass transformation and power production by wind, water, geothermal energy and photovoltaic.

In addition, the Climate and Energy Fund promotes research and development (R&D) as well as market dissemination measures in the field of sustainable energy technologies and climate research, whilst schemes such as the Domestic Environmental Support Scheme (UFI) use relevant projects to increase energy efficiency and the use of renewables.

In 2011 Austria adopted a mineral oil tax of EUR 20/t CO_2, consequently increasing tax on petrol by 4 and 5 cents per litre respectively. Increasing the fuel tax aims at a reduction of individual motorised transport and represents a shift towards public transport. Moreover, it aims at reducing GHG emissions from fuel export.

European Union Emissions Trading System (EU ETS)

In 2011, in Austria 230 stationary installations were included in the ETS. The share of ETS emissions amounted to 41 % of the total emissions.

Energy supply

Energy efficiency

Austria has transposed the combined heat and power (CHP) Directive (2004/8/EC) into national law. The main purpose of the Combined Heat and Power Act is to increase energy efficiency and improve the security of supply, creating a framework for the promotion and development of high efficiency cogeneration of heat and power and subsidising new combined CHP plants.

Renewables

The Green Electricity Act sets expansion targets for 2020 for renewables of 2 400 MW (compared to the targets for 2015), and for the share of renewables in electricity consumption from the public grid (to rise to 15 %) by 2015. In general terms, the act also guarantees feed in tariffs for 13 years, for power plants based on biomass for 15 years, and it is assumed that its objective for the year 2015 will be reached and that the promotion of green electricity will continue thereafter.

Energy use

Energy efficiency

The National Energy Efficiency Action Plan 2011 defines a target regarding the reduction of energy consumption, aiming at stabilising the end energy consumption in 2020 at the level of 2005, i.e. at a maximum of 1 100 PJ. By 2016, Austria wants to save 80.4 PJ. The highest reductions in end energy consumption have already been achieved in the building and heating sector (80 % of the reductions).

Through financial support and raising awareness, the replacement of old, inefficient heating systems is promoted in Austria. A reduction of 707 and 1 651 Gg CO_2 eq. can be reached in 2020 and 2030 respectively. The increased thermal renovation of buildings entails an emission reduction of energy consumption of 426 Gg CO2 by 2020, and 635 Gg by 2030. Further, Austria plans to improve energy efficiency in the residential sector by increasing the building residential boiler exchange rate to 2.5 % by (2020). A higher energetic standard of new buildings was implemented in 2010, along with financial support for new buildings, and most federal states in Austria support the replacement of old fossil-fuelled heating systems by highly efficient systems based on renewable energy (solar, biomass) or natural gas (with condensing boiler technology). In addition, they continue to promote the connection with existing or new (often biomass-fired) district heating.

Renewables

In Austria, the increased use of renewable energy in the residential sector comprise a great number of policies and measures defined in the Climate Strategy and its amendment, e.g. the Housing Support Scheme of regional authorities, the Technical Construction Regulations or the Domestic Environmental Support Scheme. The overall objective is to increase the use of biomass through specific subsidies for renewable energy sources. New buildings or comprehensive renovation of existing buildings have to use an alternative heating system and further additional subsidies for the use of heating systems with renewable energy are planned in Austria.

Transport

Renewables

In 2004, the Biofuels Directive (2003/30/EC) was transposed into Austrian law with an amendment to the Fuel Ordinance in order to increase the share of renewables in the transport sector. This has been increased from 2.5 % initially to 5.75 % in 2011, and in 2011 the target was overachieved by 1 %.

With the latest amendment from 2012 all relevant contents of the RED (Renewable Energy Directive) were

transposed into national law. Amongst others, the target for 2020 was defined (8.45 %) and the framework for the national certification scheme for biofuels was established (within the Austrian fuel ordinance).

Transport efficiency

The enhanced dispersion of electric vehicles isa measure in Austria that l is planned to be pushed to increase energy efficiency in the transport sector. Furthermore Austria`s taxation system on the purchase of new vehicles was adapted in 2007 in order to promote the sales of energy efficient vehicles while adding extra taxation on gas guzzlers. This taxation system gets adjusted in regular intervals.

Modal shift and raising awareness

Promotion of corporate rail connections for freight transport aims at supporting investments in corporate feeder lines in order to maintain and expand the railway network. The improvement of rail infrastructure at company/industrial sites aims at shifting transport activities from road to rail. The Commuter Tax Reform also provides a tax-free public transport ticket for all employees, as long as the employer is willing to pay for the ticket. The 'klima aktiv mobil' programme shall raise awareness in terms of sustainable means of transportation and eco-driving.

Industrial processes

Non-CO_2 gases

Subject to further developments on the EU-level (new F-gas regulation expected), Austria plans to introduce taxes on F-gases in 2014, which aims at reducing the use and emission of these gases in cooling systems. This policy is expected to achieve a reduction of 90 kt CO_2 equivalent by 2020 by the substitution of hydrofluorocarbons (HFCs) in new cooling systems.

Energy efficiency

No specific strategies or measures have been reported in the industrial processes sector.

Agriculture

Austria pays special attention to the implementation of the Common Agricultural Policy by fullfilling the cross compliance criteria. It is planned to decouple premiums for suckling cows and promote outdoor grazing for all cows, both of which would be expected to lower GHG emissions. Austria plans to offer more premiums for organic farming, as well as payments for investments in emission-reducing animal production and fertiliser application technologies. Currently, 1 000 ha are set aside, and Austria plans to increase this to 6 000 ha by use of incentives. For the reduction of methane emissions in manure management. Austria also plans to continue promoting anaerobic digestion in biogas plants.

Waste

Since the implementation of the Austrian Landfill Ordinance in 2004, the landfill of wastes containing more than 5 percent by weight of organic carbon (TOC), e.g. untreated biodegradable waste, has been forbidden (landfill ban) and the collection and drainage of landfill gas originating from mass-waste landfills is mandatory. Furthermore, the Guideline for the Mechanical Biological Treatment of Wastes was elaborated in 2002, providing a consistent state-of-the-art process for mechanical biological treatment. A relevant ordinance on the mechanical–biological treatment of waste with binding emission thresholds is under preparation.

Land use, land-use change and forestry

Measures in the LULUCF sector are supporting and promoting an increase in demand for woody biomass, thus leading to an increase in timber prices; they are the most important drivers for harvest activities in Austria.
No specific strategies or measures have been reported in the LULUCF sector.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
AT-TRA-001 Promotion of biofuels - Implementation of Directive 2003/30/EC on biofuels fuel Regulation	2100
AT-TRA-002 Economic incentives - fuel tax increase in 2011 ('Klimabeitrag')	1200
AT-RES-003 change of heating systems (Heizsystemerneuerung)	707
AT-TRA-003 Mobility management and awareness: klima:aktiv mobility programme	500
AT-RES-002 Thermal insulation of existing buildings	426
AT-ENS-002 Green Electricity Act	421
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
AT-TRA-010 Economic incentive: fuel tax increase in 2015 and 2019	2100
AT-TRA-011 Economic incentives – Further greening of consumption tax (NoVA)	300
AT-RES-008 Enforced thermal insulation (Sanierung)	205
AT-TRA-012 More efficient car use – nationwide speed limits	200
AT-TRA-013 Mobility Management and awareness - Promoting mobility management including Master Plan Bicycle & Pedestrian Master Plan	200
AT-ENU-002 Energy efficiency Act draft 2012	150
Measures with large expected savings specifically in the non-ETS sectors	
AT-TRA-001 Promotion of biofuels - Implementation of Directive 2003/30/EC on biofuels fuel Regulation	2100
AT-TRA-010 Economic incentive: fuel tax increase in 2015 and 2019	2100
AT-TRA-002 Economic incentives - fuel tax increase in 2011 ('Klimabeitrag')	1200
AT-RES-003 change of heating systems (Heizsystemerneuerung)	707
EU policies or measures related to measures expected to deliver the largest savings	
Promotion of biofuels - Transport: Biofuels Directive (Directive 2003/30/EC)	
Energy supply: RES Directive 2009/28/EC	
Energy supply: Taxation of energy products 2003/96/EC	
Economic incentive: fuel tax increase in 2015 and 2019	
Transport: Regulation on CO_2 from cars 2009/443/EC	
Thermal insulation of existing buildings	
Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	
EU policies or measures expected to result in the largest emission savings	
Transport: Regulation on CO_2 from cars 2009/443/EC	
Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
Energy supply: Taxation of energy products 2003/96/EC	
Transport: Biofuels Directive (Directive 2003/30/EC)	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Belgium

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	143.1	146.0	131.8	120.2	121.0
GHG per capita (t CO_2 eq./cap.)	14.4	14.3	12.2	10.9	10.9
GHG per GDP (g CO_2 eq./EUR)	635.9	520.8	408.9	366.3	369.5
Share of GHG emissions in total EU-28 emissions (%)	2.6 %	2.9 %	2.8 %	2.6 %	2.7 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	50.1	46.2	43.0
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	38 %	38 %	36 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 10.6 %	– 18.3 %	– 36.9 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	1.3 %	13.5 %	23.3 %

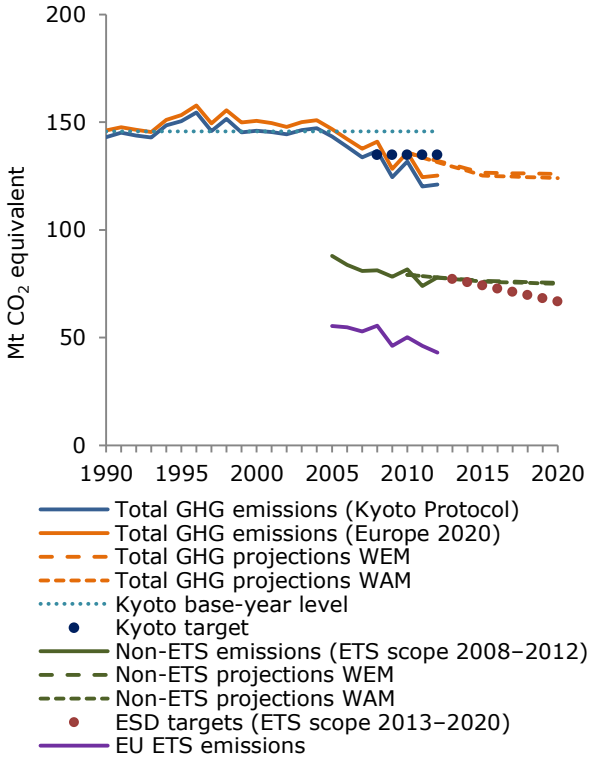
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	78.6
2008–2012 average non-ETS target	76.2
Gap to target (domestic emissions-target)	**2.4**
Expected effect of carbon sinks	0.2
Planned use of flexible mechanisms	5.9
Issued emission reduction units	0.0
Overall gap to target	**– 3.3**

Belgium is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 4 % of base-year emissions per year.

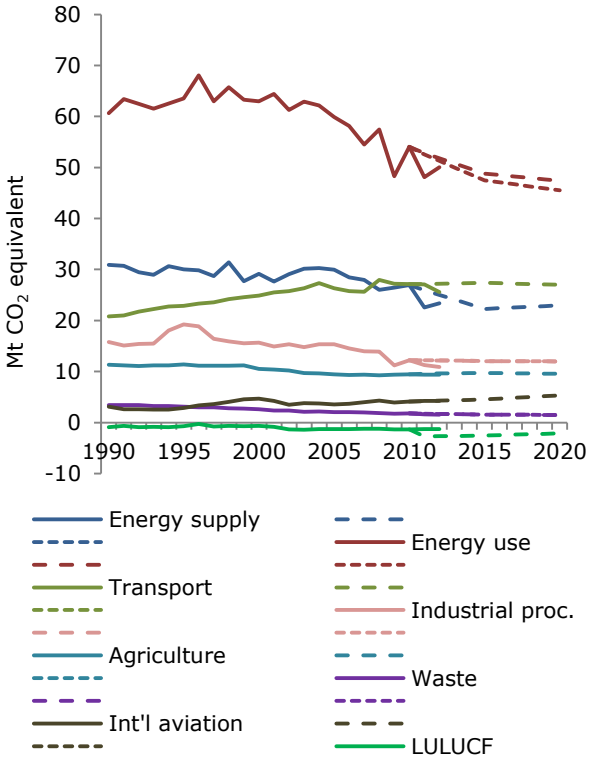
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	77.9
2013 ESD target	81.2
Gap to target (domestic emissions-target)	**– 3.3**
2020 ESD target (with art. 10 adjustment)	66.7
2020 non-ETS projections WEM	75.5
Gap to target WEM	**8.8**
2020 non-ETS projections WAM	75.0
Gap to target WAM	**8.3**

Belgium is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

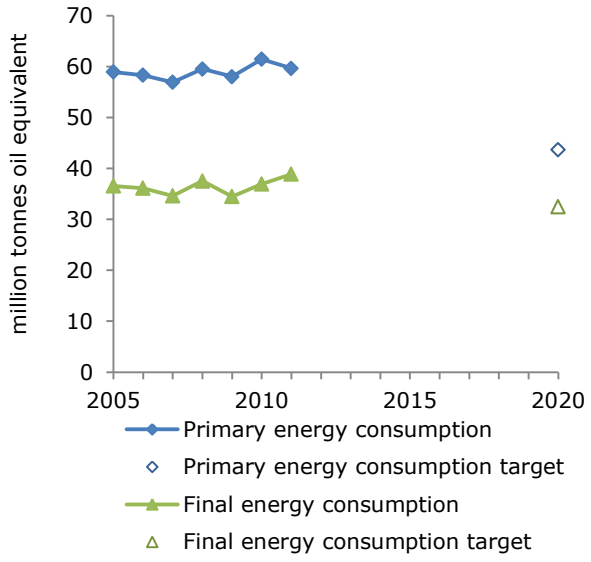


Sectoral GHG trends and projections

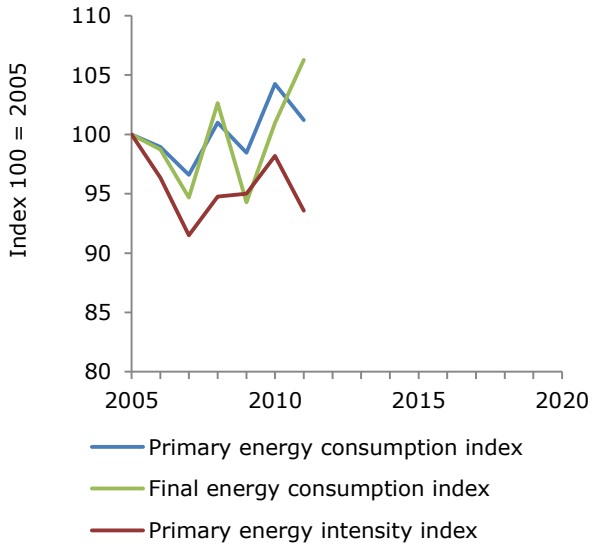


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	59.0	58.1	61.5	59.7	43.7
Final energy consumption (FEC) (Mtoe)	36.6	34.5	36.9	38.9	32.5
Belgium is making some progress in reducing energy consumption, but further improvements are necessary in either energy efficiency policy implementation, the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	2.3 % (2.3 %)	3.6 % (4.4 %)	4.0 % (4.9 %)	4.1 %	13.0 %
Share of renewable energy in gross FEC - electricity (%)	2.3 %	5.8 %	6.9 %	8.8 %	
Share of renewable energy in gross FEC - heating and cooling (%)	3.4 %	5.0 %	4.9 %	4.3 %	
Share of renewable energy in gross FEC - transport (%) (including all biofuels consumed in transport)	0.2 % (0.2 %)	0.3 % (3.3 %)	0.3 % (4.1 %)	0.3 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 4.1 % (1 617 ktoe), which is lower than the indicative target for the 2011-to-2012 period (4.4 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (53 %), solid biomass for electricity (17 %) and onshore wind (8 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 11.1 %. In order to reach the 2020 target, an average annual growth rate of 14.3 % is needed for the period from 2011 to 2020. This corresponds to 2.8 times the cumulative effort up to 2011.					

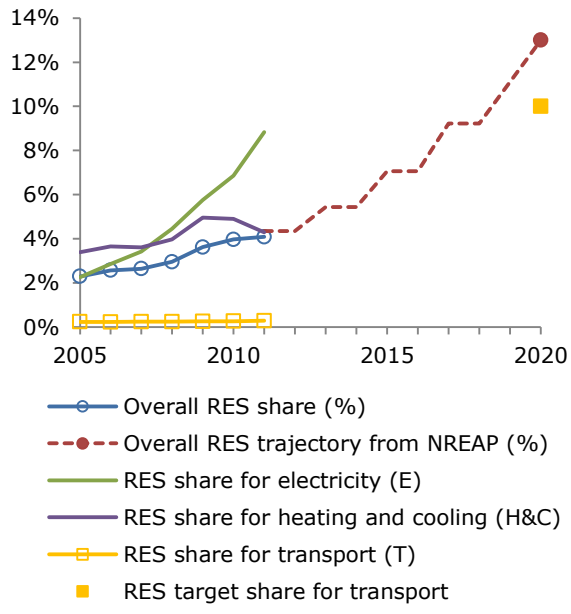
Primary and final energy consumption



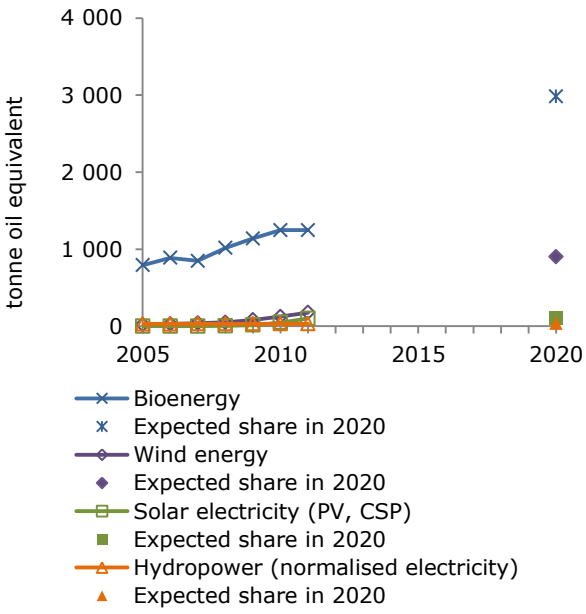
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

Belgium's second National Allocation Plan (2008–2012) was adopted by the European Commission on 10 October 2008.

As a Member State of the European Union, Belgium has committed to provide its contribution to the European climate and energy package, by:

- covering 13 % of its gross final energy demand with renewable energy sources by 2020;
- reducing greenhouse gas emissions of non-ETS sectors by 15 % between 2005 and 2020;
- tending to improve its global energy efficiency by 20 %.

A new National Climate Plan (2013–2020) is currently being developed. The National Climate Plan 2008–2012 aimed to harmonise and create synergies between the authorities and policies implemented. In Belgium, the two main regions have established their own climate policy plan: the Flemish Climate Policy Plan 2013–2020 has been approved in principle, but has not yet been finalised completely; Wallonia implemented the Walloon Air-Climate Plan, its framework for air protection and climate change. In addition, Wallonia is preparing a roadmap to a low-carbon region by 2050. The Brussels Capital Region follows an Action Plan for a Low-Carbon Brussels by 2025, aiming to reduce emissions per capita by 40 % by 2025 (with respect to the situation in 1990).

Main economic instruments for renewable energy and energy efficiency

Most of the strategy aims at the development of renewable energy sources and high-efficiency combined heat and power (CHP) to produce electricity. The main instruments implemented are markets of green certificates (in Wallonia and Brussels, these cover both renewables and CHP; in Flanders they cover renewables only, but with a separate CHP certificates market). Emission trading has a significant role also, but quota allocations were essentially performed in view of new renewables (renewable energy sources or RES) and CHP developments, rather than in expecting energy efficiency improvements in existing power plants.

European Union Emissions Trading System (EU ETS)

In 2011 in Belgium, 368 stationary installations were included in the ETS. The share of ETS emissions amounted to 41 % of the total emissions.

Energy supply

Energy efficiency

To promote energy efficiency, an exemption from excise duties has been suppressed, and an excise duty on energy for coal and heavy fuel oil products has been established. The rational use of gas and the extension of the natural gas network are supported by a natural gas fund which has been reallocated to improve financial support. The green certificate scheme also helps to increase the efficient allocation of energy production based on fossil fuels.

Renewables

The main instruments implemented are markets of green certificates. In Wallonia and Brussels, these cover both RES and CHP, whereas in Flanders there are separate CHP and RES certificate markets. In Flanders, the share covered by CHP was expected to have been 19 % in 2010, rising higher by 2020 (with targets still to be agreed), and the share of electricity supplies covered by RES should be 13 % in 2020.

In Wallonia, both high-efficiency CHP and RES electricity production generate green certificates. The targets are that 26.7 % of electricity supplies should be covered by 2015, and 37.9 % by 2020, yielding 8 000 GWh of electricity. The promotion of offshore windmills also constitutes an essential tool for RES development. By 2020, it is expected that 2 000 MW will be installed.

Energy use

Energy efficiency

In industry, the combination of CO_2 allocations to emission trading enterprises and of benchmarking (Flanders), and energy/CO_2 efficiency long-term agreements (Wallonia) enabled significant energy savings, beyond the business-as-usual performance.

In the residential and commercial sector, the major policy instruments implemented are the improvement of energy performance of buildings, through strict regulations concerning new constructions and incentives for energy savings in renovations. These policies are expected to limit emissions by nearly 2 000 kT CO_2/e per year by 2020.

Renewables

No measures reported.

Transport

Renewables

Since 1 July 2009, the minimum percentage of biofuels in fuels has been 4 %. By 2020, this is expected to reach 10 %. There are tax exemptions supporting the promotion of biofuels.

Transport efficiency

Belgium has been promoting mobility plans at local levels. A 'Journey to work' survey is now legally obligatory for companies with 100 people or more. Publication of the results encourages companies to realise an action plan for the transport of their employees. Within Brussels, mobility plans at local level (schools, enterprises and businesses) aim to promote car-sharing and alternative transport modes.

Modal shift and raising awareness

Belgium has implemented several initiatives that promote public transportation, bicycle use, multimodal freight transport, car-pooling, car-sharing, and teleworking.

Industrial processes

Non-CO_2 gases

Belgium has implemented several policies to limit F-gas emissions (hydrofluorocarbons (HFCs), perfluorocarbons

(PFCs), and sulphur hexafluoride (SF_6)) in refrigeration design and disposal, automobile design, and high-voltage switches. Belgium has also implemented two policies to reduce nitrous oxide (N_2O) emissions from nitric acid and caprolactic production.

Energy efficiency

Belgium is promoting long-term energy/CO_2 efficiency agreements in the industrial sector by raising profitability criteria for rational use of energy (RUE) investments from a business-as-usual scenario, with 2 years of payback time to an internal rate of return (IRR) of 12.5 % through an agreement (Flanders), and by raising profitability criteria for RUE investments from business as usual, with 2 years of payback time to 5 years within an agreement (Wallonia).

Agriculture

The vast majority of the Belgian greenhouse cultivation takes place in the Flemish Region, while a minor level of production takes place in the Walloon Region. In the Flemish Region, specific policies aimed at limiting GHG emissions include increasing the share of natural gas and other more sustainable energy sources (CHP, biomass, etc.) in energy consumption by cultivation in greenhouses. In the Walloon Region, the primary intervention is aimed at reducing energy-related CO_2 emissions from greenhouse cultivation through RUE. Rural development plans are supplemented by specific measures on the rational use of organic and nitrogen-based fertilisers. Such policies, initially aimed at reducing the stress of pollution on surface and underground waters, contribute to the reduction of N_2O and methane (CH_4) emissions. Moreover, cross-compliance regulations aim to protect pastures: prohibiting pasture reductions, regulating acidity contents and taking action to combat erosion.

Waste

Belgium has implemented three main policies in the waste sector: they aim to minimise waste generation, optimise waste incinerators, and promote biogas recovery for electricity generation. Emissions reductions for these policies have not been estimated.

Land use, land-use change and forestry

Belgium has implemented two main policies in the LULUCF sector. The first aims to limit deforestation and promote afforestation in order to maintain the CO_2 sink potential of Belgian forests. The second aims to preserve the ecological sustainability of forests by gaining Forest Stewardship Council (FSC) and Programme for the Endorsement of Forest Certification (PEFC) certification. Neither has measured the quantifiable emissions reductions that these policies will generate.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year in 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
BE-ENS-014 Green and/or CHP certificates	10 947
BE-TRA-019 Improve and promote public transport (non-ETS)	3 440
BE-IND-006 Specific emission reduction agreement with nitric acid producers	3 361
BE-ENS-015 Action plan for RES and CHP	2 356
BE-RES-012 Financial support to RUE and RES in the residential sector (non-ETS)	1 823
BE-ENU-011 Long Term Energy/CO_2 efficiency Agreements in the industrial sector (both EU ETS and non-ETS)	1 800
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
BE-ENU-012 Long Term Energy/CO_2 efficiency Agreements in the industrial sector (both EU ETS and non-ETS)	1 708
BE-COM-017 Energy performance and certificate of buildings (residential) (non-ETS)	94
BE-RES-015 Energy performance and certificate of buildings (residential) (non-ETS)	63
BE-RES-017 Specific support for RUE initiatives for people with low incomes (non-ETS)	6
Measures with large expected savings specifically in the non-ETS sectors	
BE-TRA-019 Improve and promote public transport	3 440
BE-RES-012 Financial support to RUE and RES in the residential sector	1 823
BE-ENU-011 Long Term Energy/CO_2 efficiency Agreements in the industrial sector	1 800
EU policies or measures related to measures expected to deliver the largest savings	
BE-ENS-014 Green and/or CHP certificates: • Energy supply: Electricity production from renewable energy sources (Directive 2001/77/EC) • Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) • Energy supply: Combined Heat and Power (CHP) Directive Promotion of cogeneration 2004/8/EC BE-ENS-015 Action plan for RES and CHP: • Energy supply: Electricity production from renewable energy sources (Directive 2001/77/EC) • Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) • Energy supply: Combined Heat and Power (CHP) Directive Promotion of cogeneration 2004/8/EC BE-RES-012 Financial support to RUE and RES in the residential sector: • Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC) BE-ENU-011 Long Term Energy/CO_2 efficiency Agreements in the industrial sector • Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC • Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC) BE-ENU-012 Long Term Energy/CO_2 efficiency Agreements in the industrial sector (WAM) • Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC • Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC) BE-TRA-020 Promoting biofuels • Transport: Biofuels Directive (Directive 2003/30/EC)	
EU policies or measures expected to result in the largest emission savings	
Energy supply: Electricity production from renewable energy sources (Directive 2001/77/EC) Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) Energy supply: Combined Heat and Power (CHP) Directive Promotion of cogeneration 2004/8/EC Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC) Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC Transport: Biofuels Directive (Directive 2003/30/EC)	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Bulgaria

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	109.5	59.5	60.4	66.1	62.4
GHG per capita (t CO_2 eq./cap.)	12.5	7.3	8.0	9.0	8.5
GHG per GDP (g CO_2 eq./EUR)	n/a	3 340.4	2 271.4	2 444.0	2 287.4
Share of GHG emissions in total EU-28 emissions (%)	2.0 %	1.2 %	1.3 %	1.4 %	1.4 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	33.5	40.0	35.0
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	56 %	60 %	56 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 4.9 %	– 3.7 %	– 18.4 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	8.9 %	26.8 %	27.6 %

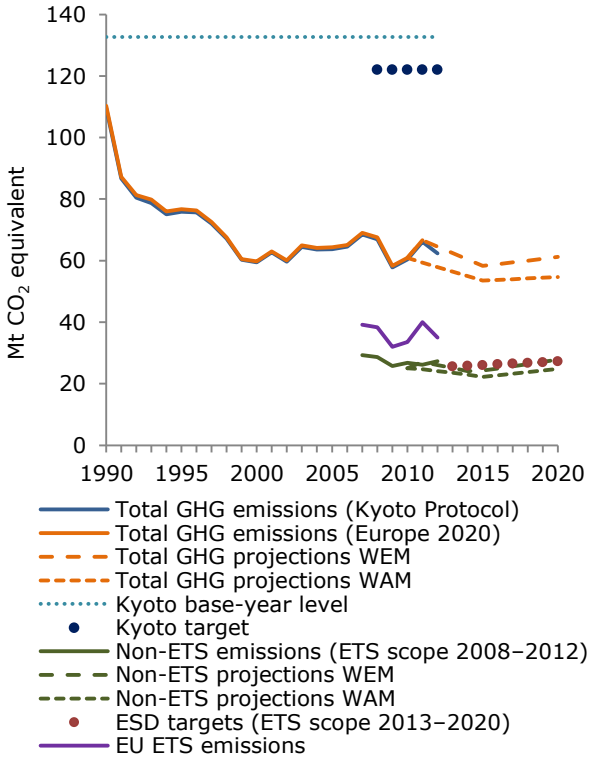
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	26.9
2008–2012 average non-ETS target	82.3
Gap to target (domestic emissions-target)	**– 55.3**
Expected effect of carbon sinks	– 0.5
Planned use of flexible mechanisms	– 1.4
Issued emission reduction units	– 1.6
Overall gap to target	**– 52.9**

Bulgaria is on track towards its Kyoto target. Its government intends to sell to other countries, through the Kyoto flexible mechanisms, a number of Kyoto units equivalent to 1 % of base-year emissions per year.

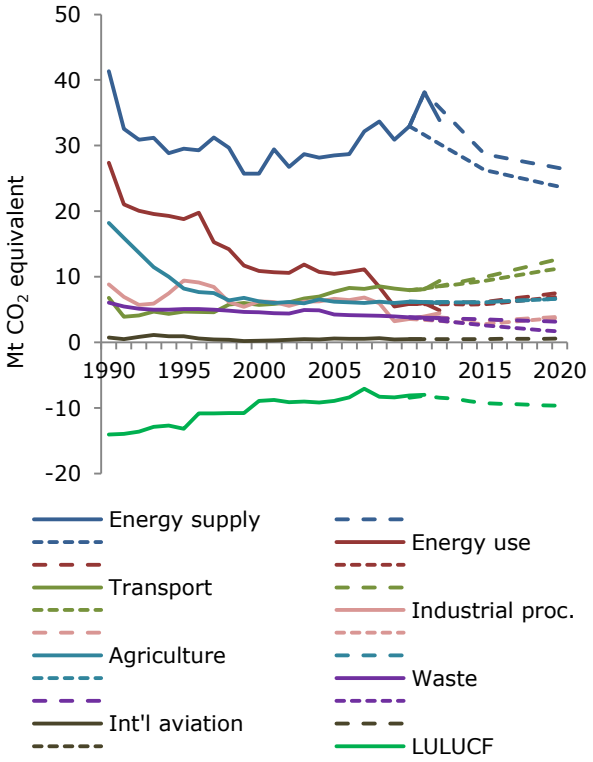
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	27.3
2013 ESD target	27.3
Gap to target (domestic emissions-target)	**– 0.1**
2020 ESD target (with art. 10 adjustment)	27.2
2020 non-ETS projections WEM	27.8
Gap to target WEM	**0.6**
2020 non-ETS projections WAM	24.8
Gap to target WAM	**– 2.4**

Bulgaria is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

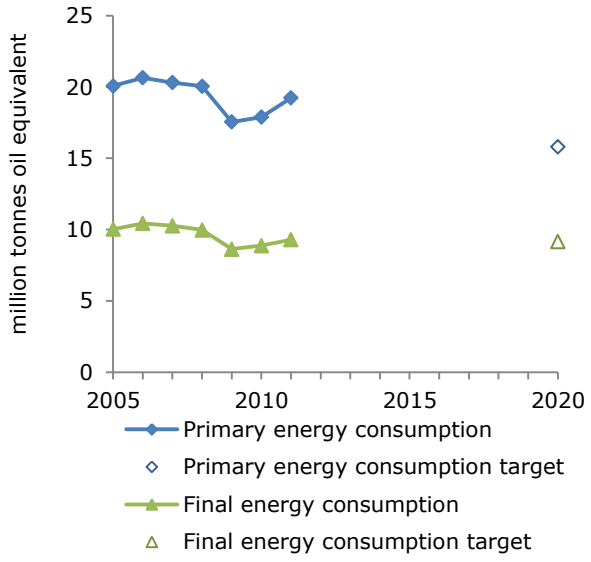


Sectoral GHG trends and projections

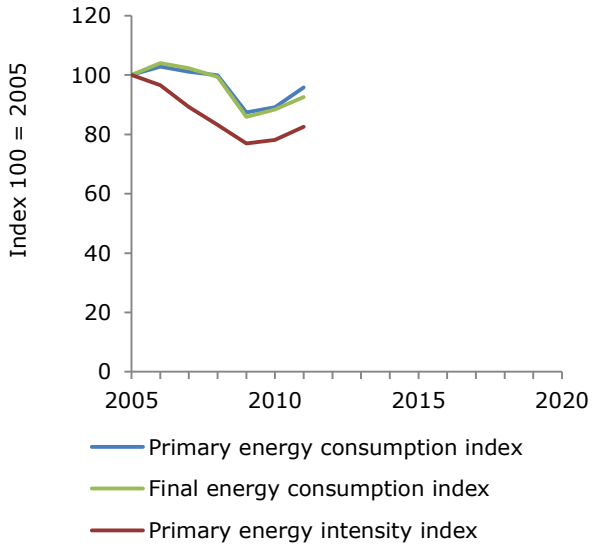


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	20.1	17.6	17.9	19.2	15.8
Final energy consumption (FEC) (Mtoe)	10.0	8.6	8.9	9.3	9.2
Bulgaria is making good progress in reducing energy consumption and primary energy intensity, and has a well-balanced policy package to support energy efficiency across sectors.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	9.2 % (9.2 %)	11.7 % (11.7 %)	13.4 % (13.7 %)	13.8 %	16.0 %
Share of renewable energy in gross FEC - electricity (%)	9.0 %	11.0 %	12.5 %	12.9 %	
Share of renewable energy in gross FEC - heating and cooling (%)	14.0 %	20.8 %	23.4 %	23.8 %	
Share of renewable energy in gross FEC - transport (%) (including all biofuels consumed in transport)	0.3 % (0.3 %)	0.4 % (0.7 %)	0.4 % (1.5 %)	0.4 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 13.8 % (1 428 ktoe), which is higher than the indicative target for the 2011-to-2012 period (10.7 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (66 %), hydropower (25 %) and onshore wind (5 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 6.0 %. In order to reach the 2020 target, an average annual growth rate of 2.1 % is needed for the period from 2011 to 2020. This corresponds to 0.7 times the cumulative effort up to 2011.					

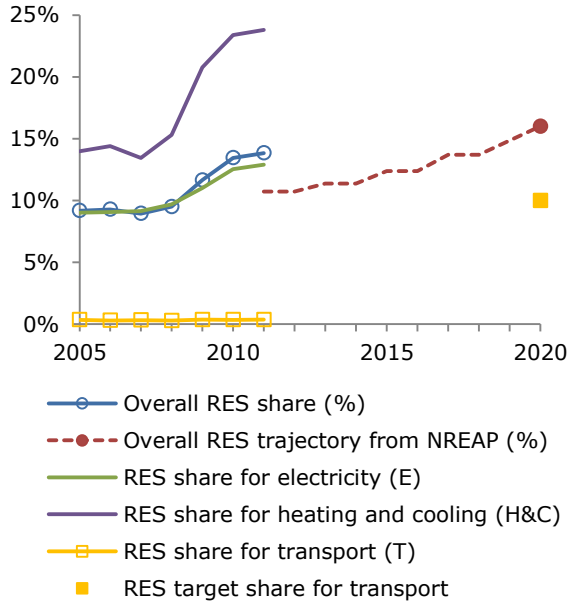
Primary and final energy consumption



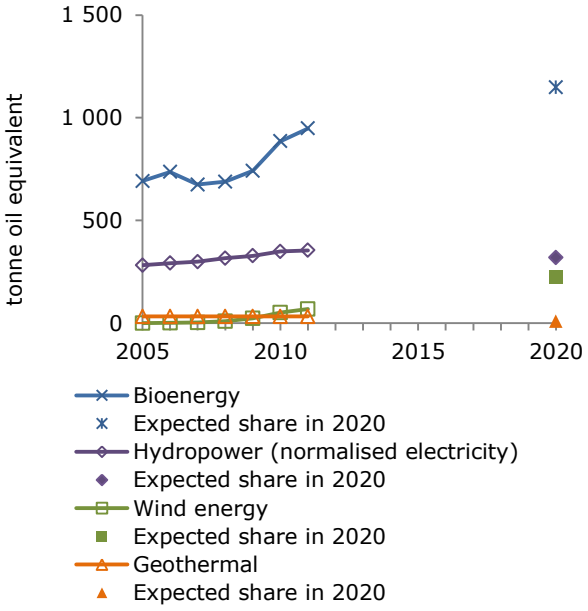
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Third National Action Plan on Climate Change (NAPCC) outlines the framework for action to combat climate change for the period 2013–2020 in Bulgaria. The policies and measures in this plan are designed to lead to reductions of GHG emissions. Bulgaria faces the challenge to achieve this without limiting its economic growth, so it is to pursue the development of an efficient economy with low carbon intensity.

Bulgaria intends to reduce the carbon intensity of the energy mix for electricity production by increasing the nuclear electricity capacity and by increasing renewable electricity production. However, based on a referendum in January 2013, the Bulgarian Parliament voted in February 2013 to abandon the Belene nuclear power plant. This vote will stop at least for another two years and further attempts to start up the project.

Main economic instruments for renewable energy and energy efficiency

In Bulgaria, renewable energy generation is supported mainly through a feed-in tariff. The use of renewable energy technologies in buildings is promoted through a system of tax incentives for building owners. A quota system obliges companies importing or producing petrol or diesel to ensure that biofuels make up a defined percentage of their annual fuel sales. Furthermore, biofuels are supported through a fiscal regulation mechanism, where a reduced rate of excise duty is applied to unleaded petrol or gas oil if a share of more than 4 % of bioethanol or biodiesel has been added. For funding of projects and measures, Bulgaria intends to use EBRD funds (European bank for Reconstruction and Development), European Structural Funds (ERDF grants subsidies for investments related to the generation of electricity from renewable sources), the Green Investment Scheme, the Kozloduy Fund, the state budget and private investments.

European Union Emissions Trading System (EU ETS)

In 2011, Bulgaria has 156 installations that fall under the EU ETS. They represented a share of 60 % of total GHG emissions in the country.

Energy supply

Energy efficiency

Bulgaria foresees to increase the efficiency of coal fired power plants from 5 % to 7 % by 2020. Newly built coal fired plants have to use the best available technologies. There will also be a pilot project with clean coal technology that will not lead immediately to reductions by 2020, but is intended for the longer term. The Energy Strategy of the Republic of Bulgaria 2020 has set a target of 9.2 Mt CO2 from the GHG emissions emitted by the Energy sector to be captured and stored in geological formations by 2030. The European Emission Trading Scheme and the competition on the electricity market encourage the transition to low-carbon technologies and fuels such as natural gas. Bulgaria expects a total of 600 MW new substituting gas capacities for the period 2012–2020. The Energy Strategy of the Republic of Bulgaria also envisages that the co-generation of electric energy will account for 15 % in the electric energy mix by 2020. The Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) extends loans to participating banks which on-lend to private sector companies for industrial energy efficiency projects and small renewable energy projects. Bulgaria has also implemented plans to decrease losses in the distribution and transmission networks. The operation of the nuclear power plant Kozloduy (NPP-K) has been improved.

Renewables

Regarding renewable electricity, the National Action Plan for Renewable Energy and the Renewable Energy Act reflect the national policy. The production of electricity from renewable sources is expected to increase to 7.5 TWh by 2020 or to account for 15 % in the electricity generation mix of the country. Renewable energy generation is supported mainly through a feed-in tariff that applies to producers of electricity who feed in electricity to the public grid. The Operational Programme 'Development of the Competitiveness of the Bulgarian Economy' by the European Regional Development Fund (ERDF) grants subsidies for investments related to the generation of electricity from renewable sources. Bulgaria also intends to increase the hydro-pump-storage energy, to balance the production of electricity from wind farms that are expected to contribute to achieve 30 % of the national target in the Energy sector by 2020. Bulgaria also wants to increase the share of heating and cooling from renewable energy sources. The measure is intended to sustainably develop the district heating sector and substitute conventional fuel for production of thermal energy with renewable sources. In 2014, 2 % of thermal energy should come from renewable sources, reaching 10 % in 2020.

Energy use

Energy efficiency

Bulgaria intends to take measures (institutional and fiscal incentives) to accelerate the gasification of the country. This should lead to access to the gas distribution system for 30 % of households in 2020 and the substitution of electricity used for heating purposes by gas. The investments are high, but the implementation of this measure will have long-term effect on the amount of GHG emissions also after 2020 and will reduce 2,476.4 kt CO2 cumulatively by 2020. There are plans for improving the energy efficiency of buildings: restoration of the specified annual percentage of the overall public and governmental buildings (with total area over 250m2), replacement of the obsolete and inefficient equipment for the production of energy with new equipment. Also mandatory energy savings in end-use are envisaged (based on Directive 2012/27/EC), such as a White Certificate Scheme. A plan for introducing nearly zero energy buildings, standards for sustainable buildings, the introduction of a public registry of energy efficiency certificates, a technical passport for buildings and further raising of awareness are also envisaged. In the industry sector, industrial systems with annual energy consumption more than 3,000 MWh are required to have their energy efficiency audited every three years since 2008, based on the Energy Efficiency Act.

Renewables

Bulgaria also wants to develop a national programme ' 1,000 sunny roofs', where a bivalent system for preparation of hot water for domestic needs and heat pump units for 1,000 multi-family buildings (46 apartments, households

with 3 members) will be commissioned. Bulgaria intends to increase the use of biodegradable waste in combustion units of industrial installations.

Transport

Renewables

The Renewable Energy Sources Act (Art. 47(1)) launches stages for the introduction of certain percentages of biodiesel and bioethanol content in the relevant fuel, as well as sets requirements for the types of biofuels and sustainability criteria which must be meet. This can lead to a reduction of CO2 emissions of 2,102 kt by 2020.

Transport efficiency

The planned modernisation of the existing road infrastructure and the introduction of intelligent transport systems should ensure optimum speed and driving modes, and therefore reduce emissions. Dispatching systems for road cargo and railway power dispatching are adopted. Bulgaria also wants to develop and promote the use of hybrid and electric vehicles, using a tax relief upon the initial registration. In a pilot project in Sofia, the first 7 electric stations were installed by the end of 2011. The Full Charger Company Bulgaria plans to build a network of 150–200 charging stations by the end of 2012 in Sofia and in other big cities. After that stations will be built along motorways and inter-city roads.

Modal shift and raising awareness

Bulgaria wants to reduce the share of trips by private motor vehicles by improving the urban public transport and non-motorized transport systems. This includes the increase of the share of public electrical transport - railways, trolley, tram, metro (1,017 kt CO2 reduction by 2020) and the promotion of cycling. Bulgaria also wants to develop and construct intermodal terminals for combined transport (407 kt CO2 reduction by 2020). Other measures in the 3th National Action Plan include: redirect cargo to be transported over more than 300 km from road to railways and to improve the railway connections between the national airports.

Industrial processes

Non-CO_2 gases

No specific strategies or measures have been reported in the industrial processes sector.

Energy efficiency

No specific strategies or measures have been reported in the industrial processes sector.

Agriculture

Bulgaria has introduced sustainable crop rotation systems that include plant cover in winter which will prevent soil erosion and will retain organic carbon. Other planned measures are: management of degraded agricultural land, improvement of the manure use and management, introduction of low-carbon practices for processing manure (e.g. composting, transformation of manure into biogas under anaerobic conditions), technical support for farmers for using plant residues in agriculture and financial support for improving the equipment and the technology of production. In the 3th National Action Plan the reduction of CH4 in animal husbandry by encouraging extensive grassland husbandry is also included.

Waste

Bulgaria is constructing installations for the mechanical and biological treatment of waste and installations for treatment and recovery of compost and biogas. From 2013 to 2014 12 installations will be built, until 2020 54 installations are planned. As a result of its implementation for the period 2013–2020, 5,289,000 tonnes of biodegradable waste will be diverted from landfills, with a reduction of 5,824 kt CO2-eq. The National Waste Management Programme 2009–2013 and the National Strategic Plan for Gradual Reduction of Biodegradable Waste 2010–2020 include the following measures: further development of collective systems for separate collection of waste, the introduction of differentiated charges for generating waste, developing markets for recycled waste materials and the introduction of separate collection of green waste. Bulgaria also intends to increase the capture and flaring of biogas in new and existing regional landfills, while municipal landfills will be closed. In 2014 6 installations will be built, increasing to 54 in 2020 and leading to a reduction of 5,070 kt CO2eq in 2020. The 20 largest municipal landfills, that will be closed, will be inspected for their energy potential (generation of methane). In addition, Bulgaria wants to introduce the anaerobic stabilization of sludge with capture and burning of biogas in new plants and plants under reconstruction in settlements with over 20,000 residents. This can lead to a total cumulative reduction of 1,026 kt CO2eq.

Land use, land-use change and forestry

Bulgaria has planned several measures in the LULUCF sector: the utilization of non-wooded areas intended for afforestation in forest areas, afforestation of abandoned agricultural land, arid lands and deforested areas, eroded and threatened by erosion land outside of forests; increase of areas for urban and suburban parks and green zones; restoration, protection, sustainable management and preservation of wetlands in forest areas, peatlands, marshlands; restoration and maintenance of protective forest belts and new anti-erosion afforestation; increasing the density in the listed natural and artificial plantations. Other planned measures listed in the 3th National Action Plan include the prevention of forest fires through early warning systems and further measures to increase the carbon capture potential of forests.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
Measures concerning the decrease of losses in the electrity and heat networks contribute most in the WEM scenario. Another significant effect comes from the energy efficiency audits for industrial systems with annual energy consumption over 3 000 MWh every three years (since 2008). Also the improvement of the operation of nuclear power plant Kozloduy (NPP-K) has contributed to reductions in the WEM scenario.	
BG-RES-005 Gas supply to households (non ETS)	2 500
BG-RES-003 Energy efficiency Audits and implementation of the prescribed measures (non ETS)	1 778
BG-ENS-005 Improvement of the operation of nuclear power plant Kozloduy (NPP-K) (ETS)	1 000
BG-ENS-009 Electricity transmission and distribution losses (ETS)	1 000
BG-ENS-010 Heat transmission and distribution losses (ETS)	1 000
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
A major contribution is expected from the fuel switch from coal to natural gas in the electricity production. Improvement of production efficiency in existing coal-fired power plants is also expected to reduce emissions considerably. The recovery of biogas from landfills and the recovery of biodegradable waste and/or biogas should lead to substantial reductions by 2020. Also the use of waste as biofuel in combustion installations leads to a decrease in emissions. The gasification of the country, where end users will be given more access to the gas network will also contribute to emissions reductions.	
BG-ENS-002 Fuel substitution – from coal to natural gas (ETS)	11 700
BG-WST-001 Construction of installations for mechanical and biological treatment (mbt) and installations for treatment and recovery of compost and biogas (non ETS)	5 824
BG-WST-002 Capture and burning of biogas in all new and in the existing regional landfills (non ETS)	5 070
BG-ENS-001 Improvement of production efficiency in existing coal-fired power plants q (ETS)	4 680
BG-RES-004 Use of biomass in the combustion units of installations (waste as alternative fuel) (both ETS and non ETS)	3 880
BG-ENU-001 Implementation of the measures in the programme for accelerated gasification (PAG) of the republic of Bulgaria (both ETS and non ETS)	2 476
Measures with large expected savings specifically in the non-ETS sectors	
BG-WST 001 Construction of installations for mechanical and biological treatment (mbt) and installations for treatment and recovery of compost and biogas (non ETS) - WAM	5 824
BG-WST-002 Capture and burning of biogas in all new and in the existing regional landfills (non ETS) - WAM	5 070
EU policies or measures related to measures expected to deliver the largest savings	
BG-ENS-005 Improvement of the operation of nuclear power plant Kozloduy (NPP-K) & BG-ENS 009 and BG-ENS-010 reducing transmissions and distribution losses for heat and electricity: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	
BG-WST-001 Construction of installations for mechanical and biological treatment (mbt) and installations for treatment and recovery of compost and biogas: Waste: Landfill directive 1999/31/EC	
BG-WST-002 Capture and burning of biogas in all new and in the existing regional landfills:)Waste: Landfill directive 1999/31/EC	
EU policies or measures expected to result in the largest emission savings	
The EU ETS is expected to contribute to a more low carbon electricity production in Bulgaria.	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Croatia

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	31.6	26.3	28.6	28.3	26.1
GHG per capita (t CO_2 eq./cap.)	6.6	5.8	6.5	6.4	5.9
GHG per GDP (g CO_2 eq./EUR)	n/a	907.6	776.0	766.6	723.8
Share of GHG emissions in total EU-28 emissions (%)	0.6 %	0.5 %	0.6 %	0.6 %	0.6 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	n/a	n/a	n/a
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	n/a	n/a	n/a
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	n/a	n/a	n/a
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	n/a	n/a	n/a

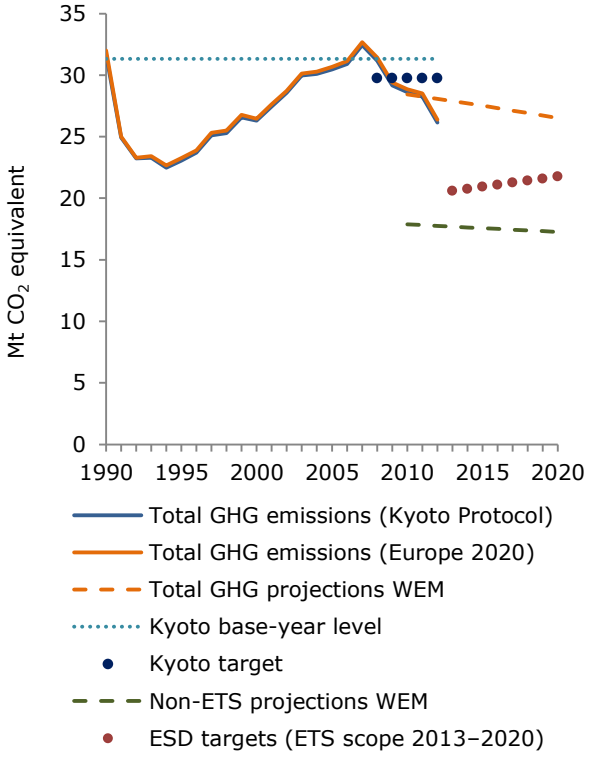
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	28.7
2008–2012 average non-ETS target	29.8
Gap to target (domestic emissions-target)	**– 1.1**
Expected effect of carbon sinks	– 1.0
Planned use of flexible mechanisms	0.0
Issued emission reduction units	0.0
Overall gap to target	**– 2.1**

Croatia is on track towards its Kyoto target. Its government does not plan on using the Kyoto flexible mechanisms to achieve its target.

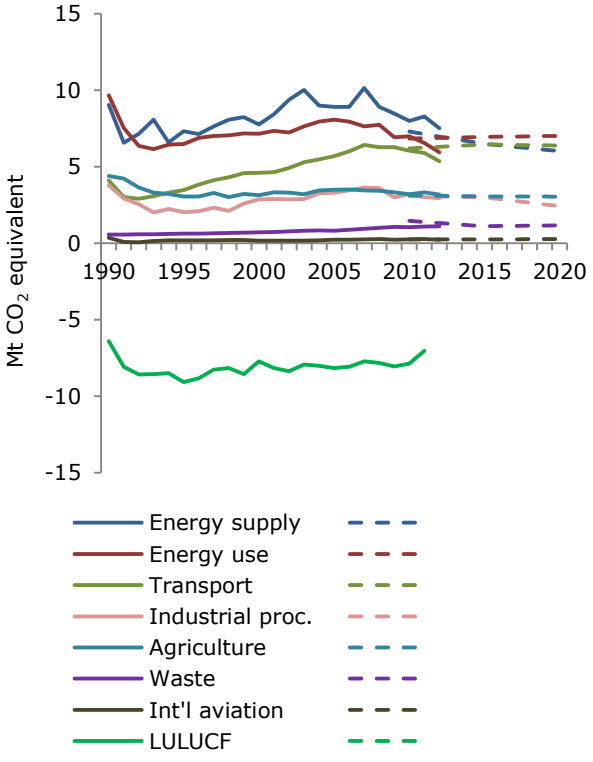
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	n/a
2013 ESD target	20.6
Gap to target (domestic emissions-target)	**n/a**
2020 ESD target (with art. 10 adjustment)	20.4
2020 non-ETS projections WEM	17.3
Gap to target WEM	**– 3.1**
2020 non-ETS projections WAM	**n/a**
Gap to target WAM	**n/a**

Projections for Croatia show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections



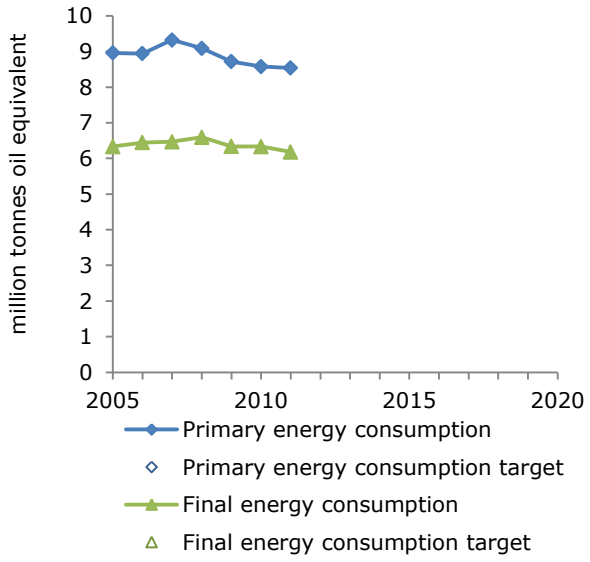
Sectoral GHG trends and projections



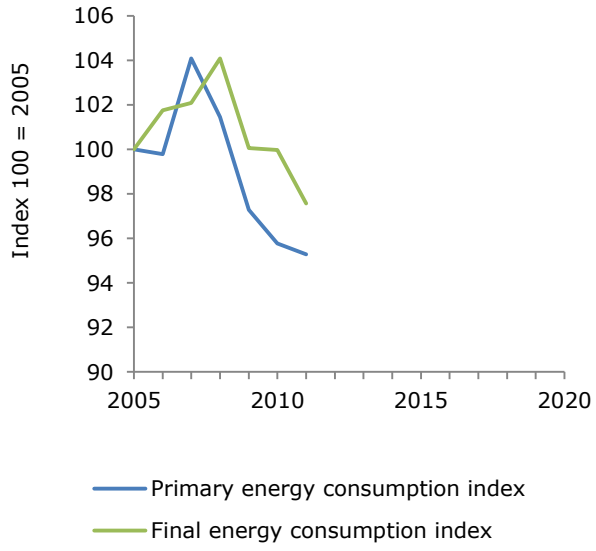
Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	9.0	8.7	8.6	8.5	n/a
Final energy consumption (FEC) (Mtoe)	6.3	6.3	6.3	6.2	n/a
Croatia does not have an energy efficiency target.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	14.1 % (14.1 %)	13.2 % (13.3 %)	14.6 % (14.6 %)	15.7 %	20.0 %
Share of renewable energy in gross FEC — electricity (%)	38.8 %	33.4 %	35.6 %	35.5 %	
Share of renewable energy in gross FEC — heating and cooling (%)	10.7 %	11.6 %	13.0 %	15.6 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.2 % (0.2 %)	0.2 % (0.6 %)	0.2 % (0.3 %)	0.2 %	10.0 %

In 2011, the share of renewable sources in gross final energy consumption was 15.7 % (1 011 ktoe), which is higher than the indicative target for the 2011-to-2012 period (14.1 %). The three main technologies contributing to renewable energy use in 2011 were hydropower (53 %), solid biomass for heat (43 %) and onshore wind (2 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 1.3 %. In order to reach the 2020 target, an average annual growth rate of 1.2 % is needed for the period from 2011 to 2020.

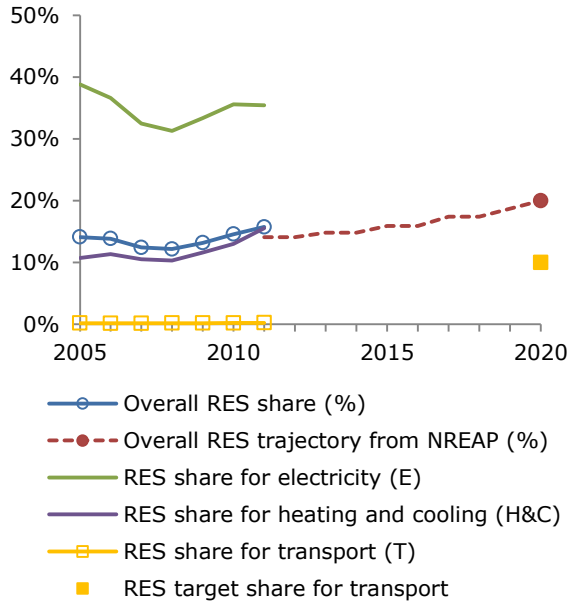
Primary and final energy consumption



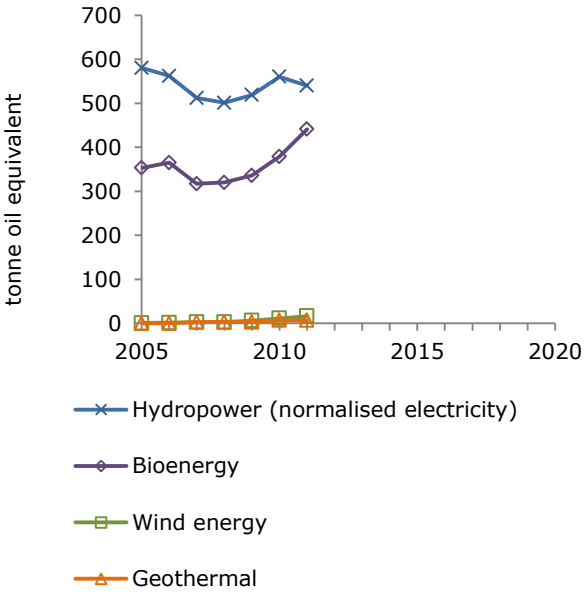
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework
based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Energy Strategy of the Republic of Croatia (OG 130/09) is the basic document for establishment of energy policy, and has three fundamental goals: energy supply security, energy system competitiveness and energy development sustainability. Additionally, the Environmental Protection and Energy Efficiency Fund has been operating since 1 January 2004 with the aim of securing the necessary finances for projects and programmes in the field of environmental protection, energy efficiency enhancement and wider utilisation of renewable energy sources (RES).

Furthermore, six Croatian cities (Zagreb, Rijeka, Ivanić Grad, Duga Resa, Klanjec and Ozalj) are signatories to the Covenant of Mayors. By signing the Covenant, cities commit to go beyond the objectives of EU energy policy in terms of reduction in CO_2 emissions through enhanced energy efficiency and cleaner energy production and use. Since over half of greenhouse gas (GHG) emissions and 80 % of energy consumption arises within cities, local authorities are well positioned to translate emission reduction objectives into local development objectives.

The Ministry of Environmental and Nature Protection conducts activities to develop a low-carbon strategy and establish measures to reduce GHG emissions from sectors not covered by the ETS, in order to keep GHG emissions within national annual allocation.

A new Plan for air protection and mitigation of climate change is in the process of adoption. This Plan will determine priority measures and activities to be implemented in the next five-year period to implement this long-term strategy.

Main economic instruments for renewable energy and energy efficiency

The Croatian Bank for Reconstruction and Development operates a credit supply programme for the preparation of RES projects as part of the Global Environment Facility (GEF)/International Bank for Reconstruction and Development (IBRD) grant awarded to the Republic of Croatia for implementation of the Renewable Energy Resources Project. The basic purpose of the grant is to encourage the development of an economically and ecologically sustainable market of renewable energy sources in the Republic of Croatia and to create stimulating surroundings for investments in renewable energy sources utilisation projects.

By adopting the Regulation on Unit Charges, Corrective Coefficients and Detailed Criteria and Benchmarks for Determination of the Charge for Carbon Dioxide Emissions into Environment (OG 73/07), the government of the Republic of Croatia introduced a tax on CO_2 emissions for all stationary sources emitting more than 30 tonnes of CO_2 per year. Emission sources are stimulated, by means of lowering their CO_2 emission charges, to invest in increasing energy efficiency and RES to reduce CO_2 emissions as well as to invest in other CO_2 emission reduction measures.

European Union Emissions Trading System (EU ETS)

Croatia joined the EU ETS on 1st January 2013.

Energy supply

Energy efficiency

In order to help reduce the carbon intensity of generated electricity, Croatia has undertaken to prepare for applying the carbon capture and storage (CCS) technology on new coal-fired power plants, as well as research and implementation of CO_2 injection with enhanced oil recovery (EOR) technology. Furthermore, cogeneration is encouraged by regulation and incentives, with the aim that a minimum of 2 % of the national electricity mix will be generated in cogeneration plants.

Renewables

Croatia aims to increase RES' share in gross final energy consumption (FEC) to 20 % by 2020. As part of this strategy, it is intended that renewables form 35 % of the electricity generation mix by 2020, including large hydropower plants. The main mechanism for development of RES is differentiated incentives, i.e. feed-in tariffs.

Energy use

Energy efficiency

Croatia's Energy Strategy includes the goal to reduce FEC by 10 % by 2020 in relation to the average in the period from 2001 to 2005. To this end, Croatia promotes domestic and commercial use of energy efficient technologies through the project 'Promoting energy efficiency in Croatia', and has a number of measures aimed at increasing new buildings' energy efficiency, through the Physical Planning and Building Act (OG 76/07, 38/09) and set of executive regulations transposing the EU Directive 2002/91/EZ.

Renewables

No available information.

Transport

Renewables

As part of the Energy Strategy, it is intended that the proportion of renewable energy used in transportation should reach 10 % by 2020, by regulating and incentivising liquid biofuel production in Croatia.

Transport efficiency

In Croatia, the use of low CO_2 vehicles is promoted by adopting related European ordinances, and an annual guide for consumers on fuel efficiency, including recommendations on driving technique, is produced. In addition, the Croatian Automobile Club in cooperation with the Environmental Protection and Energy Efficiency Fund works to promote the 'Make Cars Green' campaign in Croatia.

Modal shift and raising awareness

Croatia has undertaken a number of initiatives to increase the attractiveness of rail transport, including a truck terminal in Spačva, extension of passenger platforms around Zagreb and an integrated system of charging for suburban and city transport in the City of Zagreb.

Industrial processes

Non-CO_2 gases

Croatia has adopted a number of measures to reduce solvent volatile organic compound (VOC) emissions, which are also expected to impact upon CO_2 emissions from the industrial sector. Furthermore, the application of selective non-catalytic reduction (SNCR) technology in the nitric acid production sector is expected to enable the reduction of N_2O emissions with up to 85 % efficiency.

Energy efficiency

No available information.

Agriculture

The project 'Pollution control in agriculture' is intended to promote best practices in the Croatian agriculture sector, in accordance with the Nitrates Directive (91/676/EEC) and other European ordinances, such as ensuring the efficient management of organic manure.

Waste

The Waste Management Plan of the Republic of Croatia (OG 85/07, 126/10 and 31/11) establishes a waste management concept based on three principles: avoidance, evaluation, deposition. It is understood that this is consistent with the thermal utilisation of wastes for heat and power, and this is therefore also promoted in all sectors. At the same time, however, this implies implementation of landfill remediation and closure measures, and the development and establishment of regional and county waste management centres with pretreatment of wastes before final disposal or deposition that includes mechanical-biological waste treatment procedures.
Croatia has several policies in place to promote the thermal utilisation of biodegradable waste, particularly in the cement industry, where it is intended that 20 % of fuel used will be refuse-derived by 2020. A new Act on Sustainable Waste Management (OG 94/13) entered into force in 2013.

Land use, land-use change and forestry

Croatia has a long tradition of forest management with a comprehensive, vertically structured, national system for monitoring, data collection and reporting on the condition and activities in forestry sector. State forests make about 78 % of forest area while the remaining 22 % are privately owned. Considering that both state and private forests are within the forest management area which is managed based on Forest Management Area Plans, all forests in Croatia are sustainably managed. Croatia has implemented measures to improve private forest management, and a number of additional possible measures are also under consideration. These include initiatives such as planting new forests on forest land without tree cover, managing degraded forest vegetation in ex-agricultural areas, improving carbon sequestration in forest soils and improving cropland management.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
n/a	n/a
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
n/a	n/a
Measures with large expected savings specifically in the non-ETS sectors	
n/a	n/a
EU policies or measures related to measures expected to deliver the largest savings	
n/a	
EU policies or measures expected to result in the largest emission savings	
n/a	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Cyprus

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	6.1	8.6	9.4	9.2	8.5
GHG per capita (t CO_2 eq./cap.)	10.6	12.4	11.5	10.9	9.9
GHG per GDP (g CO_2 eq./EUR)	818.4	738.7	616.1	594.1	568.4
Share of GHG emissions in total EU-28 emissions (%)	0.1 %	0.2 %	0.2 %	0.2 %	0.2 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	5.1	4.6	4.4
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	54 %	50 %	51 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 5.9 %	– 21.2 %	– 29.7 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	12.9 %	0.6 %	37.5 %

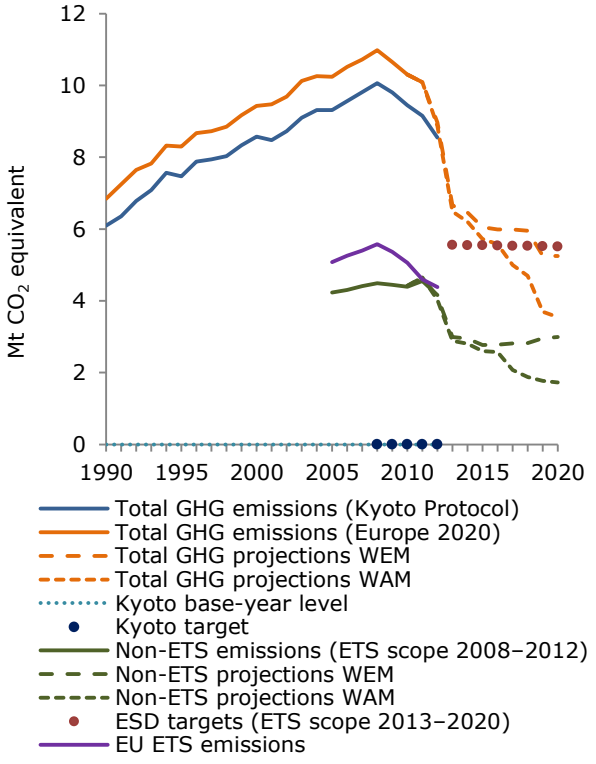
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	n/a
2008–2012 average non-ETS target	n/a
Gap to target (domestic emissions-target)	n/a
Expected effect of carbon sinks	n/a
Planned use of flexible mechanisms	n/a
Issued emission reduction units	n/a
Overall gap to target	n/a

Cyprus does not have any targets under the Kyoto Protocol's first commitment period, from 2008 to 2012.

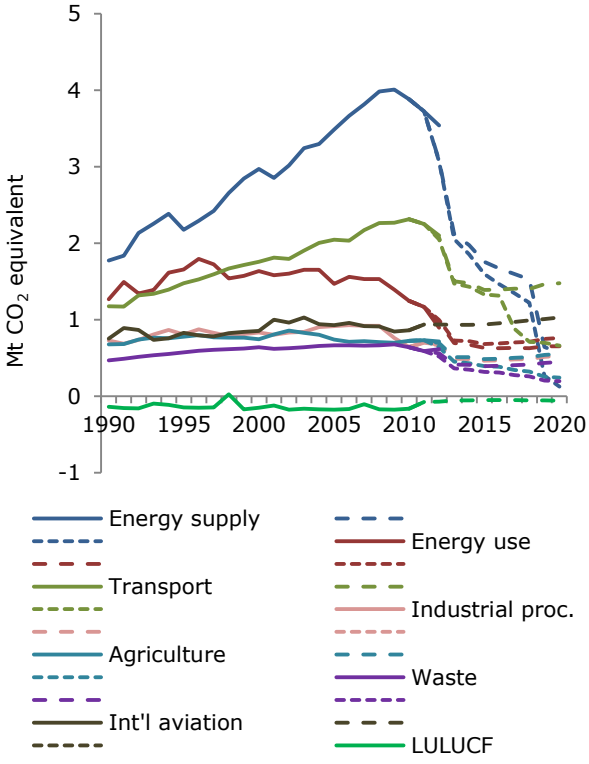
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	4.2
2013 ESD target	5.6
Gap to target (domestic emissions-target)	**– 1.4**
2020 ESD target (with art. 10 adjustment)	5.5
2020 non-ETS projections WEM	3.0
Gap to target WEM	**– 2.5**
2020 non-ETS projections WAM	1.7
Gap to target WAM	**– 3.8**

Cyprus is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

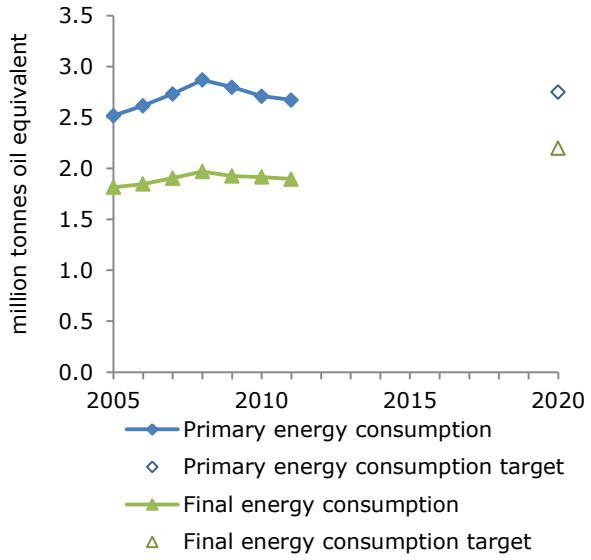


Sectoral GHG trends and projections

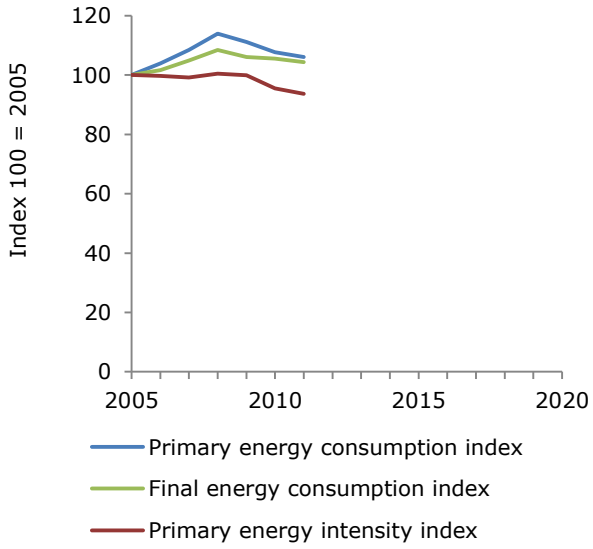


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	2.5	2.8	2.7	2.7	2.8
Final energy consumption (FEC) (Mtoe)	1.8	1.9	1.9	1.9	2.2
Cyprus has made limited progress in reducing energy consumption so far. Further improvements are necessary, in energy efficiency policy implementation as well as policy package development.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	2.6 % (2.6 %)	4.2 % (5.0 %)	4.6 % (5.4 %)	5.4 %	13.0 %
Share of renewable energy in gross FEC — electricity (%)	0.0 %	0.6 %	1.4 %	3.4 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	8.7 %	14.8 %	16.6 %	18.1 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.1 % (0.1 %)	0.0 % (2.0 %)	0.0 % (2.0 %)	0.0 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 5.4 % (94 ktoe), which is higher than the indicative target for the 2011-to-2012 period (4.9 %). The three main technologies contributing to renewable energy use in 2011 were solar thermal for heat (67 %), solid biomass for heat (21 %) and onshore wind (10 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 13.6 %. In order to reach the 2020 target, an average annual growth rate of 12.1 % is needed for the period from 2011 to 2020. This corresponds to 2.3 times the cumulative effort up to 2011.					

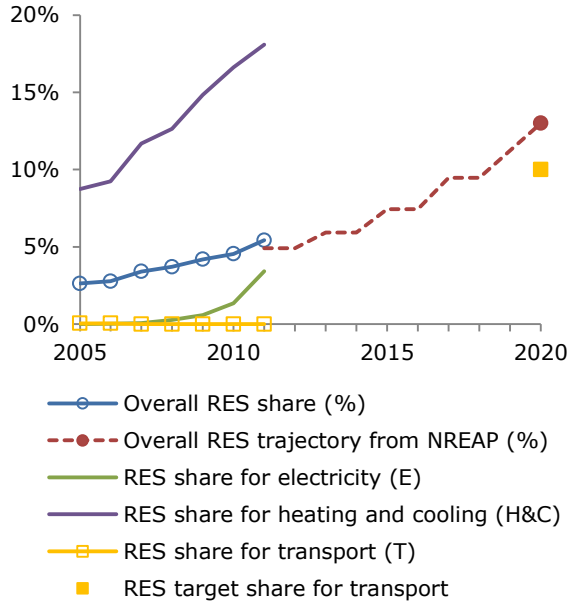
Primary and final energy consumption



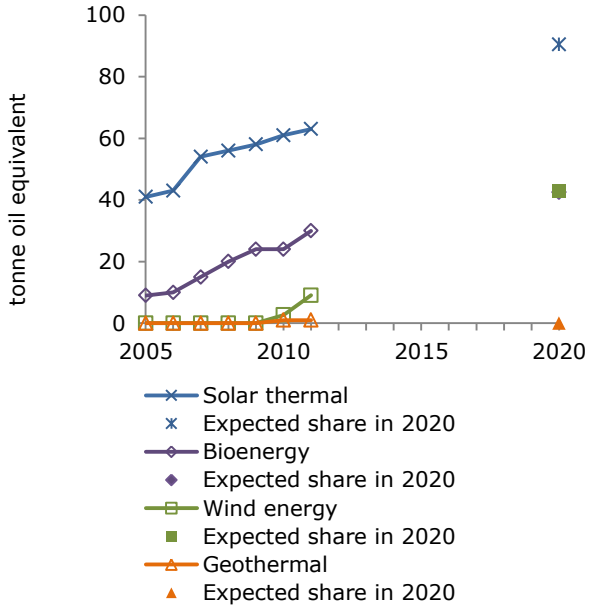
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

Within the context of the EU 2020 strategy, Cyprus has set the following national targets: energy savings of primary energy consumption shall be increased by 14.3 % by 2020. The target of greenhouse gas (GHG) emission reductions not covered by the EU ETS in 2020 is set to 5 % (compared to the 2005 level). Renewable energy sources shall amount to 13 % of the total energy consumption by 2020.

The main goal of Cyprus is to shape a new competitive energy model based on a comprehensive long-term energy policy. Cyprus is facing difficulties in energy supply typical of most islands, and it is very dependent on fuel imports. In order to reduce dependency on oil, the government decided to introduce an electricity production system based on natural gas. According to the Cyprus National Reform Programme, Cyprus plans to exploit newly found domestic natural gas deposits and to connect them with the natural gas pipeline network. The first delivery of natural gas is anticipated in 2017/2018. Through the switch to natural gas, it is expected that GHG emissions will be reduced substantially.

Main economic instruments for renewable energy and energy efficiency

The support scheme for the promotion of renewable energy sources and energy conservation provides financial incentives in form of grants or subsidies. The fund derives money from a levy on electricity consumption (EUR 0.005/KWh), and is estimated to amount to EUR 454 million for the period between 2010 and 2020.

European Union Emissions Trading System (EU ETS)

In Cyprus, 13 installations participate in the EU ETS. The share of ETS emissions is 50 % of the total national emissions.

Energy supply

Energy efficiency

The Government of Cyprus decided that imported natural gas should be the basic energy source for electricity production. The installation of combined cycle electricity production units using natural gas as fuel, and the decommissioning or conversion of existing electricity production units are planned.

Renewables

In order to achieve its national target for renewable energy, a financial support scheme was implemented for the promotion of large wind farms, thermal solar and photovoltaic systems as well as the use of biomass.

The scheme is split into three categories:

- electricity production from renewables;
- energy conservation and promotion of renewables for individuals/organisations with non-commercial interests;
- energy conservation and promotion of renewables for individuals/legal entities with commercial interests.

Wind farms with a capacity of 146.7 MW, 19.5 MW of photovoltaic and 9.4 MW biomass units were installed by January 2013.

Energy use

Energy efficiency

According to the 2013 report on the National Reform Programme, the most important measure contributing to the efficiency target of saving 14.3 % of primary energy is the introduction of natural gas to the national energy system. The target for energy savings in residential buildings is set to 12 % for electricity, and 0.6 % for heating and cooling by 2015, as well as 24 % for electricity and 1.2 % for heating and cooling by 2020. Measures are focused on the promotion of efficient bulbs, grant schemes for insulation of residential buildings and increasing efficiency in companies.

Renewables

In the cement industry, biomass and alternative fuels are promoted for the generation of thermal energy. The promotion of renewable energy sources for heating and cooling in the industrial, housing and tertiary sector is supported with a financial support scheme which is accompanied by information campaigns. The share of renewables in energy consumption for heating and cooling shall amount to 20 % by 2015 and 23.5 % by 2020.

Transport

Renewables

According to the national target, the share of renewable sources in transport shall amount to 3.3 % in 2015 and 10 % in 2020. A tax exemption for biofuels and the implementation of a grant scheme for installations producing biofuels are planned.

Transport efficiency

In order to reduce GHG emissions from transportation, alternative technologies are promoted. The purchase of new fuel-efficient, hybrid or electric vehicles is granted with tax reductions, subsidies and reduced circulation fees. Another measure aims to remunerate the withdrawal of old vehicles, if the old car is replaced by a new one emitting fewer than 165 g/km.

Modal shift and raising awareness

The rate of car ownership of Cyprus is one of the highest in the world. Therefore, the development and promotion of the public transport system is one main strategy to reduce emissions from transportation. The national target is to increase the contribution of public transport from 2 % in 2009 to 10 % by 2015. The legal framework has been revised, which allowed the development of the new urban, suburban and intercity bus routes and schedules. 'Park and ride' systems, bus priority lanes and new bus stops shall make public transport more attractive. Moreover, mobility master plans for the four large urban areas of Cyprus were developed.

Industrial processes

Non-CO_2 gases

No specific strategies or measures have been reported in the industrial processes sector.

Energy efficiency

No specific strategies or measures have been reported in the industrial processes sector.

Agriculture

In Cyprus, the promotion of anaerobic digestion for treatment of livestock breeding waste is encouraged as a voluntary measure. Relevant legislation is the Control of Water Pollution (Waste Water Disposal) Regulation 2003, 772/2003 and the Control of Water Pollution (Sensitive Areas for Urban Waste Water Discharge) 111/2004.

Waste

Based on the EU Landfill Directive (1999/31/EC) and improvements of the infrastructure in the country, Cyprus has been developing a revised strategy for solid waste management during recent years. Methane recovery from existing and new waste management sites is expected to lead to a 10 % reduction by 2015 and a 70 % reduction by 2020. Furthermore, the management of uncontrolled disposal sites is expected to lead to an emission reduction of 20 % by 2015 and 60 % by 2020. As a voluntary measure, anaerobic digestion is strongly promoted in Cyprus.

Land use, land-use change and forestry

No specific strategies or measures have been reported in the LULUCF sector.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
CY-ENS-001: Energy – Natural Gas	887
CY-RES-003: Energy Efficiency and Savings in residential buildings	841
CY-RES-001: Energy – Renewable energy sources	373
CY-COM-001: Energy Efficiency and Savings in commercial buildings	104
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
No additional measures reported.	
Measures with large expected savings specifically in the non-ETS sectors	
CY-TRA-002&005: Reduction of emissions of Transport	77
CY-TRA-001: Renewable energy sources in transport	69
EU policies or measures related to measures expected to deliver the largest savings	
CY-RES-003: Energy Efficiency and Savings in residential buildings and CY-COM-001: Energy Efficiency and Savings in commercial buildings: Energy consumption: Recast of the Energy performance of buildings (Directive 2010/31/EC) amending 2002/91/EC CY-RES-001: Energy – Renewable energy sources and CY-TRA-001: Renewable energy sources in transport: Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
EU policies or measures expected to result in the largest emission savings	
See above.	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — The Czech Republic

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	196.0	145.9	137.4	133.5	127.7
GHG per capita (t CO_2 eq./cap.)	18.9	14.2	13.1	12.7	12.2
GHG per GDP (g CO_2 eq./EUR)	2 412.2	1 703.7	1 150.3	1 096.7	1 062.4
Share of GHG emissions in total EU-28 emissions (%)	3.5 %	2.9 %	2.9 %	2.9 %	2.8 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	75.6	74.2	69.3
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	55 %	56 %	54 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 12.2 %	– 14.2 %	– 22.1 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	6.8 %	8.4 %	32.1 %

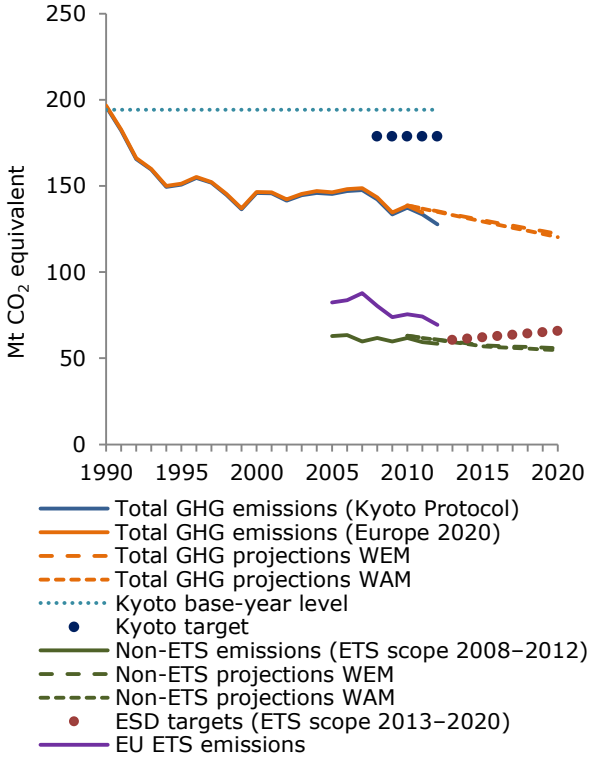
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	60.2
2008–2012 average non-ETS target	92.1
Gap to target (domestic emissions-target)	**– 31.9**
Expected effect of carbon sinks	– 1.3
Planned use of flexible mechanisms	– 25.0
Issued emission reduction units	– 0.9
Overall gap to target	**– 7.4**

The Czech Republic is on track towards its Kyoto target. Its government intends to sell to other countries, through the Kyoto flexible mechanisms, a number of Kyoto units equivalent to 13 % of base-year emissions per year.

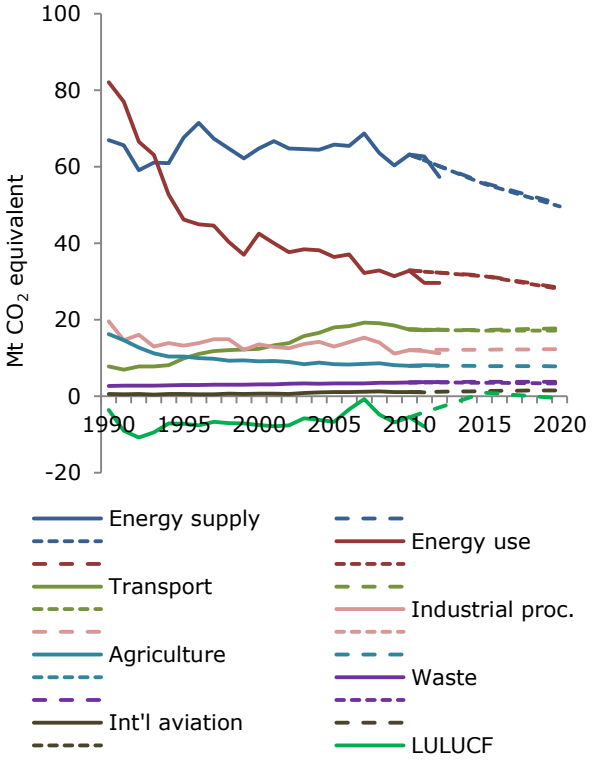
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	58.3
2013 ESD target	63.6
Gap to target (domestic emissions-target)	**– 5.2**
2020 ESD target (with art. 10 adjustment)	65.7
2020 non-ETS projections WEM	55.9
Gap to target WEM	**– 9.9**
2020 non-ETS projections WAM	54.7
Gap to target WAM	**– 11.1**

The Czech Republic is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

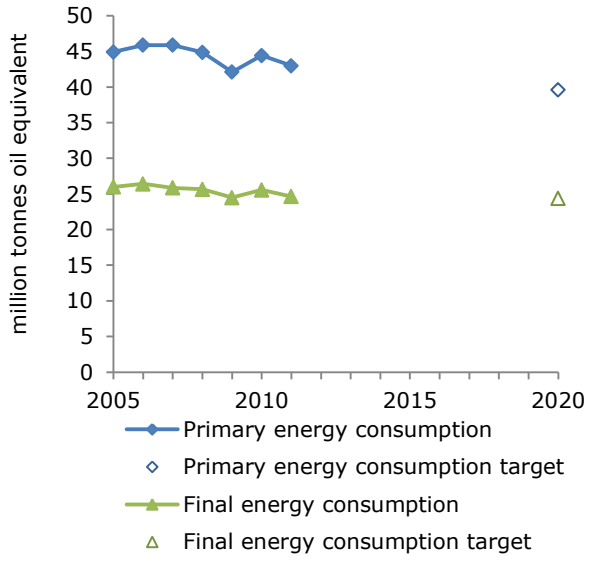


Sectoral GHG trends and projections

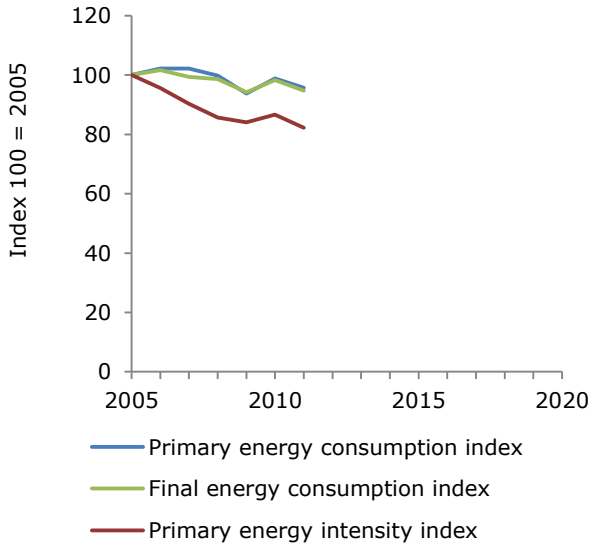


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	44.9	42.1	44.4	43.0	39.6
Final energy consumption (FEC) (Mtoe)	26.0	24.5	25.6	24.6	24.4
The Czech Republic is making some progress in reducing energy consumption, but further improvements are necessary, in either energy efficiency policy implementation or the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	6.1 % (6.1 %)	7.8 % (8.5 %)	8.4 % (9.2 %)	9.4 %	13.0 %
Share of renewable energy in gross FEC — electricity (%)	3.9 %	6.4 %	7.5 %	10.6 %	
Share of renewable energy in gross FEC — heating and cooling (%)	9.2 %	11.9 %	12.0 %	12.8 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.5 % (0.5 %)	0.5 % (3.7 %)	0.6 % (4.6 %)	0.6 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 9.4 % (2 414 ktoe), which is higher than the indicative target for the 2011-to-2012 period (7.5 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (68 %), solar photovoltaic (8 %) and hydropower (8 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 6.3 %. In order to reach the 2020 target, an average annual growth rate of 6.9 % is needed for the period from 2011 to 2020. This corresponds to 1.1 times the cumulative effort up to 2011.					

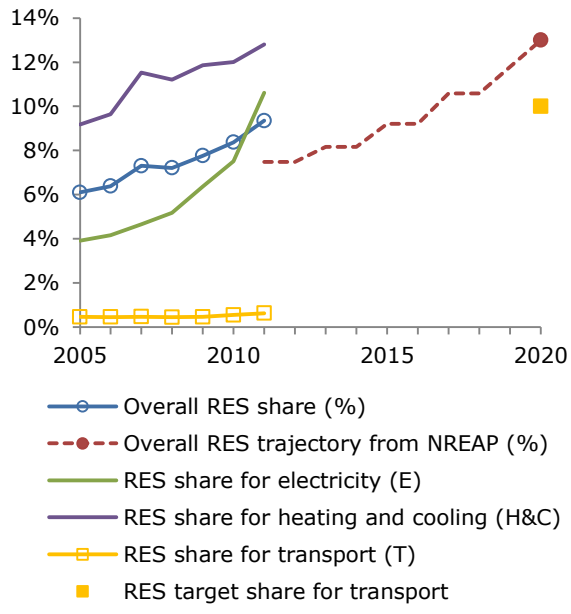
Primary and final energy consumption



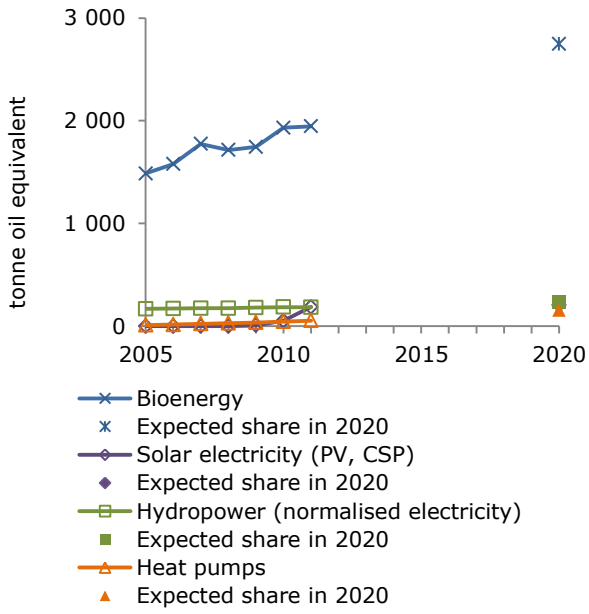
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The National Programme to Abate the Climate Change Impacts is a cross-cutting and framework strategic document at national level in the Czech Republic. It has the objective to adopt new reduction targets in the period to 2020. In 2020, compared to the year 2000, the specific CO_2 emissions per inhabitant should be reduced by 30 % and the aggregated emissions by 25 %. A new document, *Policy of Climate Protection*, is being prepared, and should replace the *National Programme to Abate the Climate Change Impacts in the Czech Republic*. The new document will be issued in the course of 2013.

Main economic instruments for renewable energy and energy efficiency

The Czech government has introduced a number of policies that use economic instruments and fiscal incentives to promote renewable energy and energy efficiency. For instance, renewable energy sources (RES) are promoted through a preferential feed-in tariff system and through direct subsidies to enterprises, municipalities, and the industrial sector. In addition, subsidies and credit guarantees have been used to support building refurbishment and modernisation.

European Union Emissions Trading System (EU ETS)

In 2011, 434 stationary installations were included in the ETS. The share of ETS emissions amounted to 60 % of the total emissions.

Energy supply

Energy efficiency

Directive 2004/8/EC on cogeneration is reflected by Energy Act (No. 406/2000 Coll.) and its amendments (most recently Act No 318/2012). The Act stipulates the obligation of power distribution companies to connect cogeneration sources to the grid and to purchase the electricity produced from cogeneration sources. Electricity production in cogeneration is encouraged by preferential feed-in tariffs, scaled by the installed capacity. The Czech Republic further plans to support voluntary commitments to energy savings, like tax allowances. According to this planned measure, the expected energy savings in 2015 will be 2 225 TJ and about 6 400 TJ in 2020.

Renewables

The National Renewable Energy Action Plan (NREAP) of the Czech Republic sets the national target for the share of energy from renewable sources by 2020 in electricity, heating and cooling and transport.

The promotion of renewables in electricity production stipulates preferential feed-in tariffs for electricity produced from renewable energy, and a 15-year guarantee from the commissioning power plant. According to the NREAP, required by the Renewable Energy Directive (RED) 2009, the main share of renewable energy supply is from biomass, followed by biofuel for transportation, biogas, electricity from water power stations and photovoltaic. The promotion of RES will reduce emissions by an estimated 2 872 kT CO_2/e per year by 2020.

Energy use

Energy efficiency

The PANEL Programme (NEW PANEL since 2009) supports complex refurbishments and modernisations (bank loan guarantees and subsidies to the credit interest) of panel houses, leading to improvement of utility value and substantial lifetime prolongation. The energy savings are expected to amount to 840 TJ in 2010, 2 000 TJ in 2015 and 3 200 TJ in 2020. The Czech Republic also offers the possibility to obtain an advantageous loan for construction or modernisation of family houses or flats. The energy savings resulting from the building savings are estimated at 2 800 TJ in 2010, 5 300 TJ in 2015 and 7 700 TJ in the year 2020.

Renewables

The Recast of the Energy Performance of Buildings Directive (2010/31/EU) stipulates minimum requirements as regards the energy performance of new and existing buildings, requires the certification of their energy performance and the regular inspection of boilers and air-conditioning systems in buildings, and promotes the use of energy from renewable sources in the buildings. This measure involves buildings in both tertiary and residential sectors; however, since the renewal of living stock in the residential sector is slow and stricter rules apply for the institutional sector, energy savings are mainly expected in the tertiary sector for the near future. It is expected that these measures will lead to a reduction of over 400 kT CO_2/e per year by 2020.

Transport

Renewables

With the Act on protection of the air (86/2000 Coll.), the Biofuels Directive (2003/30/EC) was adopted for ensuring a minimal share of biofuels in motor fuels used in transport. This measure is expected to reduce greenhouse gas (GHG) emissions by 715 kT CO_2/e per year by 2020.

Transport efficiency

The Czech government supports the development of catalytic systems, which helps to fulfil strict emission legislation. The implementation of the Fuel Quality Directive (2009/30/EC) is part of the amendment to the Act on protection of the air No. 86/2002 Coll. It requires the decrease of GHG emissions from the whole lifecycle of fuels used in transport and other engines by 10 % up to the year 2020.

Modal shift and raising awareness

The Czech Republic has introduced a number of measures to promote a modal shift to more sustainable modes of transportation. These include the introduction of the 'Park and Ride' and 'Bike and Ride' systems, and the introduction of measures that increase the attractiveness of public transport, such as quicker commuting times through the introduction of more bus lanes and access for riders with disabilities.

Industrial processes

Non-CO_2 gases

In response to the European Parliament's approval of Regulation (EC) No 842/2006 and Directive 2006/40/EC, the Czech parliament ratified these measures and incorporated them into Czech law. The reduction of SF_6 in industrial processes is expected to reduce greenhouse gas emissions by 2 600 kT CO_2/e by 2020.

Energy efficiency

The National Energy Efficiency Action Plan (NEEAP) is the overarching plan that coordinates energy savings measures in the Czech Republic. The current plan runs between 2008 and 2016, and includes the Operational Programme Industry and Enterprise (OPIE) and the Operational Programme Enterprise and Innovation. These two programmes offer subsidies to enterprises and industries to promote energy efficiency and use of RES in enterprises. Combined, the two programmes will reduce emissions by over 2 000 kT CO_2/e per year by 2020.

Agriculture

The agricultural sector is mainly influenced by the Common Agricultural Policy of the EU and is centred around the Rural Development Programme 2007–2013. The policies and measures are based on prudent application of fertilisers, cultivation of cover crops, adoption of ecological and organic farming, implementation of modern and innovative technologies, monitoring fermentation of crop residues, etc. New national measures to reduce greenhouse gas emissions are being prepared and introduced continuously. The Action Plan for the Development of Organic Agriculture for 2011–2015 intends to achieve a level of 15 % of agricultural land devoted to organic farming. The list of endangered and protected areas is expected to be updated in 2012, and the Third Action Plan will be implemented in this time period. The Nitrates Directive (91/676/EEC) lays down a limit of 170 kg N/ha for application of organic fertilisers, thereby reducing emissions by 15 000 kT CO_2/e per year by 2020.

Waste

The most important instrument at national level is the Waste Management Plan (WMP-2003). The WMP plan expires in 2013, and as such, consultations for a new WMP to cover the period from 2013 to 2023 began in 2011. Policies and measures in the waste sector aim at reducing the amount of produced waste, minimising the delivery of biodegradable waste in landfills, promoting the incineration and digestion of non-recyclable waste, increasing the landfill gas recovery and improving wastewater treatment in sparsely populated areas. Current waste management planning in the Czech Republic is expected to contribute to a reduction of 526 kT CO_2/e per year by 2020.

Land use, land-use change and forestry

No specific strategies or measures have been reported for the LULUCF sector.

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
CZ-ENU-002 EU ETS	3 230
CZ-ENS-004 Preferential feed-in tariffs for electricity produced from renewable energy sources (both EU ETS and non-ETS)	2 872
CZ-IND-001 IPPC (both EU ETS and non-ETS)	2 600
CZ-ENU-003 Operational Programme Enterprise and Innovation (both EU ETS and non-ETS)	1 195
CZ-COM-001 Energy Star (non-ETS)	1 172
CZ-ENS-005 Energy labelling of household electrical appliances (non-ETS)	952
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
CZ-TRA-002 EU draft regulation on CO_2 from light-commercial vehicles (vans) (non-ETS)	486
CZ-RES-004 Support of voluntary commitments to energy savings (both EU ETS and non-ETS)	458
CZ-RES-005 Recast of the Directive on energy performance of buildings (non-ETS)	410
CZ-WST-001 Waste Management Plan (2011) (non-ETS)	400
CZ-AGR-002 Action Plan for Development of Organic farming (non-ETS)	250
CZ-AGR-004 Nitrate Directive (1991/676/EEC) - 3rd Action Plan (non-ETS)	15
Measures with large expected savings specifically in the non-ETS sectors	
CZ-ENS-004 Preferential feed-in tariffs for electricity produced from renewable energy sources (both EU ETS and non-ETS)	2 872
CZ-IND-001 IPPC (both EU ETS and non-ETS)	2 600
CZ-ENU-003 Operational Programme Enterprise and Innovation (both EU ETS and non-ETS)	1 195
CZ-COM-001 Energy Star (non-ETS)	1 172
CZ-ENS-005 Energy labelling of household electrical appliances (non-ETS)	952
EU policies or measures related to measures expected to deliver the largest savings	
CZ-ENU-002 EU ETS: 3 230 kt CO_2 - Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	
CZ-ENS-004 Preferential feed-in tariffs for electricity produced from renewable energy sources: 2 872 kt CO_2 - Energy supply: Electricity production from renewable energy sources (Directive 2001/77/EC)	
CZ-IND-001 IPPC: 2 600 kt CO_2 - Cross-cutting: Integrated pollution prevention and control 2008/1/EC (amending 96/61/EC)	
CZ-COM-001 Energy Star: 1 172 kt CO_2 - Energy consumption: Energy labelling for office equipment 2422/2001 (Energy Star Program)	
CZ-ENS-005 Energy labelling of household electrical appliances: 952 kt CO_2 - Energy consumption: Directives on energy labelling of household appliances	
CZ-TRA-001 Minimum share of biofuels: 912 kt CO_2 - Transport: Biofuels Directive (Directive 2003/30/EC)	
EU policies or measures expected to result in the largest emission savings	
Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	
Energy supply: Electricity production from renewable energy sources (Directive 2001/77/EC)	
Cross-cutting: Integrated pollution prevention and control 2008/1/EC (amending 96/61/EC)	
Energy consumption: Energy labelling for office equipment 2422/2001 (Energy Star Program)	
Energy consumption: Directives on energy labelling of household appliances	
Transport: Biofuels Directive (Directive 2003/30/EC)	

Key climate- and energy-related data — Denmark

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	68.7	68.2	61.2	56.2	51.4
GHG per capita (t CO_2 eq./cap.)	13.4	12.8	11.1	10.1	9.2
GHG per GDP (g CO_2 eq./EUR)	455.8	350.2	295.6	268.7	246.7
Share of GHG emissions in total EU-28 emissions (%)	1.2 %	1.3 %	1.3 %	1.2 %	1.1 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	25.3	21.5	18.2
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	41 %	38 %	35 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	+6.0 %	– 9.9 %	– 32.3 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	2.8 %	13.8 %	43.6 %

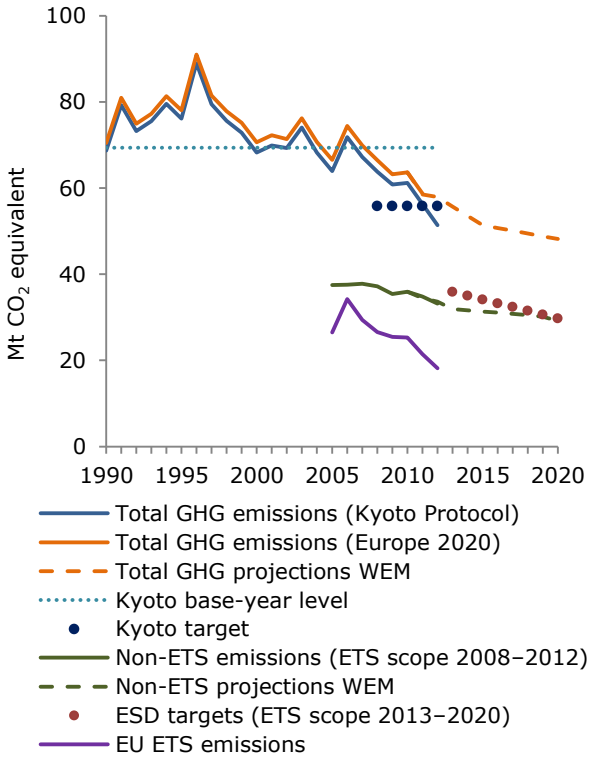
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	35.3
2008–2012 average non-ETS target	31.3
Gap to target (domestic emissions-target)	**4.0**
Expected effect of carbon sinks	– 1.8
Planned use of flexible mechanisms	2.4
Issued emission reduction units	0.0
Overall gap to target	**– 0.2**

Denmark is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 3 % of base-year emissions per year.

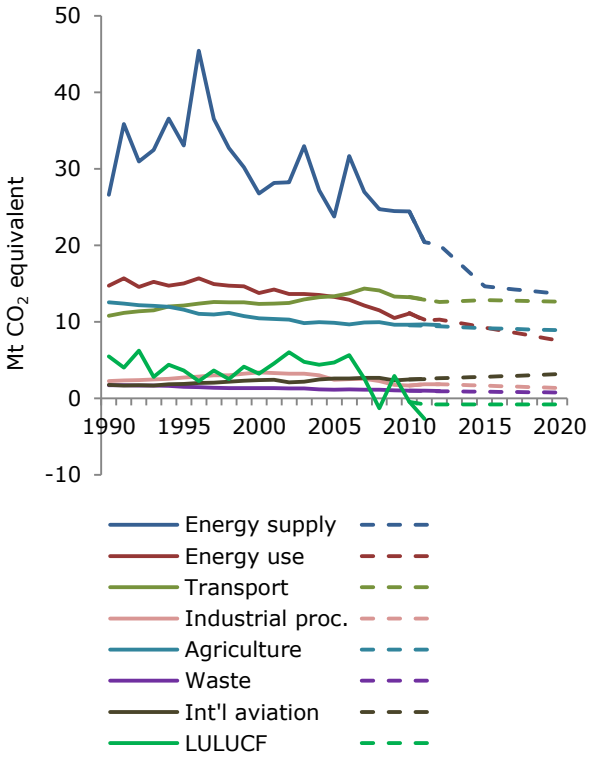
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	33.1
2013 ESD target	35.9
Gap to target (domestic emissions-target)	**– 2.8**
2020 ESD target (with art. 10 adjustment)	29.7
2020 non-ETS projections WEM	29.1
Gap to target WEM	**– 0.6**
2020 non-ETS projections WAM	n/a
Gap to target WAM	**n/a**

Denmark is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections



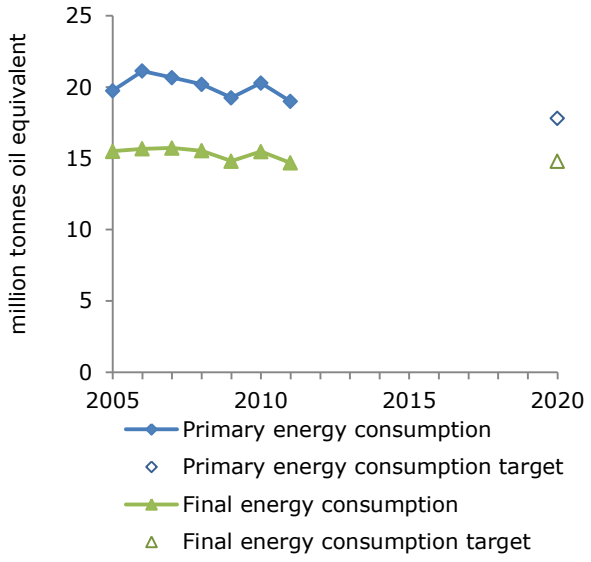
Sectoral GHG trends and projections



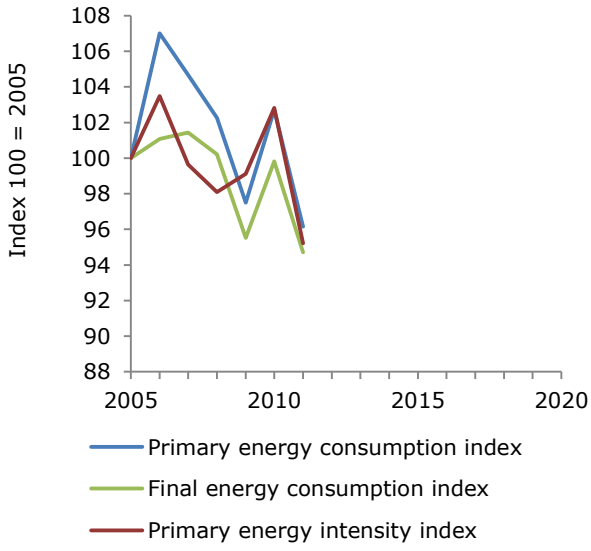
Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	19.7	19.2	20.3	19.0	17.8
Final energy consumption (FEC) (Mtoe)	15.5	14.8	15.5	14.7	14.8
Denmark is making good progress in reducing energy consumption and primary energy intensity, and has a well-balanced policy package to support energy efficiency across sectors.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	16.0 % (16.0 %)	20.0 % (20.0 %)	22.0 % (22.0 %)	23.1 %	30.0 %
Share of renewable energy in gross FEC — electricity (%)	24.6 %	28.3 %	32.8 %	35.9 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	23.2 %	30.3 %	31.6 %	33.6 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.2 % (0.2 %)	0.2 % (0.2 %)	0.2 % (0.2 %)	0.2 %	10.0 %

In 2011, the share of renewable sources in gross final energy consumption was 23.1 % (3 655 ktoe), which is higher than the indicative target for the 2011-to-2012 period (19.6 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (62 %), onshore wind (16 %) and solid biomass for electricity (9 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 5.5 %. In order to reach the 2020 target, an average annual growth rate of 3.4 % is needed for the period from 2011 to 2020. This corresponds to 0.6 times the cumulative effort up to 2011.

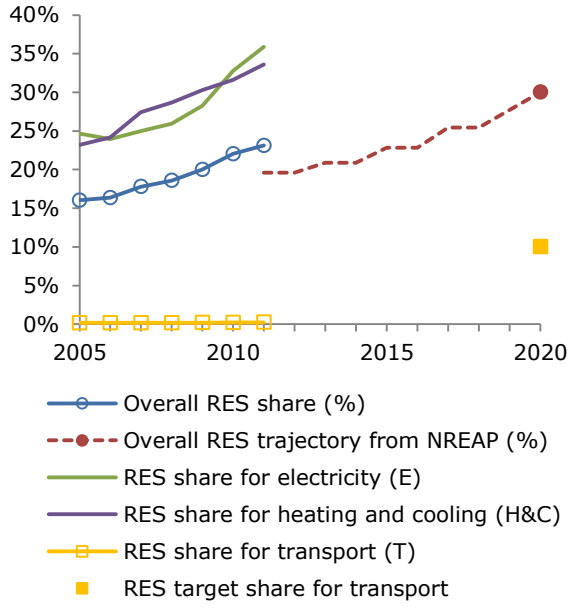
Primary and final energy consumption



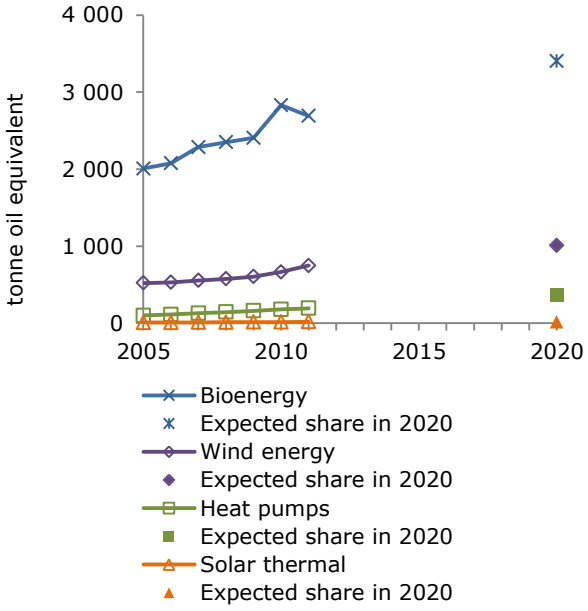
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The 2011 Government Platform underlined that climate change can be used as a driver for innovation, job creation, and development of green technologies. In this context, the following targets have been fixed: all energy supply shall be covered by renewable energy by 2050, which means that coal, gas and oil will be phased out. Electricity and heat production shall only rely on renewable energy sources already in 2035, with half of Denmark's electricity consumption to be supplied by wind energy.

Another key paper is the 2011 energy plan 'Our Future Energy', which formulates steps until 2020 to help Denmark convert to 100 % renewable energy use by 2050. The plan focuses on the development of an energy and transport network that relies on renewable sources. All the elements of the Energy Plan were politically approved by the 2012 Agreement on Danish Energy Policy 2012–2020.

The Danish Government published a climate policy plan in August 2013. It states the governments' goal of 40 % GHG reductions by 2020 compared to 1990 level. The latest 'with existing measures' projection shows that additional 6 % point reduction is needed to achieve a 40 % reduction in 2020. The Governments climate policy plan furthermore emphasizes the importance of ambitious European climate change policies and a cost effective mitigation strategy that achieves GHG reductions as a synergy to other policy goals in all relevant sectors.

Main economic instruments for renewable energy and energy efficiency

Energy Development and Demonstration Programme (EUDP): In 2013, DKK 365 million (approx. EUR 48 million) are available for the development and the demonstration of new technologies. The overall objective is to support Denmark's energy policy by providing cost-effective and new efficient energy technologies. The Public Service Obligation (PSO) scheme is an important economic instrument to finance the expansion of renewables. A supplement of price of electricity has to be paid by all electricity consumers. A similar scheme exists for natural gas.

European Union Emissions Trading System (EU ETS)

411 installations participate in the EU ETS in Denmark. The share of ETS emissions amounts to 38 % of the total national emissions.

Energy supply

Energy efficiency

In the production of electricity and heat there has been a substantial increase in co-production and substitution with other fuels. Thus, natural gas, waste and biomass are increasingly being used in small-scale and industrial CHP plants. More than half of Denmark's domestic electricity consumption is co-generated with heat because district heating was strongly promoted since the 1970s. The potential for further expansion is therefore limited.

The Danish energy market is fully liberalised and connected with Nordic and North-German electricity markets.

Renewables

Bonus payments (added to the market price) and subsidies are provided for the use of renewable energy sources for electricity production. The scrapping scheme supports the taking down of old and unfavourably placed wind turbines and supports the expansion of wind power. The Biomass Agreement was implemented to stimulate the use of biomass for electricity and heat production by providing price guaranties and subsidies.

The support of research and development of new technologies, which is administered by the Strategic Research Council, is another important measure to promote renewable energies in Denmark. It aims at strengthening the knowledge base and supporting cross-disciplinary projects.

Energy use

Energy efficiency

There are measures that aim at reducing energy consumption including more stringent energy provisions in building regulations, new improved energy labelling and better inspection of boilers and ventilation systems. Furthermore, special initiatives in the public sector and reorganisation of the energy savings initiatives of energy companies are undertaken.

Renewables

Fuels used for heat production are subject to energy and CO_2 taxes. This measure aims at promoting fuels with low CO_2 emissions. In order to support renewable energy sources, Denmark introduced a tax on mineral oil, coal, natural gas and electricity. In addition, a tax on CO_2 emissions is applied to energy products. Investments to replace fossil fuels with renewable sources and energy efficiency in the production processes of enterprises are promoted.

Transport

Renewables

According to the EU requirements, Denmark introduced biofuels into the national market. Since 2012, all gasoline and diesel must contain an average of 5.75 % of biofuels. Furthermore, electric and hydrogen fuelled vehicles are supported by infrastructural projects.

Transport efficiency

The so-called Green Owner Tax was established in order to strengthen the incentive to choose more fuel efficient cars. Car owners have to pay half-yearly taxes depending on the car's fuel efficiency (expressed in km per litre). Moreover, taxes on mineral fuels including gas were imposed.

A budget with 26 Mio EUR was provided for initiating projects scoping on energy efficient transport: large scale field tests of electrical vehicles, city logistics for goods transport, hybrid electric buses, mobility management, etc.

Modal shift and raising awareness

Travel times for public transport are reduced and intermodal installations were established. Rail infrastructure is undergoing substantial improvements, e.g. electrification.

Denmark launched campaigns targeting fuel consumption of new cars and energy-efficient / eco-driving, as well as raising awareness through the energy labelling of cars. In addition, a certification was introduced to identify 'green

transport companies' and 'green cities'.

Industrial processes

Non-CO_2 gases

The regulation of emissions of fluorinated greenhouse gases (F-Gases) is two-phased, consisting partly in a consumer tax and partly in a statutory order on discontinuation of the use of the gases in new installations. The statutory order includes a general ban on the use of the GHGs in a wide range of new installations and products from 1 January 2006, including domestic refrigerators and freezers.

Energy efficiency

Business and industry have introduced major energy efficiencies over the past 15 years. This is mainly due to a green tax package for the business sector, which contained a combination of taxes and rebates to enterprises.

Agriculture

The measures and initiatives expected to reduce emissions are the ban on burning straw on fields, several Action Plans (for the Aquatic Environment, for Sustainable Agriculture, the Ammonia Action Plan, for Joint Biogas Plants) and subsequent Follow-up Programmes, the Environmental Approval Act for Livestock Holdings, the New Energy Policy Agreement supporting biogas as well as the Agreement on Green Growth 2009. The last-mentioned measure aims at the reduction of the agricultural sector's emissions of greenhouse gases by 800 000 tons of CO_2 equivalents annually as a consequence of the energy, nature and environment initiatives.

Waste

In Denmark there are several measures and initiatives in place related to the waste sector. The main measures comprise the reduced landfilling of organic waste, utilising gas from discontinued and existing landfill sites. Moreover, Denmark focuses on the optimisation of the oxidation of gas in landfill covers, increasing recycling of plastics and the use of waste as an energy source. The Danish government has revoked the waste tax on incineration introducing instead an energy tax related to the energy content of the waste and a CO_2 tax on emissions from waste incineration, which are expected to give an incentive to increased recycling of waste plastic.

Land use, land-use change and forestry

Denmark aims at doubling its forested area. Therefore, a government grant scheme has been established that supports private afforestation on agricultural land .In addition, the state itself establishes new forests. The Danish National Forest Programme is aiming at sustainable forest management based on economic, ecological, environmental and social concerns. In the long term, the Government pursues a forest management regime which increasingly supports the natural processes of forests. For state-owned forests a close-to-nature forest management will be introduced, whereas the Forestry Act of 2004 also provides better opportunities for private forest owners to improve forest management. The Danish National Forest Programme is scheduled to be revised and updated during the next one to two years.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020 In Denmark, ex-post evaluations of the effects of existing measures (i.e. measures adopted in the period from 1990 until September 2012 and with a continued effect on GHG emissions in 2020) are not done on a regular basis. The latest analysis was made in 2005 ('The effort Analysis') with estimations of the effects of selected measures adopted in the period from 1990 until 2001. With the assumptions described in this analysis, the top-three result in terms emission reductions was: 1. Grants to private wind turbines (3.4 MtCO2/year), 2. The combined effect of tax measures (2.7 MtCO2/year) and 3. Expansion in decentralized cogeneration of heating and power (2.1 MtCO2/year). The total effect of the measures in The Effort Analysis was a reduction of 15 MtCO2eq/year in the period 2008–2012. Most of these measures and other measures adopted in the period 1990–2001 will continue to deliver emission reductions in 2020 - both in the ETS and the non-ETS sectors.	
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented According to Denmark's latest 'with existing measures' projection no additional measures are needed for the achievement of the target under the EU Effort Sharing Decision. However, for the achievement of the domestic 40 % reduction target additional measures will be needed. In August 2013 a catalogue of almost 80 additional measures with estimations of reduction potentials and costs was published in parallel to the Danish Government's Climate Policy Plan with a view to inspire policy decisions on climate efforts up to 2020. It is stated that the catalogue is not exhaustive, but includes measures both in the non-ETS sectors and in the energy area as a supplement to the 2012 energy agreement.	
Measures with large expected savings specifically in the non-ETS sectors According to the catalogue recently published in Denmark, there is in Denmark no single outstanding measure with a large reduction potential.	
EU policies or measures related to measures expected to deliver the largest savings Denmark's measures regarding energy efficiency and expansion of renewables are in part related to EU policies regarding energy efficiency and renewable energy.	
EU policies or measures expected to result in the largest emission savings The EU ETS Directive is important for the reduction of emissions in the ETS sector in Denmark. In the Non-ETS sector EU policies regarding energy efficiency is important for the reduction of emissions in the domestic sector in Denmark.	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Estonia

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	40.5	17.1	20.0	21.0	21.0
GHG per capita (t CO_2 eq./cap.)	25.8	12.5	14.9	15.6	15.7
GHG per GDP (g CO_2 eq./EUR)	n/a	2 165.9	1 774.9	1 718.4	1 668.3
Share of GHG emissions in total EU-28 emissions (%)	0.7 %	0.3 %	0.4 %	0.5 %	0.5 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	14.5	14.8	13.5
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	73 %	71 %	64 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	+22.4 %	– 7.1 %	– 4.9 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	0.0 %	1.1 %	18.8 %

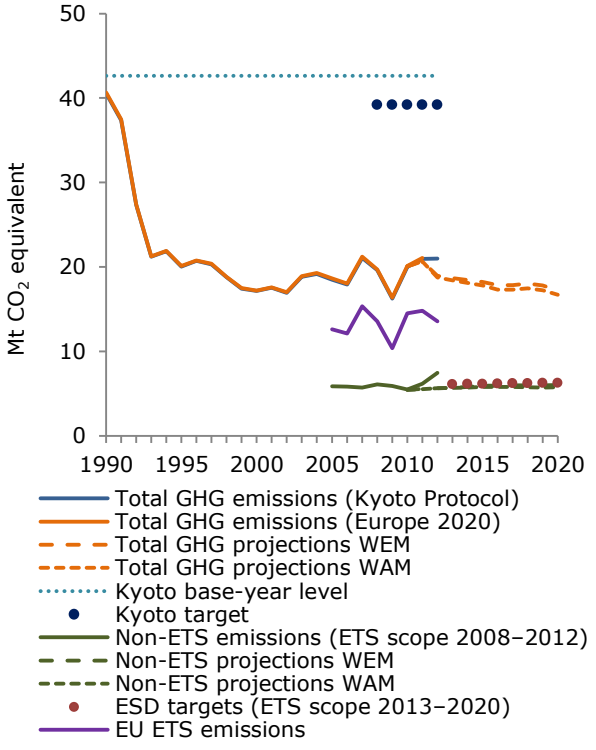
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions ([7])	6.2
2008–2012 average non-ETS target	26.1
Gap to target (domestic emissions-target)	**– 19.9**
Expected effect of carbon sinks	0.4
Planned use of flexible mechanisms	– 14.7
Issued emission reduction units	– 0.2
Overall gap to target	**– 4.5**

Estonia is on track towards its Kyoto target. Its government intends to sell to other countries, through the Kyoto flexible mechanisms, a number of Kyoto units equivalent to 35 % of base-year emissions per year.

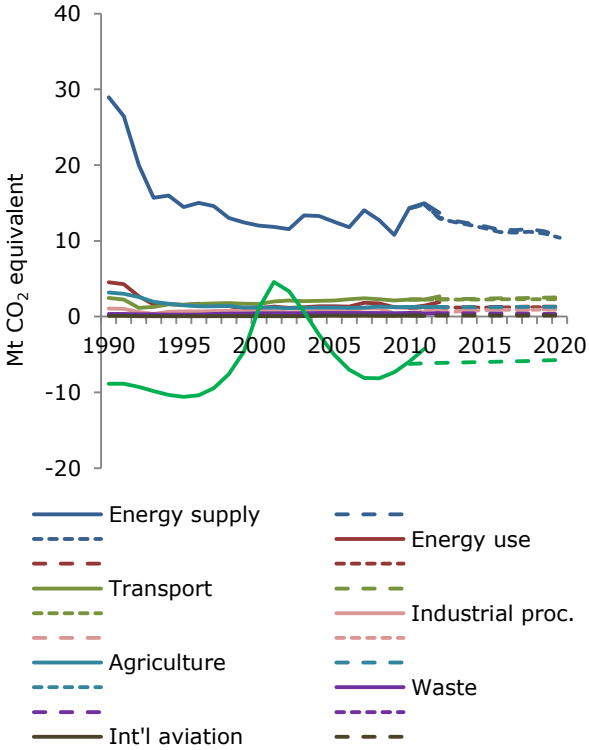
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions ([7])	7.5
2013 ESD target	6.1
Gap to target (domestic emissions-target)	**1.3**
2020 ESD target (with art. 10 adjustment)	6.3
2020 non-ETS projections WEM	6.0
Gap to target WEM	**– 0.3**
2020 non-ETS projections WAM	5.7
Gap to target WAM	**– 0.5**

Estonia is not on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target ([7]).

GHG trends and projections



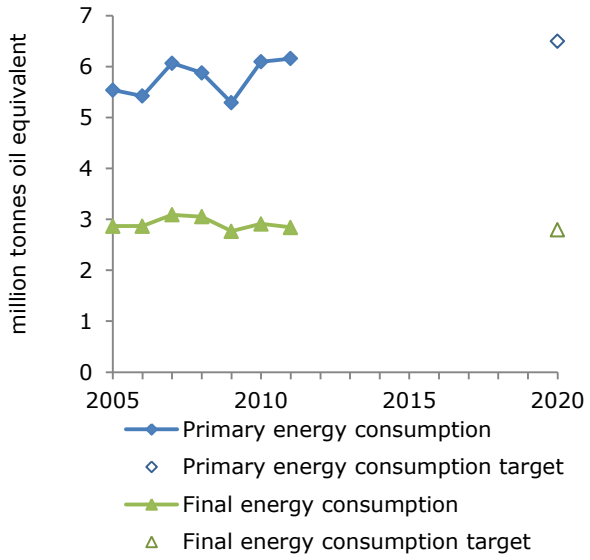
Sectoral GHG trends and projections



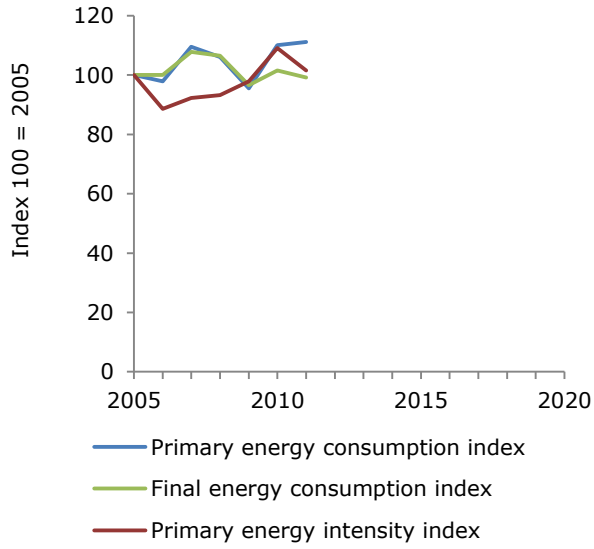
([7]) Estonia corrected its energy statistics in September 2013 and 2012 emissions in non-ETS sectors appear to be overestimated in the EEA GHG proxy report. The EEA has neither received nor been able to incorporate Estonia's late data revision in the Proxy GHG estimates and therefore it is not taken into account for in the progress assessments in this report.

Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	5.5	5.3	6.1	6.2	6.5
Final energy consumption (FEC) (Mtoe)	2.9	2.8	2.9	2.8	2.8
Estonia has made limited progress in reducing energy consumption so far. Further improvements are necessary, in energy efficiency policy implementation as well as in policy package development.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	17.5 % (17.5 %)	23.0 % (23.0 %)	24.6 % (24.6 %)	25.9 %	25.0 %
Share of renewable energy in gross FEC — electricity (%)	1.2 %	6.1 %	10.4 %	12.3 %	
Share of renewable energy in gross FEC — heating and cooling (%)	32.2 %	41.8 %	43.3 %	46.0 %	
Share of renewable energy in gross FEC - transport (%) (including all biofuels consumed in transport)	0.2 % (0.2 %)	0.2 % (0.2 %)	0.2 % (0.2 %)	0.2 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 25.9 % (811 ktoe), which is higher than the indicative target for the 2011-to-2012 period (19.4 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (82 %), solid biomass for electricity (8 %) and renewable energy from heat pumps (6 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 6.8 %. In order to reach the 2020 target, an average annual growth rate of 0.7 % is needed for the period 2011 from 2020. This corresponds to 0.4 times the cumulative effort up to 2011.					

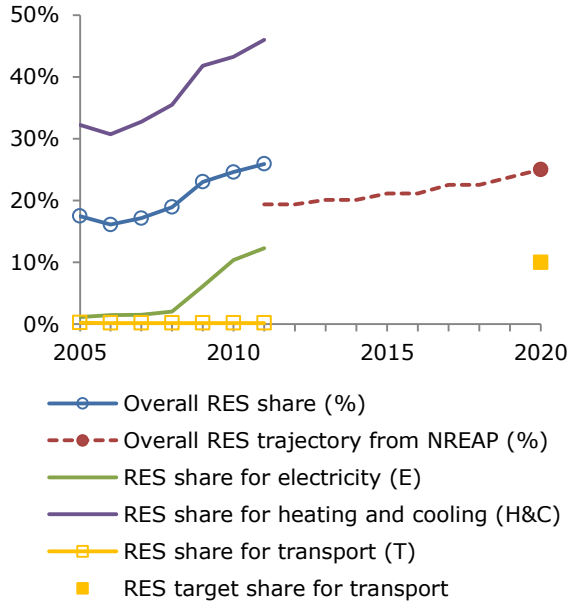
Primary and final energy consumption



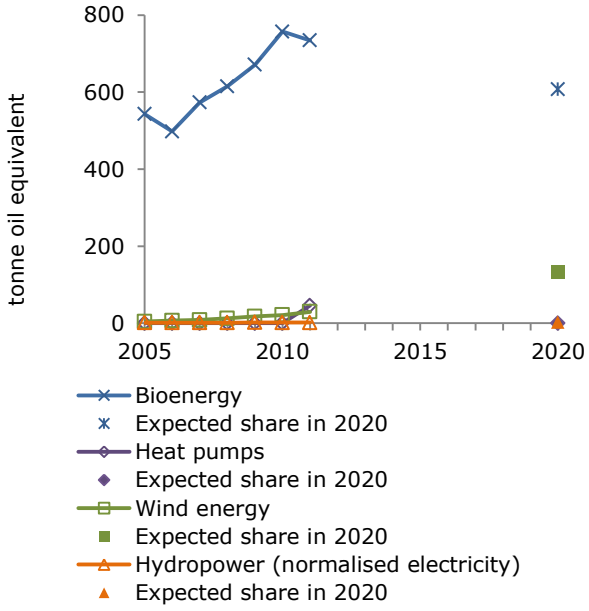
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Estonian national goals in the EU 20–20–20-package call for a 25 % share of energy from renewable sources in gross energy consumption of energy by 2020 and a 10 % share of renewable energy sources in road transport fuels by 2020. The National Environmental Strategy 2030 was endorsed by the Estonian Parliament in February 2007. Among others, it establishes measures for the reduction of waste generation, for balancing the use of forests and for developing an environmentally friendly and comfortable public transport system. No clear long-term target is set.

Main economic instruments for renewable energy and energy efficiency

The fiscal measures having impact on greenhouse gas (GHG) emissions in Estonia include excise duties and pollution charges. The total income from environmental taxes in 2011 was EUR 449 million, of which fuel and electricity excise duties accounted for 87 %, pollution taxes for 8 %, transport taxes for 2 % and resource taxes for 3 %. Fuel excise duty alone made up 80 % of the total environmental tax revenue. Environmental taxes formed 14 % of overall tax revenue. In Estonia, the share of environmental tax revenue in gross domestic product (GDP) was 3 % in 2009, which was above the EU average.

European Union Emissions Trading System (EU ETS)

In 2011 in Estonia, 58 stationary installations were included in the ETS. The share of ETS emissions amounted to 50 % of the total emissions.

Energy supply

Energy efficiency

The National Development Plan for the Energy Sector until 2020 was passed by the Parliament in June 2009. Energy efficiency is supported under the Green Investment Scheme (GIS) and has European Regional Development Fund (ERDF) support. The estimated total saving of CO_2 emissions under the GIS is 1 310 Gg within a 20-year period. This goal will be achieved by the construction of small combined heat and power (CHP) plants, the reconstruction of the largest power plants (replacing of oil shale boilers using a conventional pulverised combustion technique with those utilising the circulating fluidised bed combustion) and also by the improvement and the expansion of district heating networks. This is to enable compliance with directives 2001/80/EC and 88/609/EEC,.

Renewables

The main measures to support energy generation from renewable resources are feed-in tariffs with purchase obligation and investment support for wind power plants. Feed-in tariffs with purchase obligations are also provided for efficient CHP plants. Feed-in tariffs are regulated by the Electricity Market Act. Special attention has been paid to the promotion of renewable energy in producing electricity. In 2010, the government approved a new National Renewable Energy Action Plan until 2020 and its implementation plan for the years from 2010 to 2013. According to the RES Directive (2009/28/EC), Estonia must increase the share of renewable energy sources in total energy consumption up to 25 % by 2020. The target is to produce up to 1 500 GWh of wind electricity annually.

Energy use

Energy efficiency

In the Second National Energy Efficiency Action Plan (NEEAP2), it is noted that according to Directive 2006/32/EC, the 2016 target for Estonia is to achieve 9.9 PJ savings as a result of the energy conservation measures implemented in the period from 2008 to 2016. One of the main ways to accomplish this is through the National Development Plan for the Housing Sector 2008–2013, which targets the improvement of quality and sustainability of the housing stock in Estonia. In addition, the NEEP 2007–2013 aims to increase the share of A-label electric appliances sold at Estonia's market to 75 % by 2013, from 50 % in 2006. The estimated saving as a result of the increased effectiveness of electrical appliances will increase 10 % by 2020, which will lead to potential savings of 0.5 PJ of electricity annually.

Renewables

A grant is available for small private houses for the use of energy sources locally. The grant provides financial support for small-scale solar and wind installations.

Transport

Renewables

The target set in the Estonian Transport Development Plan 2006–2013 is a 30 % share of new cars with CO_2 emissions less than 120 g/km. In order to achieve fuel economy, the promotion of sustainable transport is planned, by labelling new vehicles and by providing training in energy-efficient driving. Fuel consumption is expected to decrease by 10 % by 2020.

Transport efficiency

Specific measures are foreseen in the National Renewable Energy Action Plan to reach the 10 % renewables target in transport sector by 2020. These measures include stipulating between 5 % and 7 % mixed fuel requirements for liquid fuels and the transfer of public transport to renewable energy.

Modal shift and raising awareness

To increase the proportion of public transport users, the government has set the goal of increasing the number of traffic lanes on streets allocated for public transport in cities by 20 % over the coming years.

Industrial processes

Non-CO_2 gases

In July 2012, a set of amendments to the Ambient Air Act related to F-gases was approved by parliament, including the addition of a completely new section (Section 4 in Chapter 7 of the Act) regulating issues relevant to F-gases. These amendments, together with the relevant secondary-level acts, formed the basis and infrastructure for full implementation of the major requirements of all related EU acts: covering training, certification and attestation

systems; containment provisions; proper recovery of F-gases; labelling requirements; reporting obligations; and bans and penalties.

Energy efficiency

The latest national-level document setting policy targets for energy performance in industry is the NEEAP2 presented to the EU in September 2011. In the NEEAP2, it is concluded that energy efficiency measures for industry must focus primarily on improvement of the skills and awareness of specialists. In the cement and lime manufacturing industry, where direct emissions from the technological process are occurring, environmental and quality management standards were introduced and technologies are planned to be updated.

Agriculture

Based on the Estonian Rural Development Plan 2007–2013, the basic objectives are to support organic farming, by increasing the organically farmed area from 72 800 ha to 120 000 ha, which will lead to the reduction of mineral fertilisers, and also to support the production of biomass and biofuels. A special commission has been established to start preparations for drawing up the rural development plan for the period from 2014 to 2020.

Waste

In May 2008, a strategy document, National Waste Management Plan 2008–2013, was endorsed by the government. According to the plan, the closure of non-conforming landfills will be supported and the establishment of regional landfills and other regional waste-handling facilities that comply with the designated requirements will be promoted. Additionally, a regulation concerning the percentage of biodegradable waste allowed to be deposited is stipulated in the Waste Act. Further measures include the reduction of waste generation and the increase of the share of recycled waste up to 50 % by 2020 (2008/98/EC).

In May 2012, the Minister of the Environment initiated the preparation of the National Waste Management Plan for the period 2014–2020. The plan has to be ready for adoption by September 2013.

Land use, land-use change and forestry

In Estonia, there are currently no policies directly targeting the reduction of GHGs in the LULUCF sector; however, there are cross-cutting strategies as well as land-use–specific acts that address different issues under LULUCF sector, e.g. promoting the use of wood as a renewable material and energy source for other materials and non-renewable sources with higher GHG emissions in the framework of the Development Plan 2007–2013 for Enhancing the Use of Biomass and Bioenergy. Since half of Estonian's territory is covered with forest, 10 % of which is strictly protected, forestry is of great importance for the Estonian economy and environment: forest policies have a major effect on the overall development of the entire LULUCF sector.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
EE-ENS-001 Transform energy supply structure towards renewable energy	816
EE-ENS-002 Improvement of the efficiency of the use of oil shale	753
EE-ENS-003 Improvement of the efficiency of the use of oil shale	513
EE-ENS-005 Support to efficient cogeneration of heat and electricity	294
EE-ENS-006 Energy efficiency and use of renewable energy at small boiler houses and improvement of district heating networks (Non-ETS)	157
EE-ENS-007 Promotion of use of energy efficient electrical appliances (both EU ETS and non-ETS)	153
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
EE-ENS-004 Energy efficiency in manufacturing industries and construction (both EU ETS and non-ETS)	332
EE-TRA-001 Introduction of regulation regarding use of biofuels (non-ETS)	235
Measures with large expected savings specifically in the non-ETS sectors	
EE-ENS-004 Energy efficiency in manufacturing industries and construction	332
EE-TRA-001 Introduction of regulation regarding use of biofuels	235
EE-ENS-006 Energy efficiency and use of renewable energy at small boiler houses and improvement of district heating networks	157
EU policies or measures related to measures expected to deliver the largest savings	
EE-ENS-001 Transform energy supply structure towards renewable energy: 816 kt CO_2 - Energy supply: RES Directive 2009/28/EC	
EE-ENS-002 Improvement of the efficiency of the use of oil shale: 753 kt CO_2 - Energy supply: Large combustion Directive 2001/80/EC	
EE-ENS-003 Improvement of the efficiency of the use of oil shale: 513 kt CO_2 - Energy supply: Large combustion Directive 2001/80/EC	
EE-ENS-004 Energy efficiency in manufacturing industries and construction: 332 kt CO_2 - Energy consumption: End-use efficiency and energy services 2006/32/EC	
EE-ENS-005 Support to efficient cogeneration of heat and electricity: 294 kt CO_2 - Energy supply: Combined Heat and Power (CHP) Directive Promotion of cogeneration 2004/8/EC & Energy supply: RES Directive 2009/28/EC	
EE-TRA-001 Introduction of regulation regarding use of biofuels: 235 kt CO_2 (non-ETS) - Transport: Biofuels Directive (Directive 2003/30/EC) & Transport: Fuel Quality Directive 2009/30/EC	
EU policies or measures expected to result in the largest emission savings	
Energy supply: RES Directive 2009/28/EC	
Energy supply: Large combustion Directive 2001/80/EC	
Energy consumption: End-use efficiency and energy services 2006/32/EC	
Energy supply: Combined Heat and Power (CHP) Directive Promotion of cogeneration 2004/8/EC	
Energy supply: RES Directive 2009/28/EC	
Transport: Biofuels Directive (Directive 2003/30/EC)	
Transport: Fuel Quality Directive 2009/30/EC	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Finland

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	70.4	69.3	74.5	67.0	61.4
GHG per capita (t CO_2 eq./cap.)	14.2	13.4	13.9	12.5	11.4
GHG per GDP (g CO_2 eq./EUR)	624.6	501.4	454.2	397.4	364.5
Share of GHG emissions in total EU-28 emissions (%)	1.3 %	1.4 %	1.6 %	1.5 %	1.4 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	41.3	35.1	29.5
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	55 %	52 %	48 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	+8.9 %	– 7.7 %	– 22.7 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	4.7 %	11.1 %	27.8 %

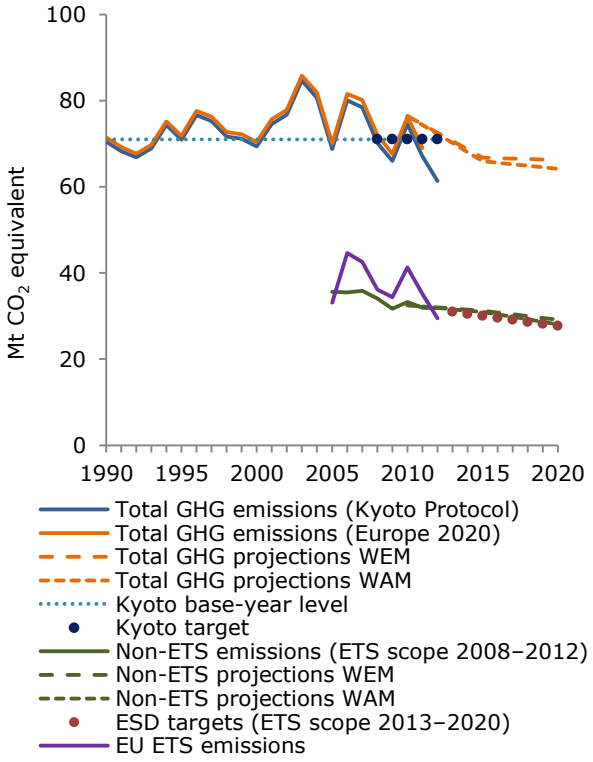
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	32.6
2008–2012 average non-ETS target	33.5
Gap to target (domestic emissions-target)	**– 0.9**
Expected effect of carbon sinks	– 0.6
Planned use of flexible mechanisms	0.0
Issued emission reduction units	– 0.2
Overall gap to target	**– 1.3**

Finland is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 1 % of base-year emissions per year.

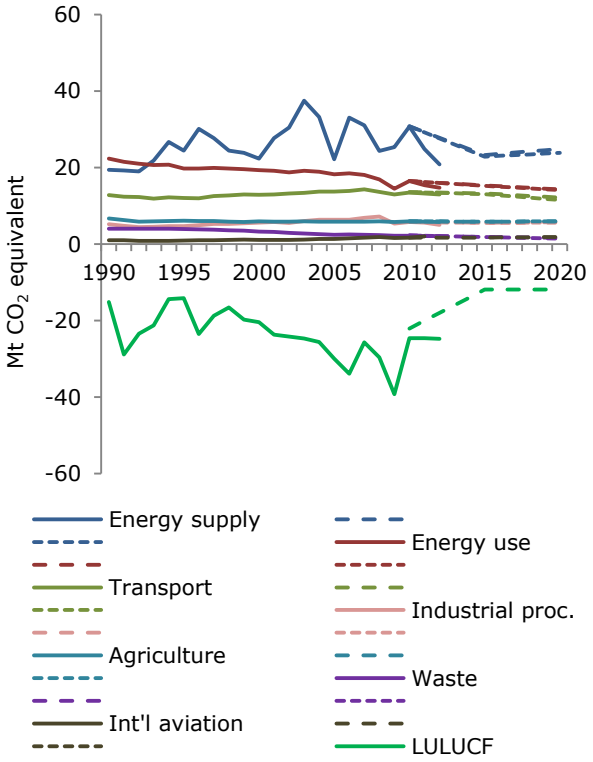
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	31.6
2013 ESD target	32.7
Gap to target (domestic emissions-target)	**– 1.1**
2020 ESD target (with art. 10 adjustment)	27.7
2020 non-ETS projections WEM	29.1
Gap to target WEM	**1.5**
2020 non-ETS projections WAM	28.1
Gap to target WAM	**0.4**

Finland is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections



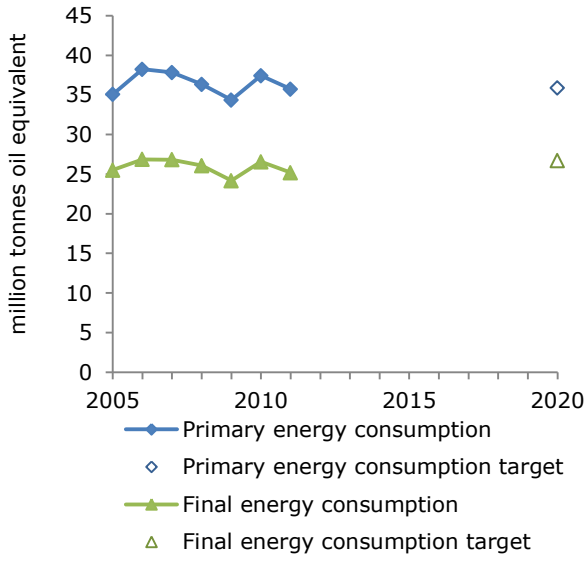
Sectoral GHG trends and projections



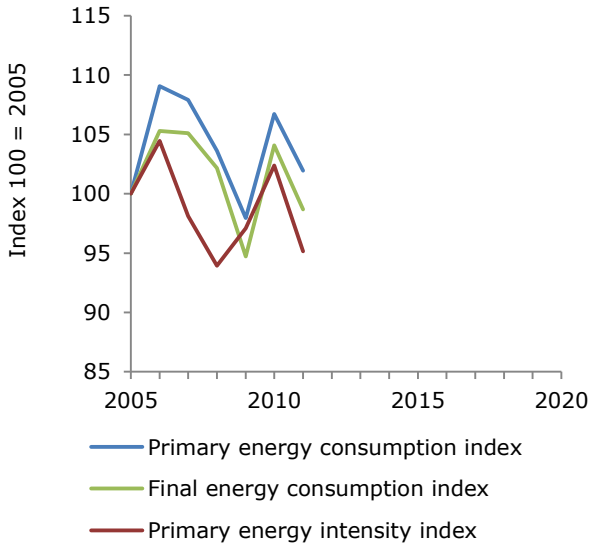
Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	35.1	34.4	37.4	35.7	35.9
Final energy consumption (FEC) (Mtoe)	25.5	24.2	26.6	25.2	26.7
Finland is making some progress in reducing energy consumption, but further improvements are necessary, in either energy efficiency policy implementation, the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	28.6 % (28.6 %)	29.9 % (30.4 %)	31.0 % (31.4 %)	31.8 %	38.0 %
Share of renewable energy in gross FEC — electricity (%)	26.9 %	27.3 %	27.6 %	29.2 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	38.9 %	41.7 %	42.6 %	44.3 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.4 % (0.4 %)	0.4 % (3.4 %)	0.4 % (3.3 %)	0.4 %	10.0 %

In 2011, the share of renewable sources in gross final energy consumption was 31.8 % (8 232 ktoe), which is higher than the indicative target for the 2011-to-2012 period (30.4 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (73 %), hydropower (14 %) and solid biomass for electricity (12 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 1.7 %. In order to reach the 2020 target, an average annual growth rate of 3.0 % is needed for the period from 2011 to 2020. This corresponds to 0.4 times the cumulative effort up to 2011.

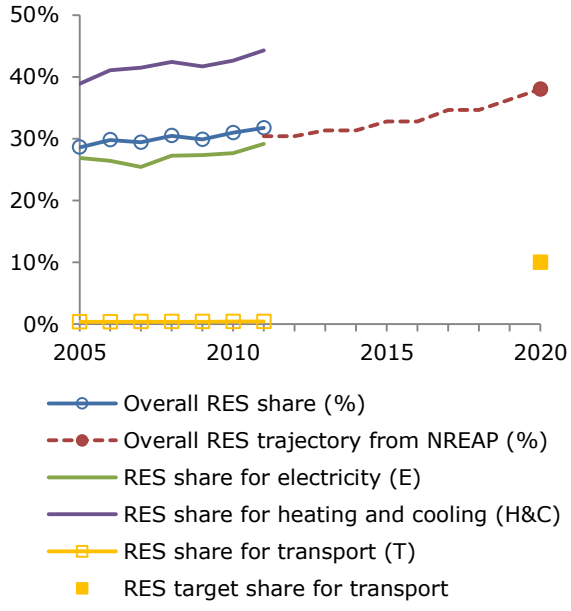
Primary and final energy consumption



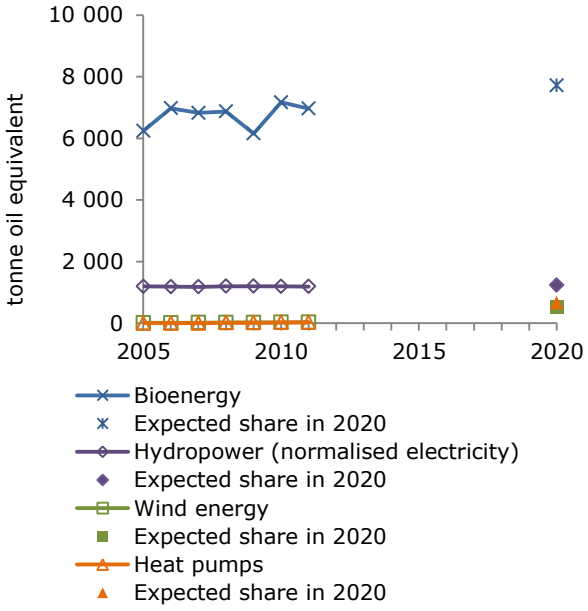
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Finnish national goals in the EU 20–20–20 package are to increase the share of renewable energy sources (RES) of final energy consumption to 38 % by 2020, and to reduce non-ETS greenhouse gas (GHG) emissions by 15 % from the 2015 level, by 2020. Finland has set a 20 % share of renewable energy sources in the road transport by 2020. In 2009, the government adopted the Foresight Report on Long-term Climate and Energy Policy, setting a target to reduce Finland's GHG emissions by at least 80 % from 1990 level by 2050. The long-term goal of Finland is to achieve a carbon-neutral society, which can be achieved by following the road map (National Road Map Towards 2050) to increase energy efficiency and the use of renewable energy.

Main economic instruments for renewable energy and energy efficiency

The State of Finland provides subsidies for investment and research projects in the field of sustainable energy generation. Feed-in tariffs for wind energy, biogas, small wood-fired combined heat and power (CHP) and forest chip CHP are currently being prepared. Training programmes and certification system for installers are being developed in 2013. State subsidies and tax incentive schemes have been improving energy efficiency and the use of RES in the residential sector. Research and development in relation to renewable energies is supported by the state through grants. RES heating infrastructure development is also supported through investment subsidies. The main scheme used to support renewable energies in the transport sector is a quota obligation for biofuels. The taxation of liquid fuels is carried out as taxation of separate fuel components based on their energy content and carbon dioxide emissions, implicating reduced taxation for biofuels. A fixed 'heat bonus' is paid for heat produced by CHP plants using biogas and fuel wood. Investment support is also available for farmers to support the construction of heat plants using RES.

European Union Emissions Trading System (EU ETS)

Finland has 669 installations falling under the EU ETS. In 2011 they represented a share of 52 % of total GHG emissions in the country.

Energy supply

Energy efficiency

A fixed 'heat bonus' is paid for heat produced by CHP plants using biogas and wood fuel.

Renewables

The renewable energy package especially promotes the use of forest chips and other kinds of wood-based energy alongside wind power and heat pumps. A bill on the production subsidy for electricity produced from RES was adopted on 30 December 2010. The bill concerns government support for electricity generation based on wind power, biogas and wood fuel.

The feed-in tariff scheme (in force since 25 March 2011) contributes to meeting the national objectives set by the EU for increasing the utilisation of RES (wind power, biogas, forest chip and wood fuels). The target for wind power is set at 6 TWh of electricity by 2020. The 2020 objective for forest chips is set to 25 TWh. Furthermore, some special policy measures are targeted at forest chips. The feed-in tariff for electricity production in fuel wood-powered plants also contributes to these objectives.

Energy use

Energy efficiency

The Energy Efficiency Agreement scheme is in line with the EU Directive on Energy Efficiency. The following sectors are included until 2016: industries, municipal sector, oil sector, real estate sector, transport and agricultural sector. The Ministry of Employment and the Economy provides subsidies to carry out energy audits of commercial and public buildings and industrial and energy sectors. The National Building Code has set minimum requirements for thermal insulation and ventilation of new buildings since 1976. The latest tightening of the requirements (– 20 % compared to previous requirements) took place in March 2011 and came into force in July 2012. Information dissemination and campaigns, aim at influencing the behaviour of users, owners of buildings and individual consumers. An energy advice infrastructure is available for consumers. It will strengthen the advisory services, training, communications, marketing, monitoring and evaluation. The energy advisory services should enable consumers to rationalise their ways to use energy, while they also get to know the possibilities offered by RES. Since 2008, energy certificates have been issued to all new buildings when applying for a building permit. As of January 2009, existing buildings must be certified when sold or rented. According to the Directive on the Energy Performance of Buildings (2010/31/EU), the energy class has to be declared also in sales and in renting announcements. State subsidies have been available for several years to housing companies and to low-income families for improving their energy efficiency.

CO_2 emissions from machinery (including tractors and other gasoil operated vehicles) are planned to be tackled by promoting and increasing the use of RES, e.g. biofuels. The objective is that the fuel used in machinery will have the same share of biocomponents as the road transport fuels have. The CO_2 taxation takes account of the energy content, CO_2 emissions and local particle emissions that have adverse health effects. It is based on the CO_2 emissions of the fuels in question. The Act on Eco-design and Energy-labelling came into force on 1 December 2010, in order to introduce the Ecodesign Directive (2009/125/EU) and the Energy Labelling Directive (2010/30/EU).

Renewables

State subsidies for residential buildings have been available for several years. The goal is to stimulate the use of RES in heating systems. A support for up to 20 % of the investment costs is foreseen when a ground-source heat and air-to-water heat pump is installed in a residential building as its main heating system. Shifts to pellet heating or other wood-based fuels are also included. Apart from state subsidies, households can also apply for a tax deduction for these investments. For the non-residential building stock, grants are provided for energy audits only. However, due to the minimised state budget allocation, the support does not exist for the year 2013. The Ministry of Employment and the Economy supports municipalities to carry out audits concerning promotion of renewable energy use in the

municipality district.

Transport

Renewables

Under the National Act on promoting the use of biofuels by implementing Directive 2003/30/EC, the annual minimum share of biofuels delivered for consumption shall be 6 % from 2011 to 2014, and then gradually rise to 20 % in 2020. Smaller shares of biofuels have been added to diesel and petrol since 2002.

Transport efficiency

The administrative vehicle fleet will be renewed in the framework of the Climate Programme for the Transport Sector. In 2020, emissions of new cars sold in Finland shall be in line with the EU objective, which implies that the rate of vehicle fleet renewal would be around 7 % a year. The specific emissions of the Finnish vehicle fleet would be reduced by a third. The programme also includes two valid energy efficiency agreements, on goods transport and logistics, and on public transport services. Both aim to reduce the transport energy consumption of enterprises which have joined the agreement by 9 %.

The Act on Professional Qualifications for bus, truck and coach drivers (2007) provides training in ecodriving. Under the Act considering the energy and environmental impact of vehicles in public procurement, public bodies must take into account energy consumption and CO_2 emissions as a comparison criterion when purchasing vehicles and passenger transport services. The car taxation was reformed in 2007 and 2008. The tax on passenger vehicles was differentiated according to vehicle-specific emissions. Finland has also been active in providing people with more information about CO_2 emissions of passenger cars.

Modal shift and raising awareness

The aim of the Climate Policy Programme for the Transport Sector and the Public Transport Act (2009) is to increase public transport journeys by 100 million, and walking and cycling journeys by 300 million by 2020, which corresponds to an increase of 20 % compared to current levels. It will be promoted particularly in urban areas. e.g. through better coordination of spatial planning and transport planning in order to improve conditions for public transport and non-motorised transport and by improving light traffic routes.

Industrial processes

Non-CO_2 gases

The F-gas Regulation (842/2006) and the Directive of HFC emissions from air conditioning in motor vehicles (2006/40/EC) are transposed into national law. Finland will also promote the F-gas substitutes by organising information and awareness-raising campaigns. Finland will also support the partial prohibition of F-gases in the EU F-gas Regulation during its review process in 2013.

Energy efficiency

No specific strategies or measures have been reported in the industrial processes sector.

Agriculture

With the Agri-environmental Payment Programme, Finland promotes sustainable development in agriculture. The objectives are to decrease nutrient loads and to preserve plant and animal biodiversity such as rural landscapes. An additional aim is to increase perennial crops on agriculture soils. Additional implemented measures are the promotion of environmentally friendly manure treatment. The production and use of energy crops will be intensified, as will the use of agricultural by-products and manure, especially in biogas production. The farm energy programme aims to improve energy efficiency in farms and to reduce the use of fossil fuels by promoting renewable energy and biofuels. In this way, forest management objectives are also taken into consideration. Farmers can also obtain investment aid for the construction of unheated livestock sheds.

Waste

The new Waste Tax Act entered into force in 2011 and replaced the existing Waste Tax Act (495/1996). The purpose of the New Waste Tax Act is to collect a tax from those waste fractions which could be technically and environmentally recovered, but which are disposed to landfill sites. The list of waste types considered by this tax is based on Commission Decision 2000/532/EC on the Waste List. The industrial landfills are under this taxation as well. The waste tax amounts to EUR 50 per tonne in 2013. There are restrictions on landfilling of biodegradable municipal waste. Plans are progressing to ban the landfilling of biodegradable and other organic waste after 2016.

Land use, land-use change and forestry

In Finland's National Forest Programme (NFP 2015), it is estimated that the carbon sinks of forests (including trees and soil) will remain at least at 10 000 to 20 000 kt CO_2 eq a year by 2015, if the logging increases by 10 million to 15 million cubic metres a year as is targeted. The policy defined in the NFP regarding the increase of industrial round wood and energy wood is consistent with the Climate and Energy Strategy, and will help to achieve the target set by the Directive on the Promotion of the Use of Energy from Renewable Sources.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
FI-ENS-002 Promoting woodchips (both ETS and non-ETS)	9 861
FI-ENS-005 Voluntary energy efficiency agreements (both ETS and non-ETS)	3 994
FI-RES-001 P&M Buildings (non-ETS)	1 600
FI-TRA-002 Promoting the use of biofuels (non-ETS)	1 500
FI-AGR-004 and FI-AGR-005 Increase the area of multiannual crops on organic soils (non-ETS)	1 334
FI-TRA-003 Promoting biogas in electricity and heat production (non-ETS)	1 300
FI-ENU-001 Energy audits (both ETS and non-ETS)	490
FI-TRA-005 Influencing modal split by promoting public transport, walking, cycling (non-ETS)	300
FI-COM-001 Energy efficiency in supported farm and rural building, reparcelling and the Farm Energy Programme (non-ETS)	86
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
FI-RES-002 P&M Buildings (both ETS and non-ETS)	351
Measures with large expected savings specifically in the non-ETS sectors	
FI-RES-001 P&M Buildings (non-ETS)	1 600
FI-TRA-002 Promoting the use of biofuels (non-ETS)	1 500
FI-AGR-004 and FI-AGR-005 Increase the area of multiannual crops on organic soils (non-ETS)	1 334
FI-TRA-003 Promoting biogas in electricity and heat production (non-ETS)	1 300
EU policies or measures related to measures expected to deliver the largest savings	
FI-ENS-001 & FI-ENS-002 & FI-TRA-002 Promoting wind power, woodchips and biofuels: Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
FI-AGR-004 & FI-AGR-005 Increase the area of multiannual crops on organic soils: Agriculture: Common Agricultural Policy (CAP)-related regulations	
FI-ENS-004 Act on ecodesign and energy labelling: Energy consumption: Ecodesign requirements for energy-using products (Directive 2005/32/EC) and its implementing regulations	
FI-TRA-004 & FI-ENU-001 & FI-ENS-005 & FI-COM-001: ecodriving, energy audits, voluntary energy agreements and energy efficiency in supported farm and rural building: Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	
FI-IND-001 F-gases control: Industrial Process: F-gas regulation (Regulation 842/2006)	
FI-TRA-005 Influencing modal splits: Transport: Allocation of railway infrastructure capacity and charging for the use of infrastructure, Directive 2007/58/EC amending Directive 91/440/EEC and Directive 2001/14/EC	
FI-TRA-003 Decreasing the specific emissions of new cars and renewing of the whole vehicle fleet: Transport: Regulation on CO_2 from cars 2009/443/EC	
FI-WST-001 & 002: Waste management: Waste: Landfill Directive 1999/31/EC	
EU policies or measures expected to result in the largest emission savings	
Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
Energy consumption: Ecodesign requirements for energy-using products (Directive 2005/32/EC) and its implementing regulations	
Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	
Waste: Landfill Directive 1999/31/EC	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — France

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	556.4	558.9	514.2	485.5	485.1
GHG per capita (t CO_2 eq./cap.)	9.6	9.2	8.0	7.5	7.4
GHG per GDP (g CO_2 eq./EUR)	426.1	352.3	290.3	269.5	269.4
Share of GHG emissions in total EU-28 emissions (%)	9.9 %	11.0 %	10.9 %	10.6 %	10.7 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	115.7	105.7	103.6
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	22 %	22 %	21 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 12.4 %	– 19.9 %	– 21.5 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	4.4 %	26.5 %	31.7 %

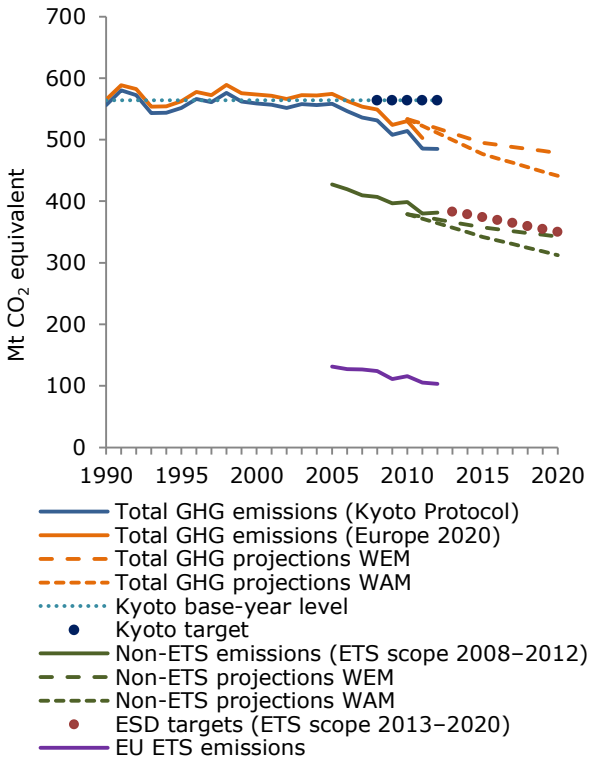
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	392.7
2008–2012 average non-ETS target	431.9
Gap to target (domestic emissions-target)	**– 39.2**
Expected effect of carbon sinks	– 3.2
Planned use of flexible mechanisms	0.0
Issued emission reduction units	– 1.5
Overall gap to target	**– 40.9**

France is on track towards its Kyoto target. Its government does not plan on using the Kyoto flexible mechanisms to achieve its target.

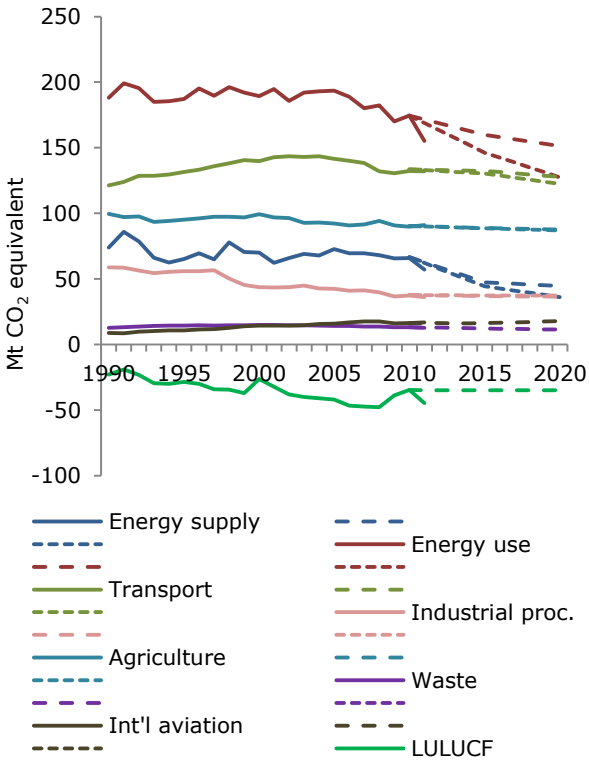
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	376.9
2013 ESD target	397.9
Gap to target (domestic emissions-target)	**– 21.1**
2020 ESD target (with art. 10 adjustment)	350.1
2020 non-ETS projections WEM	342.3
Gap to target WEM	**– 7.7**
2020 non-ETS projections WAM	312.4
Gap to target WAM	**– 37.6**

France is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

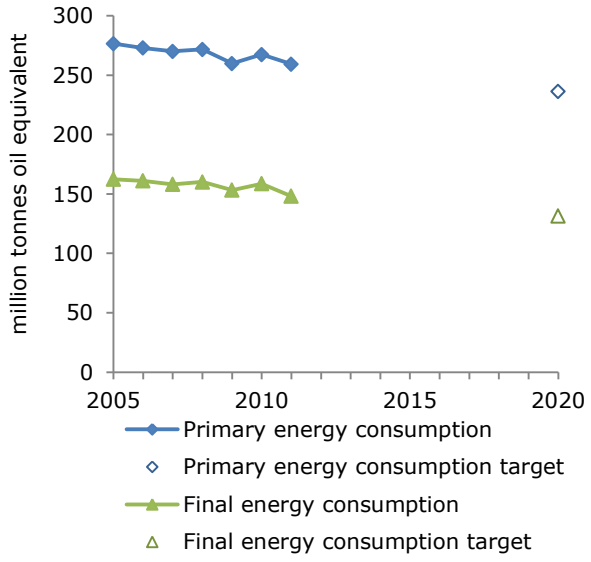


Sectoral GHG trends and projections

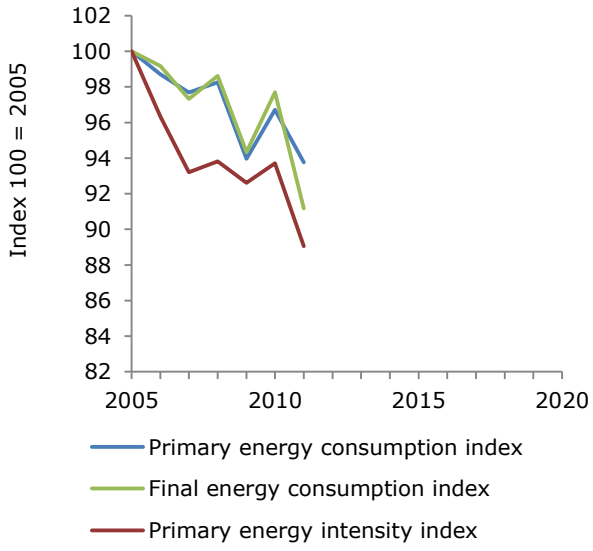


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	276.4	259.7	267.3	259.2	236.3
Final energy consumption (FEC) (Mtoe)	162.4	153.2	158.7	148.1	131.4
France is making good progress in reducing energy consumption, with a well-balanced well-balanced policy package exists across relevant sectors.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	9.2 % (9.5 %)	10.8 % (12.3 %)	11.4 % (12.8 %)	11.5 %	23.0 %
Share of renewable energy in gross FEC — electricity (%)	13.8 %	15.1 %	14.9 %	16.5 %	
Share of renewable energy in gross FEC — heating and cooling (%)	12.2 %	15.3 %	16.6 %	16.7 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.3 % (1.2 %)	0.4 % (6.1 %)	0.4 % (6.0 %)	0.5 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 11.5 % (17 578 ktoe), which is lower than the indicative target for the 2011-to-2012 period (12.8 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (52 %), hydropower (30 %) and renewable energy from heat pumps (6 %). For the period 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 2.2 %. In order to reach the 2020 target, an average annual growth rate of 8.3 % is needed for the period from 2011 to 2020. This corresponds to 1.2 times the cumulative effort up to 2011.					

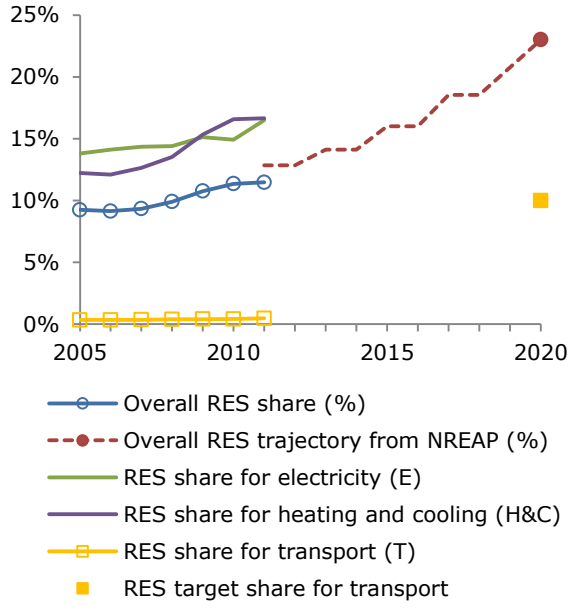
Primary and final energy consumption



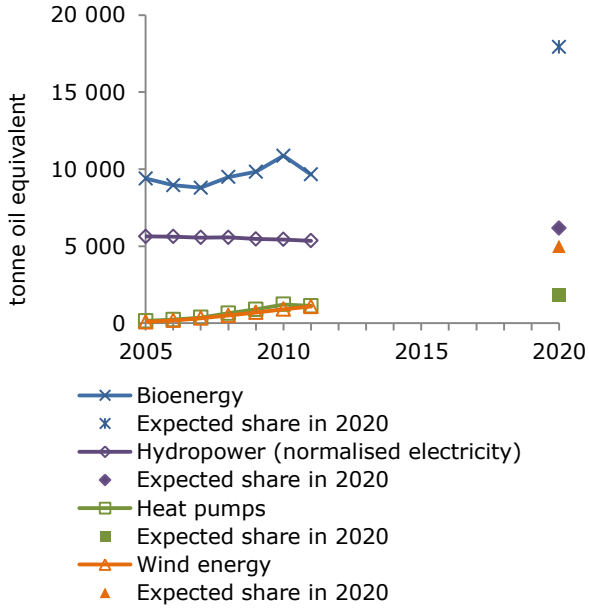
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Environment Round Table (Grenelle de l'Environnement) and the Environmental Conference (September 2012) reflect France's engagement in green growth measures and climate mitigation, which shall lead France to a national road map, in close consultation with the stakeholders. This process is financed by the Investment for the Future Programme. With regard to climate change, an energy transition debate was initiated in 2013 which focuses on reducing energy import dependence, improving energy efficiency and discussing the restructuring of the energy mix. Nuclear energy and renewables will be part of this energy mix. A wide range of stakeholders will participate in this process that shall be the basis of the planned Energy Transition Law. It is expected to have important impacts on the further development of energy policy.

France is committed to reducing its emissions by 14 % by 2020, in accordance with its climate obligations under the EU climate and energy package. Besides that target, France aims to cut its emissions by 75 % by 2050, in line with national targets for climate change mitigation adopted by the government.

Main economic instruments for renewable energy and energy efficiency

In France, the generation of electricity from renewable energy sources (RES) is promoted through a feed-in tariff scheme. The French government invites tenders for the construction of renewable energy plants in order to reach the target capacity set by the multiannual investment plan. Electricity generated from RES is also promoted through several tax incentives. The Demonstration Fund supports demonstration projects in the field of environmental innovation. Moreover, the French National Research Agency (ANR) disposes of a sustainable energy support programme. The 2012 thermal regulation includes the mandatory use of renewable energies in order to reach energetic performance requirements in single-family houses. Furthermore, there are support schemes for RES heating infrastructures and some quality labels.

Biodiesel and bioethanol used for fuel purposes and blended within conventional fuels benefit from a partial exemption of the domestic consumption tax. The French government has introduced a national programme to support modest households in the thermal renovation of their buildings in order to decrease energy losses. For industry as well as for households and the tertiary sector, there are green loans available.

European Union Emissions Trading System (EU ETS)

France has 1 139 installations falling under the EU ETS. In 2011, they represented a share of 22 % of total GHG emissions in the country.

Energy supply

Energy efficiency

With the energy efficiency certificate scheme, energy suppliers are obliged to reduce energy and to promote energy efficiency among their clients. By several calls for tender, France aims to stimulate green combined heat and power (CHP) production. Also, some support for micro-cogeneration in buildings is foreseen.

Renewables

The current multiannual programming investments for electricity and for heat production were implemented in 2009 via a decree that also sets development targets for the period from 2009 to 2020. For the promotion of installations and the use of renewable energy sources in France, several measures were implemented: two training programmes for RES installers; four certification schemes for photovoltaic (PV) installations, solar thermal plants, wood-heating systems and heat pumps; two different research, development and demonstration (RD&D) programmes; a building obligation for the use of renewable heating, and two support schemes for RES heating infrastructures.

Energy use

Energy efficiency

Based on a broad national debate on energy efficiency carried out in 2011, the government has announced 27 measures in order to reach the 20 % target of energy efficiency by 2020. Those measures include loans at preferential rates for energy efficiency investment in small companies and for the renovation of social housing and grants for the renovation of public lighting of small cities. The building sector is a priority area. Minimum energy performance standards for new and for existing buildings have recently been strengthened to lower consumption levels. For larger buildings, a feasibility study regarding energy efficiency and the use of renewables is required. For different target groups, financing aid is available for new low-energy buildings and existing buildings. There are numerous financial incentives schemes alongside these. At times of sale and rental, the possession of energy performance certificates is mandatory. Also, at the information, education and demonstration level, France provides a wide range of measures in order to support the entire building sector. Both the Ecodesign Directive and the Energy Labelling Directive were implemented at national level and cooperation with the French Lighting Trade Union exists; France launched information tools like websites, campaigns and information centres in this area too. Energy audits are progressively required in public buildings.

Renewables

In order to promote the use of renewable energies, territorial collectives are entitled to construct district heating networks located in their area, provided that at least 50 % of the heat is supplied from RES. New and renovated buildings located within a district heating area are obliged to be connected to the heating network. The French government introduced in 2008 a heat fund in order to support the production of heat through renewable energy plants. This support system is endowed with a budget of EUR 1.2 billion for the period between 2009 and 2013.

Transport

Renewables

The main support scheme for RES used in transport is a quota system. This scheme prompts companies importing or producing petrol, gas or diesel fuels to ensure that biofuels make up a defined percentage of the company's total annual sale of fuel. Furthermore, biofuels are supported through fiscal regulation. The National Biofuels Development

Plan has set a target of 10 % of biofuels in the total fossil fuel production by 2015. In order to reach this target, the quota of biofuels to be blended with conventional fuels is defined for each fuel type. In cases of companies selling fuels for consumption that do not respect the biofuels quota, a higher rate of the tax on polluting activities is levied.

Transport efficiency

According to the Finance Act 2009, an eco-tax will be levied on trucks over 3.5 tonnes from July 2013 on. It is estimated that the implementation of the eco-tax will reduce CO_2 annually, between 0.26 and 0.6 Mt CO_2 . The Environment Roundtable (Grenelle de l'Environnement) has set a target to reduce the average emissions of the entire French vehicle fleet to 120 g in 2020. When it comes to new cars, an average level of 95 g CO_2/km emissions is the target for 2020. In July 2012, the government decided to increase the subsidies for new electric, hybrid and efficient cars. Yet, in 2009, France concluded to create an infrastructure that can stimulate and strengthen the further development and growth of electric vehicles. The goal here is to have 2 million cars of this type in the entire vehicle fleet by 2020. The Single European Sky Air traffic management Research (SESAR) programme will develop a new, safe and efficient transport management system. The goal is to reduce 6 % to 12 % of CO_2 emissions through fuel savings, thanks to the reduction of distances, waiting and driving time. Also for water transport, France stipulated several actions. With the 'Etiquette CO_2', the CO_2 label for cars and the Semaine de la Mobilité (the Mobility Week), France wants to raise awareness of transport efficiency. The Research and Innovation Programme on terrestrial Transport (PREDIT) provides funding for RD&D of EUR 400 million for the period from 2008 to 2013.

Modal shift and raising awareness

The objective set out in the Grenelle for transport is to encourage alternative modes to individual transport and air traffic. In 2009, the government launched a EUR 7 million action plan to support rail freight, which includes the construction of 2 000 kilometres of railways for the high-speed train.

Industrial processes

Non-CO_2 gases

Concerning general measures implemented by France to limit emissions of F-gases in the atmosphere (2006/40/EC), the government introduced regulations for air conditioning systems in motor vehicles. An annual reduction of 0.55 Mt CO_2 eq. in 2020 is estimated. In addition, a procedure for measuring CO_2 emissions from air conditioning systems in passenger cars and light commercial vehicles is being developed at European level. Hence, a further enlargement of the regulation is needed soon.

Energy efficiency

In line with the 2012/27/EU Directive on Energy Efficiency, France continues its active support in the field of energy efficiency, including the industrial sector. Various tools are available to companies wishing to improve their efficiency (including buildings, processes, etc.) via energy audits. Encouraging future investments, industrial actors can benefit from low-interest loans and loan guarantees ('green loans') that had a budget of EUR 500 million in July 2010.

Agriculture

The reduction of energy consumption and the development of renewable energy in the agriculture and forestry result from the implementation of several support programmes. French policy focuses on the most energy-intensive processes. Policies and measures to reduce emissions from agriculture aim to reduce energy consumption on farms, reduce pollution via manure management and support the development of RES. They include an action plan for farms in order to implement Grenelle de l'Environnement's objective to reduce GHG emissions and to upgrade carbon capture and storage (CCS). The REACCTIF call for research was launched by the Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME) in December 2011 with an emphasis on improving knowledge on GHG emissions and balances in forests and agriculture (vegetation and soil). It aims to improve knowledge of the contribution of agriculture and forestry in the crusade against climate change. The first call for proposals has selected 15 projects. A new call in 2013 for funding in 2014 is expected soon.

Waste

French waste policy has expanded and become more stringent.

The Grenelle de l'Environnement sets the following targets:

- reduce annual production of residential waste per capita by 7 % over 5 years (by 2015);
- increase recycling rates of residential waste to 35 % by 2012 and 45 % by 2015;
- recycle 75 % of consumer packaging and standard waste from businesses by 2012;
- reduce by 15 % the volume of waste send to landfill or incinerators;
- introduce separation of waste at source.

National policy is also concerned with capturing methane emissions from waste and progressively increasing the tax on polluting activities (making incineration and landfill more expensive). The government launched several campaigns in order to sensitise the French public. Further research can rely on specific funding programmes.

Land use, land-use change and forestry

France also recognised the importance of forests as a carbon sink and the role of forestry to preserve this sink. Moreover, the French forest policy distinguishes between wood as a building material (carbon sequestration) and as a source of energy.

A greater use of wood in construction (which is also carbon storage) shall be promoted through a strategic fund to support the competitiveness of timber mills and labels to highlight buildings with a higher proportion of wood.

The need for fuel wood in the future will be quantified, the capacity and potential markets established, and biodiversity will be protected.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
FR-ENS-002 Energy Efficiency Directive: (ETS)	21 144
FR-ENS-011 to FR-ENS-015 Programmation pluriannuelles des investissements 'electricité'-Eolien, hydraulique, biomasse, photovoltaique, chaleur	12 850
FR-TRA-023 Bonus-malus automobile et superbonus (non-ETS)	9 200
FR-CRS-011 Fonds chaleur (both ETS and non-ETS)	8 100
FR-TRA-032 Plan biocaarburants francais, TGAP, nouveaux carburants (non-ETS)	7 700
FR-IND-003 Limitation des émissions de gaz fluorés utilisés comme fluide frigorigène (non-ETS)	7 170
FR-CRS-006 Certificats d'économie d'énergie (première et deuxième période) (both ETS and non-ETS)	6 200
FR-ENS-005 écoconception des équipements d'éclairage (both ETS and non-ETS)	4 050
FR-RES-015 Eligibilité au Crédit d'impôt développement durable (CIDD) de dépenses d'amélioration de la performance énergétique des bâtiments existants (both ETS and non-ETS)	3 760
FR-RES-003 Réglementation thermique (RT) 2012 (both ETS and non-ETS)	3 550
FR-TRA-025 Plans véhicules électriques et hybrides (both ETS and non-ETS)	1 720
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
FR-TRA-001 SNIT (schéma national des infrastructures de transport) (estimate for 2030, both ETS and non-ETS)	2 500
Measures with large expected savings specifically in the non-ETS sectors	
FR-TRA-023 Bonus-malus automobile et superbonus (non-ETS)	9 200
FR-TRA-032 Plan biocaarburants francais, TGAP, nouveaux carburants (non-ETS)	7 700
FR-IND-003 limitation des émissions de gaz fluorés utilisés comme fluide frigorigène (non-ETS)	7 170
EU policies or measures related to measures expected to deliver the largest savings	
FR-ENS-002 directive SCEQE: Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	
FR-ENS-005 écoconception des équipements d'éclairage: Energy consumption: Ecodesign Directive 2009/125/EC (amending 2005/32/EC)	
FR-CRS-006 Certificats d'économie d'énergie (première et deuxième période): Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	
FR-RES-003 Réglementation thermique (RT) 2012: Energy consumption: Recast of the Energy performance of buildings (Directive 2010/31/EC) amending 2002/91/EC	
FR-ENS-011 to FR-ENS-015 programmations pluriannuelles des investissements « électricité » - Eolien, Hydraulique, Biomasse: Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
FR-CRS-011 Fonds Chaleur: Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
FR-IND-003 limitation des émissions de gaz fluorés utilisés comme fluide frigorigène: Industrial Process: F-gas regulation (Regulation 842/2006)	
EU policies or measures expected to result in the largest emission savings	
FR-ENS-002 directive SCEQE (21 144 kt CO_2 eq. per year, 2020, ETS)	
FR-ENS-011 programmations pluriannuelles des investissements « électricité » - Eolien (8 290 kt CO_2 eq. per year, 2020, ETS)	
FR-CRS-011 Fonds chaleur (8 100 kt CO_2 eq. per year, 2020, both ETS and non-ETS)	
FR-CRS-006Certificats d'économie d'énergie (première et deuxième période) (6,200 kt CO_2 eq. per year, 2020, both ETS and non-ETS)	
FR-ENS-005 écoconception des équipements d'éclairage (4 050 kt CO_2 eq. per year, 2020, ETS)	
FR-IND-003 limitation des émissions de gaz fluorés utilisés comme fluide frigorigène (7 170 kt CO_2 eq. per year, 2020, non-ETS)	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Germany

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	1 250.3	1 040.6	943.5	916.5	931.1
GHG per capita (t CO_2 eq./cap.)	15.8	12.7	11.5	11.2	11.4
GHG per GDP (g CO_2 eq./EUR)	n/a	481.9	396.5	373.8	377.3
Share of GHG emissions in total EU-28 emissions (%)	22.3 %	20.4 %	19.9 %	20.0 %	20.6 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	454.9	450.3	452.6
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	48 %	49 %	49 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	+3.2 %	+2.2 %	– 4.0 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	8.3 %	16.5 %	31.1 %

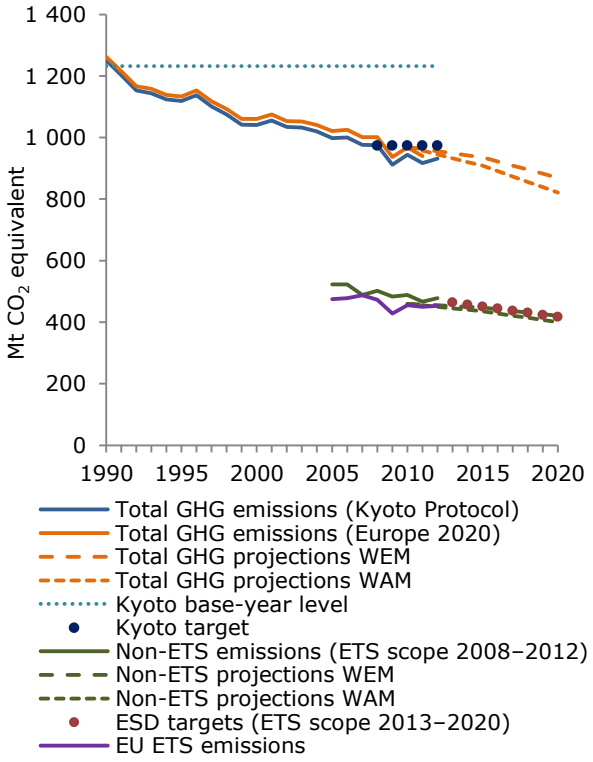
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	483.7
2008–2012 average non-ETS target	529.3
Gap to target (domestic emissions-target)	**– 45.6**
Expected effect of carbon sinks	– 10.0
Planned use of flexible mechanisms	0.0
Issued emission reduction units	– 2.4
Overall gap to target	**– 53.1**

Germany is on track towards its Kyoto target. Its government does not plan on using the Kyoto flexible mechanisms to achieve its target.

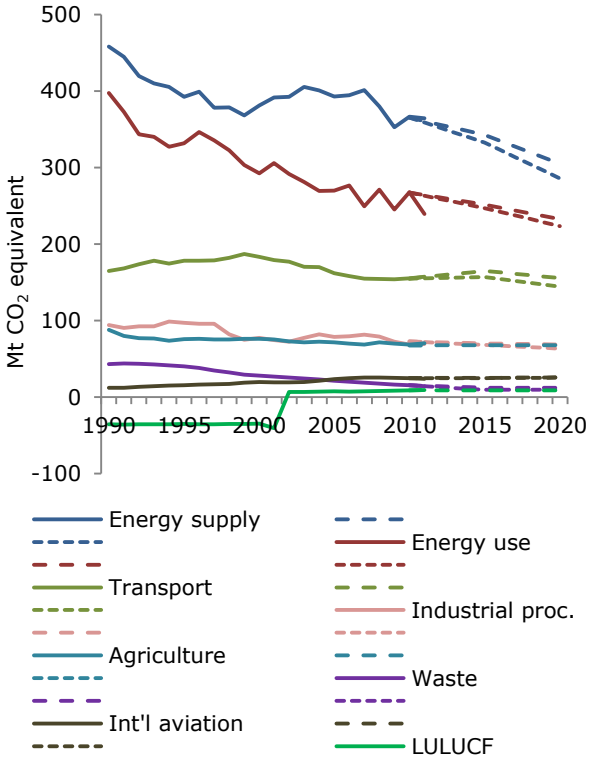
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	476.7
2013 ESD target	487.1
Gap to target (domestic emissions-target)	**– 10.4**
2020 ESD target (with art. 10 adjustment)	417.3
2020 non-ETS projections WEM	420.7
Gap to target WEM	**3.4**
2020 non-ETS projections WAM	399.8
Gap to target WAM	**– 17.5**

Germany is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

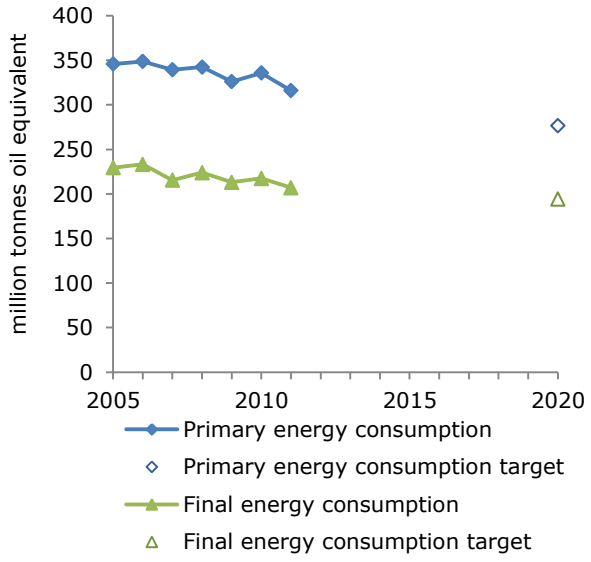


Sectoral GHG trends and projections

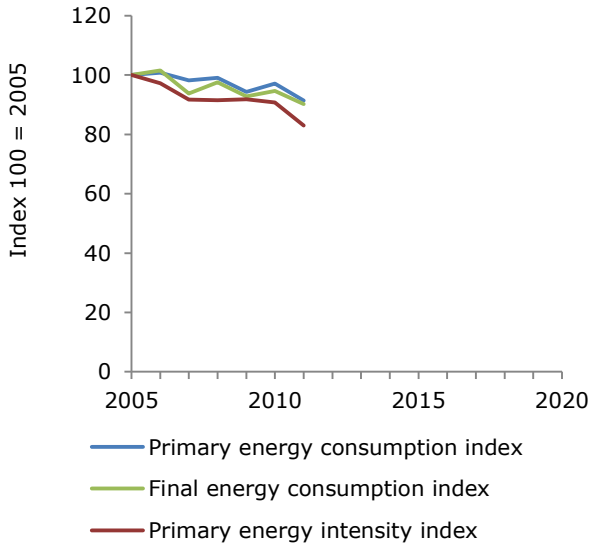


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	345.8	326.2	335.7	315.9	276.6
Final energy consumption (FEC) (Mtoe)	229.5	213.2	217.4	207.1	194.3
Germany is making good progress in reducing energy consumption and primary energy intensity, and has a well-balanced policy package to support energy efficiency across sectors.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	5.2 % (6.0 %)	8.0 % (9.2 %)	10.7 % (10.7 %)	12.3 %	18.0 %
Share of renewable energy in gross FEC — electricity (%)	10.1 %	16.8 %	18.1 %	21.3 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	5.6 %	8.3 %	10.3 %	12.0 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.2 % (3.8 %)	0.3 % (5.6 %)	6.1 % (6.1 %)	6.1 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 12.3 % (26 215 ktoe), higher than the indicative target for the 2011-to-2012 period (8.2 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (36 %), onshore wind (15 %) and hydropower (8 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 13.5 %. In order to reach the 2020 target, an average annual growth rate of 4.4 % is needed for the period from 2011 to 2020. This is equivalent to the cumulative effort up to 2011.					

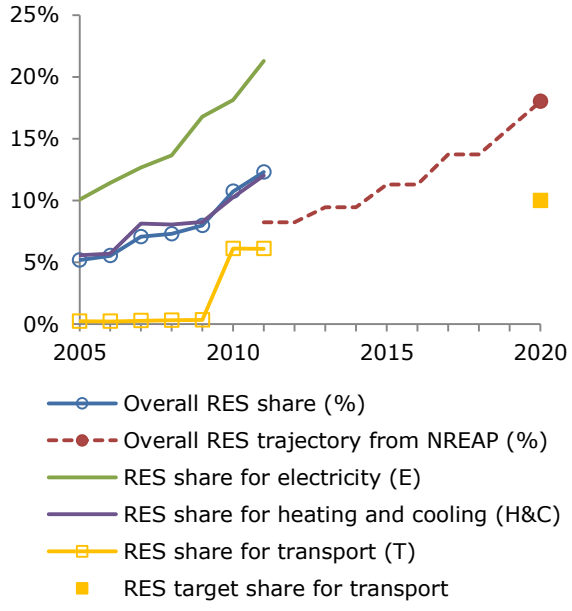
Primary and final energy consumption



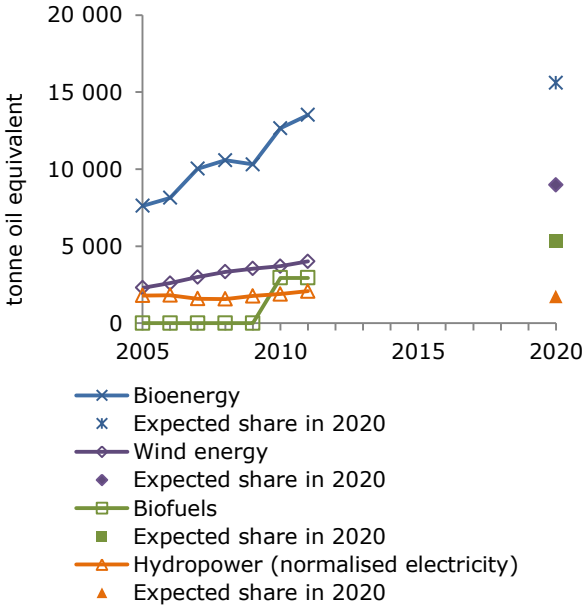
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The climate policy in Germany is closely associated with the energy policy. The overarching policy is the new Energy Concept, adopted in September 2010. The concept envisages long-term targets for renewable energy: a 60 % reduction in total final energy consumption, and a 50 % reduction in primary energy consumption, by 2050. The measures put in place to implement the Energy Concept are expected to support the fulfilment of the 40 % reduction target for greenhouse gas (GHG) emissions by 2020, and should enable Germany to remain on track with the overall objective of developed countries to reduce GHG emissions by 80 % to 95 % by 2050. As a response to the nuclear phase-out, 35 % of electricity production shall be derived from renewables by 2020. The security of supply and expansion of the transmission and distribution grid are also important key elements of the energy concept.

Main economic instruments for renewable energy and energy efficiency

The Energy and Climate Funds comprise financial sources for renewable energy, energy efficiency, climate mitigation, etc. In 2011, an amount of EUR 300 million was allocated, in 2012 it provided EUR 780 million and EUR 3.3 billion are expected for 2013. The fund should be covered by the revenues of the Emissions Trading Systems (ETS).

The Energy Efficiency Funds (which are part of the Energy and Climate Funds) provide financial incentives for investments targeting the increase of energy efficiency. In 2011 and 2012, approximately EUR 90 million were supplied, for 2013 to 2016, the funds will be raised to EUR 200 million annually.

The expansion of renewable electricity generation (e.g. offshore wind energy in the northern regions of Germany) is supported by the KfW Bankengruppe. Another important economic instrument is the fixed feed-in compensation for renewables.

The Market Penetration Programme (MAP) supports the installation of innovative, renewable heating technologies. On the one hand, it includes financial incentives for investments for residential heating systems (solar heat, biomass, heat pumps) from the Federal Office of Economics and Export Control (BAFA). On the other, the KfW provides loans to commercial and municipal investors to expand district heating/cooling and thermal storage systems.

European Union Emissions Trading System (EU ETS)

In 2011, in Germany 2 086 stationary installations were included in the ETS. The share of ETS emissions amounted to 49 % of the total emissions.

Energy supply

Energy efficiency

Energy efficiency is a cornerstone of the German climate and energy policy. Germany is planning to implement a pilot project for introducing so called white certificates, a new instrument to promote energy efficiency.

The Energy Industry Act and the pertinent Electricity Grid Access Charges Ordinance constitute the first-ever legal claim to reimbursement of network utilisation charges avoided via non-central feed-in of electricity to the grid. In case of avoided network utilisation, charges will be calculated for each network level.

Moreover, Germany plans to enforce the connection to the district heating system. The Combined Heat & Power Act (KWKG) (last amended in 2012), is the most important measure for supporting combined heat and power (CHP) installations. It includes feed-in tariffs for CHP in the heating grid, but also investment grants. The Market Penetration Programme also subsidises heating and cooling installations and thermal storage (e.g. CHP, thermal solar energy and heat pumps).

In addition, energy plants are expected to step up their efforts to improve energy efficiency.

Renewables

The growth in electricity generated from renewable energies is credited to the Renewable Energy Sources Act (EEG). It is the most important instrument for the expansion of wind, photovoltaics and biomass for electricity generation and guarantees a feed-in compensation.

Some of the most notable measures of the EEG concentrated on offshore wind and grid expansion. The Federal Ministry of Environment also founded the Renewable Energy Platform, which is expected to coordinate further expansion of renewables. The Platform is organised in three working groups dealing with market and system integration, grid expansion and integration of renewables into conventional systems of energy supply and demand. In order to guarantee the flexibility of the electricity grid, power-to-gas storage and heat storage systems are promoted.

Energy use

Energy efficiency

In recent years, a number of different measures have been undertaken to transpose EU legislation into national legislative requirements for e.g. the Buildings directive, Eco-design directive, Labelling directive, Green public procurement. Some of the most important measures envisaged include:

A roadmap for refurbishing the existing building stock at a rate of 2 % a year with the aim to achieve nearly zero energy standards by 2050. The programme for energy efficient renovation and new building construction provides cheap loans and subsidies for single renovation measures but also for a complete renovation. The level of financial support depends on the efficiency category of the building after renovation. Other measures focus on the energy efficient renovation of municipal and social buildings and the renovation of urban zones. The Energy Saving Ordinance (EnEV) requires energetic minimum standards for new buildings and existing building in case of renovation.

A greater emphasis is put on the enforcement of rules and support structures to enable individual consumers to take more conscious decisions, e.g. counselling centres have been organised by the Federal Consumer Association to provide independent advice.

In the industry sector the main goal is to increase the energy efficiency according to the whole system, as well as to

electrical appliances. Measures such as the KfW programme for promoting energy efficiency in industry and in commerce-trade-services, the Energy Efficiency Initiative, voluntary labelling for office equipment and the Special Fund for Energy Efficiency in SMEs are already implemented.

Renewables

The renewable share obligation (EEWärmeG) requires new buildings to cover heat and cooling demand by a minimum share of 15 % of renewable energy.

For this reason, the Market Incentive Programme focuses especially on promoting the use of renewable energies for heat production. The programme aims at facilitating broad-based market introduction of renewable energy technologies for heat production, as well as to trigger relevant cost reductions and technological development. It supports the installation of solar-thermal systems and both small and large biomass systems. Since 2008, there is also financial support for installation of heat pumps in buildings. As an incentive for modernisation and for an increased use of renewable energies, a reduced value-added tax for products and services according to modernisation of buildings is planned by the government.

Transport

Renewables

Germany already implemented the Biofuel Quota Act and therefore had to achieve the defined targets: In 2015, GHG emission reductions through the use of biofuels shall amount to 3 %, in 2017 4.5 % and 7 % in 2020.

Transport efficiency

Besides the national implementation of the EU requirements (CO_2 emission standards for vehicles, biofuels blends, etc.), Germany has introduced the motor vehicle tax. It applies to all three and four wheel LDV (light duty vehicles) and is rated by engine displacement and emission class. Electric vehicles are exempt from this tax.

In 2005, the government introduced a truck toll on highways (autobahn) which applies for trucks weighing more than 12 t. In 2011, the toll was expanded to certain federal highways. For trucks with not more than 3 axes the toll amounts to 0.141–0.274 EUR/km, trucks with more than 3 axes pay 0.155–0.288 EUR/km. Germany plans a greater spreading of truck and road toll rates on all highways and for all weight categories of trucks with more than 3.5 t weight until 2015.

Within the framework of the Electric Mobility Programme, the German Government plans to become the market leader in terms of electric mobility. One million electric cars shall be on the road by 2020, 6 million electric cars in 2030.

Since 2011, air passengers have to pay an air tax, depending on the flight distance.

Modal shift and raising awareness

In January 2013, the National Bicycle Traffic Plan 2020 was adopted. It aims at expanding the transport network for bicycles including improved infrastructure, more parking places, better connection to main roads, security measures and connection with other means of transport. But also, pedestrian traffic is intended to be improved by reduced waiting times at traffic lights. Where possible, pedestrian areas and traffic calmed areas are extended.

The public transportation is ameliorated by developing a nation-wide schedule that integrates a ticketing system for all public means of transport.

Intermodal connections will be better linked also aiming at increasing capacities of the railway network. This includes the optimisation of rail junctions and technical improvements. In order to avoid bottlenecks the investment for new railway lines will be enforced.

Industrial processes

Non-CO_2 gases

With regard to F-gases, Germany plans to discontinue their use in new installations in existing and new supermarkets. Further hydrofluorocarbons (HFCs) will be abandoned completely in polyurethane (PU) foams, extruded polystyrene (XPS) foams, mobile cooling devices and residential heat pumps. Germany further plans the substitution of HFCs in mobile cooling devices by refrigerants with a global warming potential (GWP) ≤ 150 for all types of vehicles, and the substitution of sulphur hexafluoride (SF_6) as a protective gas in magnesia production.

Energy efficiency

No measures have been reported for energy efficiency in industrial processes.

Agriculture

Policies for the agricultural sector are decided largely at EU level, in the framework of the Common Agricultural Policy (CAP). The reform of the CAP is promoting measures that will help to reduce GHGs by the promotion of organic farming and measures, which aim at encouraging extensification, the reduced use of nitrogen fertiliser as well as an adequate animal husbandry. Additional measures are the compliance with environmental specifications for receiving adjustment payments (cross-compliance) and a higher co-financing of environment-related measures.

Waste

The key regulatory framework for waste management comprises the Technical Instructions on Municipal Waste; provisions of the Act for Promoting Closed Substance Cycle Waste Management (amended in 2011) promoting recycling of waste compared to energy recovery and the Act for Ensuring Environmentally Compatible Waste Disposal. Moreover, Germany implemented the Ordinance on Environmentally Compatible Storage of Waste from Human Settlements, the Ordinance on Biological Waste-Treatment Facilities and the Ordinance on Installations for Biological Treatment of Waste. The Amendment of the Ordinance on Incineration and Co-incineration of Waste largely prohibits landfilling of untreated waste and opens the way for other types of waste disposal, such as incineration or mechanical-biological waste treatment.

Land use, land-use change and forestry

No specific strategies or measures to promote increased sequestration of carbon in German forests have been reported for the LULUCF sector.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
DE-RES-001 Electricity savings	28 000
DE-AGR-001 Fertilizer Ordinance (non-ETS)	15 000
DE-ENS-007 Renewable Energy Act	14 000
DE-IND-001 National implementation of F-Gas regulation (non-ETS)	7 000
DE-WST-001-008 Waste management (non-ETS)	5 100
DE-TRA-003 Mandatory biofuel quotas (non-ETS)	5 100
DE-RES-008 Incentives and grants (KfW) (non-ETS)	3 800
DE-TRA-009: ICAO 37th Assembly resolutions (energy efficiency in the air traffic)	3 300
DE-ENS-004-005: CHP Act	3 000
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
DE-RES-002 Electricity savings	7 800
DE-ENS-008 Further development of EU Emissions Trading Scheme	6 000
DE-TRA-014 Revision of fuel taxation	5 500
DE-ENU-006 EU ETS II (reduced CAPs and higher prices)	4 200
DE-TRA-015 Extension of HDV road pricing	2 700
DE-WST-007 National protein consumption	2 600
DE-IND-006 HFC substitution in many application sectors	2 500
Measures with large expected savings specifically in the non-ETS sectors	
DE-AGR-001 Fertilizer Ordinance	15 000
DE-IND-001 National implementation of F-Gas regulation	7 000
DE-WST-001-008 Waste management	5 100
EU policies or measures related to measures expected to deliver the largest savings	
DE-RES-001 Electricity savings (28 000 kt CO_2): Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC DE-AGR-001 Fertilizer Ordinance (15 000 kt CO_2): Agriculture: Common Agricultural Policy (CAP)-related regulations DE-IND-001 National implementation of F-Gas regulation (7 000 kt CO_2): Industrial Process: F-gas regulation (Regulation 842/2006) DE-TRA-003 Mandatory biofuel quota (5 100 kt CO_2): Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) and Transport: Fuel Quality Directive 2009/30/EC amending 1998/70/EC	
EU policies or measures expected to result in the largest emission savings	
EU ETS Directive 2003/87/EC CAP-related regulations F-Gas Regulation 842/2006 RES Directive 2009/28/EC	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Greece

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	104.6	126.2	117.3	115.0	115.2
GHG per capita (t CO_2 eq./cap.)	10.3	11.6	10.4	10.2	10.2
GHG per GDP (g CO_2 eq./EUR)	832.4	797.0	605.3	639.1	683.3
Share of GHG emissions in total EU-28 emissions (%)	1.9 %	2.5 %	2.5 %	2.5 %	2.5 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	59.9	58.8	61.4
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	51 %	51 %	53 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 7.3 %	– 22.6 %	– 16.9 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	6.1 %	18.7 %	20.8 %

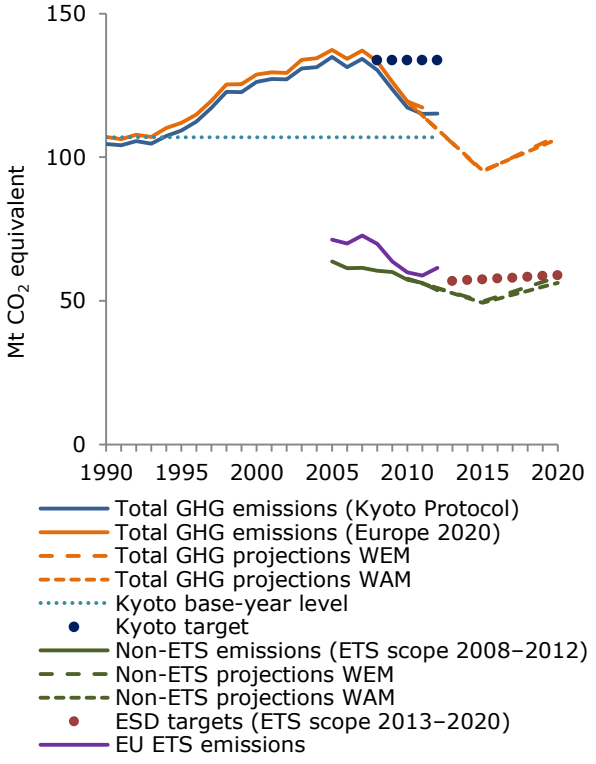
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	57.5
2008–2012 average non-ETS target	65.4
Gap to target (domestic emissions-target)	**– 7.9**
Expected effect of carbon sinks	– 0.6
Planned use of flexible mechanisms	0.0
Issued emission reduction units	0.0
Overall gap to target	**– 8.5**

Greece is on track towards its Kyoto target. Its government does not plan on using the Kyoto flexible mechanisms to achieve its target.

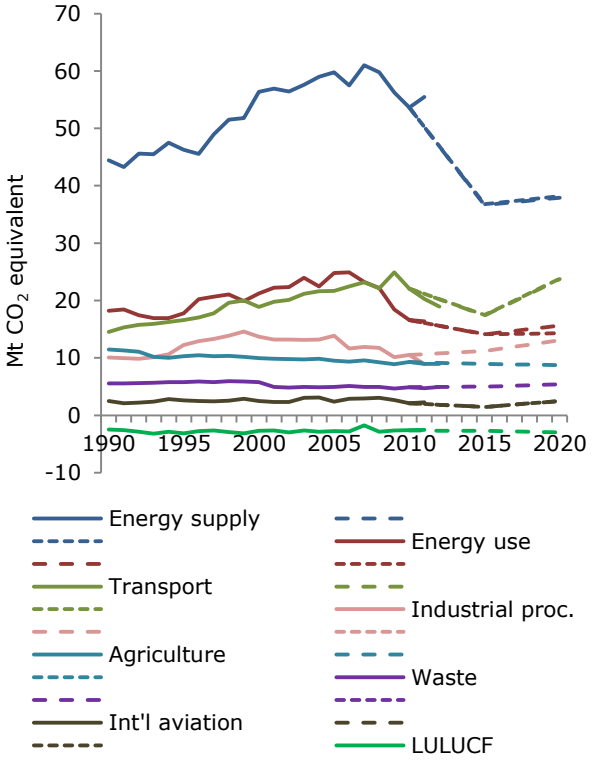
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	53.4
2013 ESD target	58.9
Gap to target (domestic emissions-target)	**– 5.5**
2020 ESD target (with art. 10 adjustment)	58.9
2020 non-ETS projections WEM	58.2
Gap to target WEM	**– 0.6**
2020 non-ETS projections WAM	56.3
Gap to target WAM	**– 2.6**

Greece is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

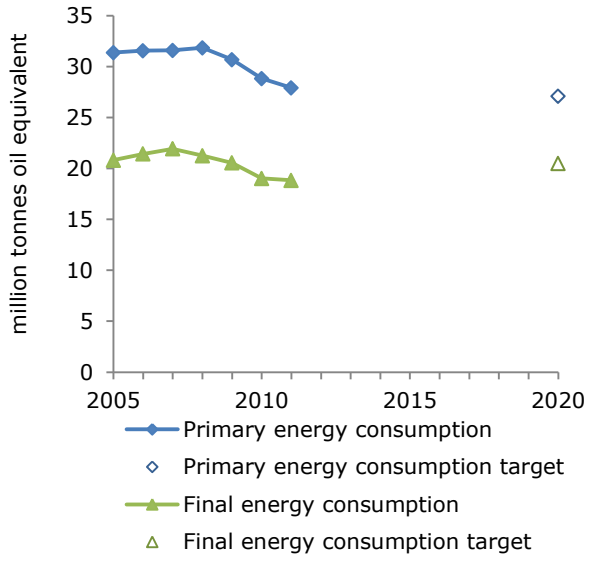


Sectoral GHG trends and projections

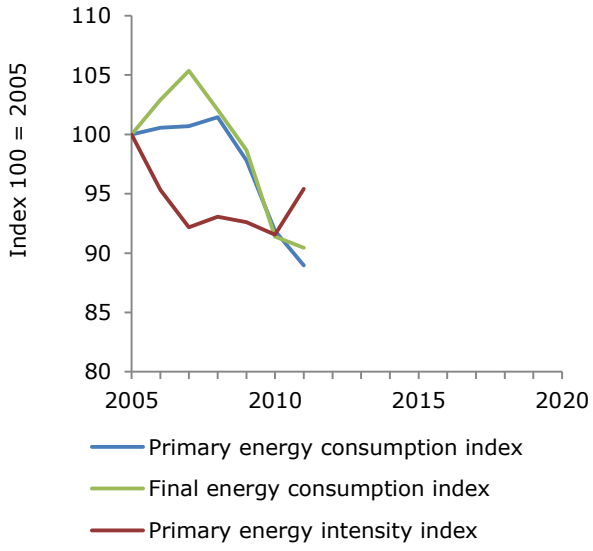


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	31.4	30.7	28.8	27.9	27.1
Final energy consumption (FEC) (Mtoe)	20.8	20.5	19.0	18.8	20.5
Greece is making some progress in reducing energy consumption, but further improvements are necessary in either energy efficiency policy implementation or the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	7.2 % (7.2 %)	8.1 % (8.5 %)	9.8 % (9.8 %)	11.6 %	18.0 %
Share of renewable energy in gross FEC — electricity (%)	8.9 %	11.8 %	13.1 %	14.6 %	
Share of renewable energy in gross FEC — heating and cooling (%)	12.9 %	15.9 %	17.3 %	20.1 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.0 % (0.0 %)	0.1 % (1.1 %)	2.0 % (2.0 %)	1.8 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 11.6 % (2 238 ktoe), which is higher than the indicative target for the 2011-to-2012 period (9.1 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (47 %), hydropower (19 %) and onshore wind (13 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 6.2 %. In order to reach the 2020 target, an average annual growth rate of 7.6 % is needed for the period from 2011 to 2020. This corresponds to 1.5 times the cumulative effort up to 2011.					

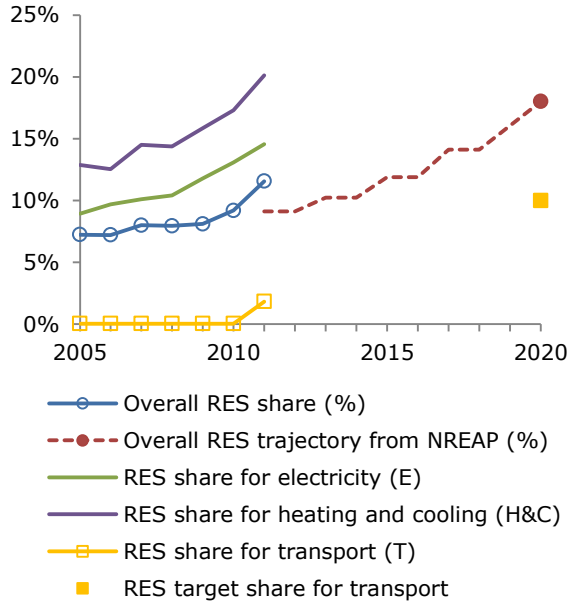
Primary and final energy consumption



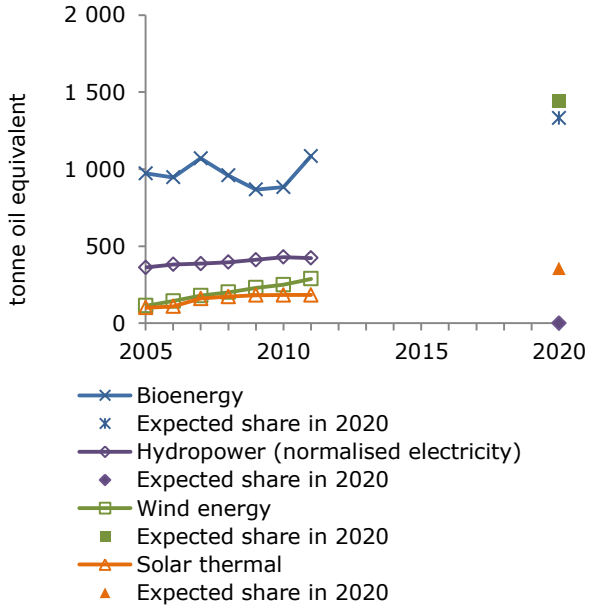
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

Based on the National Energy Strategy, the total realistic greenhouse gas (GHG) emissions reduction potential from the implemented and adopted policies and measures was estimated to be 35.6 Mt CO_2 eq. for 2015 and 50.7 Mt CO_2 eq. for 2020. Respectively, the total GHG emissions reduction potential for the planned policies and measures was estimated to be 7.2 Mt CO_2 eq. for 2015 and 10.9 Mt CO_2 eq. for 2020.

The introduction of natural gas in the national energy system is one of the largest investments ever carried out in Greece and it constitutes a major priority of the national energy policy.

According to the Greek National Action Plan for Renewable Energy Sources (2010–2020), 20 % of primary energy use is planned to come from renewable energy sources (RES) by 2020 (indicative penetration level: 40 % electricity, 20 % heat and 10 % transport). The RES roadmap includes accelerating the permission process for large projects, and simplifying the licensing for the procedure for smaller projects.

Main economic instruments for renewable energy and energy efficiency

The Green Fund was implemented in 2011 and aims to enhance development through environmental measures also focusing on climate change. In 2012, the Green Fund included EUR 72 million. For the period 2011 to 2014, EUR 400 million in total are supplied by the fund. The operational programme 'Environment and Sustainable Development 2007–2013' contributes to economic growth through more efficient use of resources. This includes energy savings, the use of RES and the promotion of clean urban public transport. The budget of the programme amounts to EUR 2 000 million.

European Union Emissions Trading System (EU ETS)

The EU ETS includes 167 Greek installations in 2011 and covers 51 % of the total national emissions.

Energy supply

Energy efficiency

The introduction of natural gas in the national energy system has been one of the largest investments in Greece, and is the major energy policy. Besides the construction of power plants, the expansion of the transmission network and gas infrastructure is of importance. The support of natural gas is linked with various measures; one such measure is the Operational Programme for Competitiveness and Entrepreneurship (OPCE II). The OPCE II aims at supporting energy market liberalisation and the integration of the country into major international transmission networks of electricity and natural gas.

Old and inefficient power plants will be continuously decommissioned and replaced by natural gas power plants and RES. Islands shall be interconnected with the mainland grids. The interconnection of the Cyclades islands is planned to be completed in 2016, while for Crete this will be in 2025.

Renewables

Concerning the promotion of renewables heat-cooling technologies, and in order to fully implement the National Renewable Energy Action Plan as well as meet the '20–20–20' targets, new financial incentives for the support of the heat production from biomass and geothermal energy have been put in place or are planned.

To promote electricity production from renewable energy sources, feed-in-tariffs have been introduced for all RES technologies.

Energy use

Energy efficiency

The basic measures promoting energy efficiency are the application of minimum requirements on the energy performance of new buildings and existing buildings that are subject to major renovation, and the mandatory replacement of all low-energy efficiency lights in the public sector. Although solar thermal applications already have a significant penetration in the Greek building sector, a new legislative framework passed in 2010 along with the technical requirements that are set by the Energy Performance of Buildings Regulation (KENAK). The KENAK regulation stipulates a minimum contribution of solar thermal systems required for all new buildings. The implementation of energy conservation programmes in various industrial units is pursued due to public financial support schemes (as the Development Assistance ACT). Incentives for the establishment and implementation of the Energy Management Systems (EMS), the creation of energy and environmental management centres in industrial areas and outsourcing of energy services are planned.

Renewables

The switch to renewable energy in households is supported by a tax relief of 20 % (and a maximum of EUR 700) of the costs for replacing the domestic heating/cooling system. The tax relief applies to fuel-switching in the heating system: from oil to natural gas or to a new natural gas installation, to replacements of oil boilers with district heating connections, to the installation of solar collectors or photovoltaics, to decentralised power generation systems based on RES or natural gas and to the thermal insulation of buildings. The Greek government introduced a tax regime on energy products mainly affecting fossil fuels such as petrol, hard coal and coke. Biofuels are not excluded from taxation; natural gas will be suspended from the tax until January 2014.

As a response to the debt crisis, value added tax (VAT) was increased in 2010: energy products are taxed with 11 %, natural gas with 8 %.

Transport

Renewables

The introduction of biofuels and natural gas is promoted by the Greek government. Biofuels are excluded from the excise tax in order to increase their use. Since 2010, biodiesel has been blended up to 7 %.

Transport efficiency

Under the framework of the implementation of policies for the replacement of old vehicles, a list of actions have been carried out. The bus fleet is being renewed, aiming at the improvement of energy efficiency of vehicles. Economic

incentives were given to taxi owners for them to replace their old vehicles with new ones. There is a registration tax for cars, determined on the basis of the cylinder capacity and the antipollution technology of the vehicle. Hybrid cars are excluded from this tax.
The VAT on fuels for motor vehicles amounts to 23 %, and to 16 % on fuels for motor vehicles when they are delivered and used for transport within and between certain islands.

Modal shift and raising awareness

Public works to enhance the existing infrastructure, such as reconstruction of major highways and optimisation of the traffic-light system, are in progress. Additionally, important interventions are under development, aiming to improve public transport, such as the expansion of metro lines, the extension of bus lanes and the electrification of railways.

Industrial processes

Non-CO_2 gases

Greece has committed to implement Directive 2002/96/EC and its modification 2003/108/EC for the recovery of F-gases from air conditioning and refrigeration equipment. The directives have been incorporated into national legislation, while enhancement of electric and electronic equipment recycling is promoted by the Operational Programme for Competitiveness. Additionally, the production of hydrochlorofluorocarbon-22 (HCFC-22) will no longer be permitted after 31 December 2019. The only plant producing HCFC-22 in Greece ceased operation from 2006 anyway. Regulation 842/2006 on certain fluorinated greenhouse gases and its implementing acts are anticipated to reduce emissions of certain fluorinated gases (hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6)).

Energy efficiency

Projects of voluntary agreement schemes co-financed by the European Commission, such as the Motor Challenge and the Greenlight, are in their pilot phases, and they have promising results to date.

Agriculture

Actions of the Rural Development Policy include the increase of organic farming, reduction of intensity of agricultural land use and the decreasing use of synthetic nitrogen fertilisers by 30 % beyond the limit defined in the cross-compliance system. A further measure is the disengagement of subsidies from the agricultural production, which has already indirectly enhanced the reduction of agricultural production and livestock population. The total GHG emissions reduction in the agriculture sector is estimated to reach 670 kt CO_2 eq. in 2015 and 880 kt CO_2 eq. in 2020.

Waste

The main objectives of national policies and measures related to waste management are the elimination of unmanaged solid waste disposal sites and providing coverage of all urban and rural areas of the country with modern installations for final waste disposal. This includes the promotion of measures for the prevention and reduction of waste as well as the maximisation of recycling and recovery of products and energy. For reducing the quantities of biodegradable wastes, Joint Ministerial Decision 29407/3508 in agreement with Directive 1999/31/EC, is acknowledged. The reduction of the landfilling of biodegradable waste is enhanced as a result of implementing Directive 94/62/EC for Packaging and Packaging Waste. The flaring of landfill gas in managed sites for urban centres is partially integrated. A collection network for wastewater has already been developed; it covered the needs of 91 % of the population in 2011. The implementation of Directive 86/278/EEC for the use of sludge in agriculture is in force.

Land use, land-use change and forestry

Measures in the LULUCF sector target the conservation of existing forest land and its gradual increase, as well as recovery of degraded forests. The measures originate from rural development actions and other financial mechanisms. Other projects deal with the employment in the framework of forest fire prevention and the restoration of forest areas affected by forest fires as well as the road network and forest management.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
EL-ENS-001: RES for electricity production	20 300
EL-ENS-004: Gradual decommissioning of old inefficient thermal power units and commissioning of new ones – increase of NG share in electricity production	12 000
EL-ENU-003: Partial implementation National Energy Efficiency Action Plan	2 500
EL-TRA-001: Biofuel in the transport sector	2 100
EL-WST-001: Recovery of organic waste	800
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
EL-ENU-005: Promotion of CHP	350
EL-TRA-004: Road transport measures	300
EL-ENS-002: Additional RES for electricity production	230
Measures with large expected savings specifically in the non-ETS sectors	
EL-TRA-001: Biofuel in the transport sector	2 100
EL-WST-001: Recovery of organic waste	800
EL-WST-002: Recovery of biogas	500
EU policies or measures related to measures expected to deliver the largest savings	
EL-ENS-001: RES for electricity production: Energy supply: RES Directive (Directive 2009/28/EC)	
EL-ENS-004: Gradual decommissioning of old inefficient thermal power units and commissioning of new ones – increase of NG share in electricity production: Energy supply: Internal market in natural gas (Directive 98/30/EC) including provision of the third package	
EL-ENU-003: Partial implementation National Energy Efficiency Action Plan: Energy consumption: Energy performance of buildings (Directive 2002/91/EC)	
EL-TRA-001: Biofuel in the transport sector: Transport: Biofuels Directive (Directive 2003/30/EC)	
EL-WST-001: Recovery of organic waste: Waste: Landfill Directive (Directive 1999/31/EC)	
EU policies or measures expected to result in the largest emission savings	
See above.	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Hungary

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	99.0	78.4	67.9	66.1	63.7
GHG per capita (t CO_2 eq./cap.)	9.5	7.7	6.8	6.6	6.4
GHG per GDP (g CO_2 eq./EUR)	n/a	1 083.7	772.2	739.6	724.5
Share of GHG emissions in total EU-28 emissions (%)	1.8 %	1.5 %	1.4 %	1.4 %	1.4 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	23.0	22.5	21.3
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	34 %	34 %	33 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 10.5 %	– 10.0 %	– 35.1 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	7.2 %	9.1 %	13.8 %

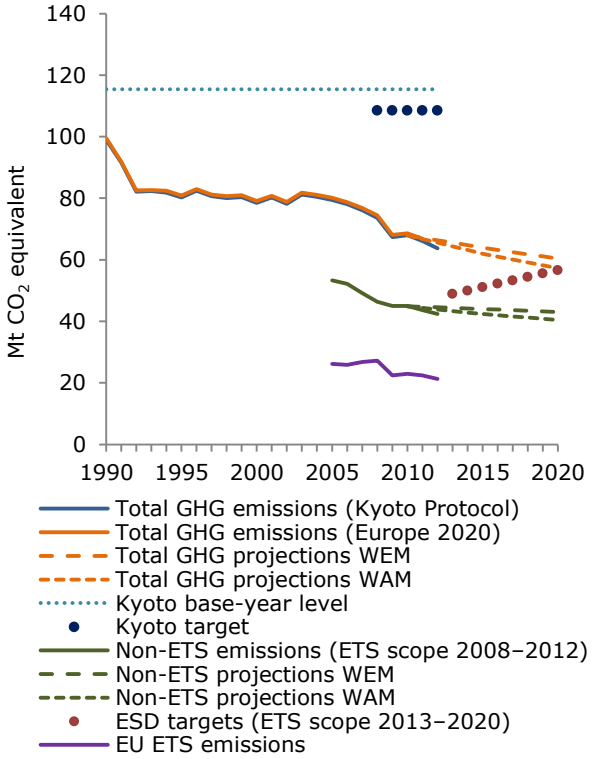
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	44.5
2008–2012 average non-ETS target	82.0
Gap to target (domestic emissions-target)	**– 37.5**
Expected effect of carbon sinks	– 2.2
Planned use of flexible mechanisms	– 4.0
Issued emission reduction units	– 1.5
Overall gap to target	**– 34.3**

Hungary is on track towards its Kyoto target. Its government intends to sell to other countries, through the Kyoto flexible mechanisms, a number of Kyoto units equivalent to 3 % of base-year emissions per year.

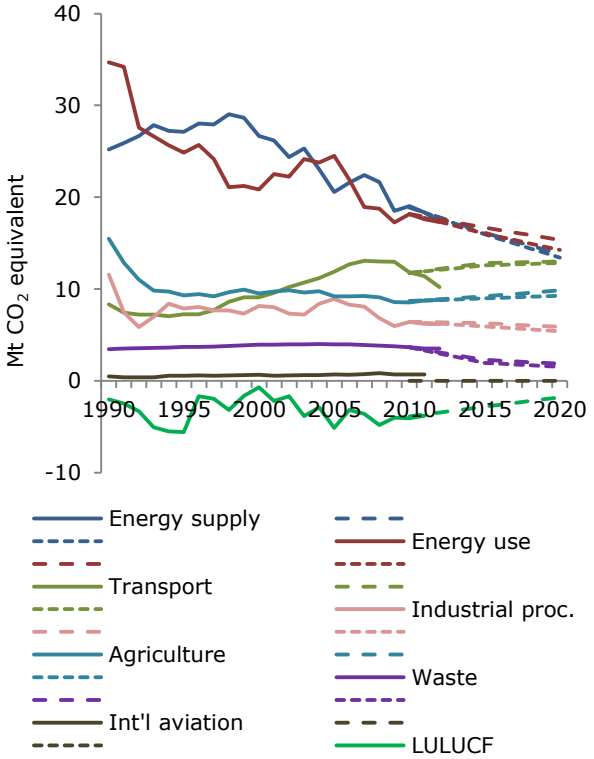
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	42.4
2013 ESD target	49.3
Gap to target (domestic emissions-target)	**– 6.9**
2020 ESD target (with art. 10 adjustment)	56.6
2020 non-ETS projections WEM	43.0
Gap to target WEM	**– 13.6**
2020 non-ETS projections WAM	40.5
Gap to target WAM	**– 16.1**

Hungary is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

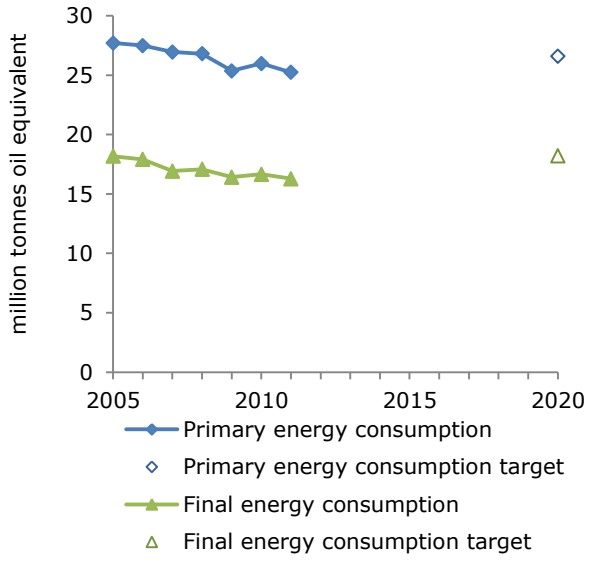


Sectoral GHG trends and projections

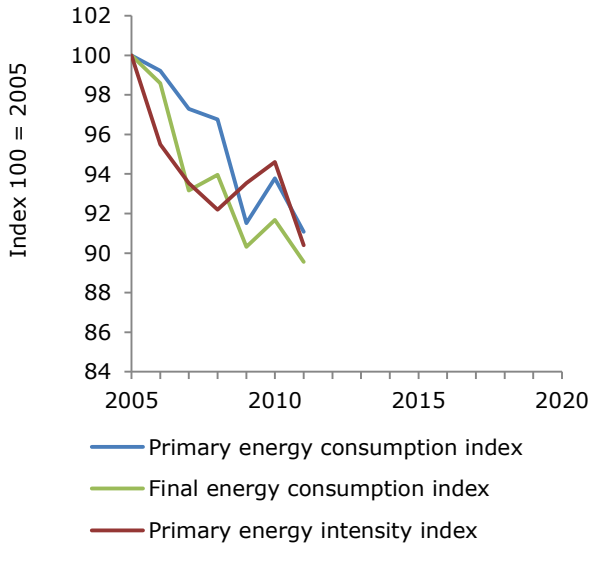


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	27.7	25.4	26.0	25.2	26.6
Final energy consumption (FEC) (Mtoe)	18.2	16.4	16.7	16.3	18.2
Hungary is making some progress in reducing energy consumption but further improvements are necessary, in either energy efficiency policy implementation or the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	4.5 % (4.5 %)	7.0 % (8.0 %)	8.6 % (8.6 %)	9.1 %	13.0 %
Share of renewable energy in gross FEC — electricity (%)	4.4 %	7.0 %	7.1 %	6.4 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	6.0 %	10.5 %	11.1 %	12.3 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.3 % (0.3 %)	0.4 % (4.1 %)	4.7 % (4.7 %)	4.5 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 9.1 % (1 527 ktoe), which is higher than the indicative target for the 2011-to-2012 period (7.3 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (66 %), solid biomass for electricity (9 %) and geothermal for heat (7 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy consumption amounted to 10.5 %. In order to reach the 2020 target, an average annual growth rate of 7.3 % is needed for the period from 2011 to 2020. This corresponds to 1.8 times the cumulative effort up to 2011.					

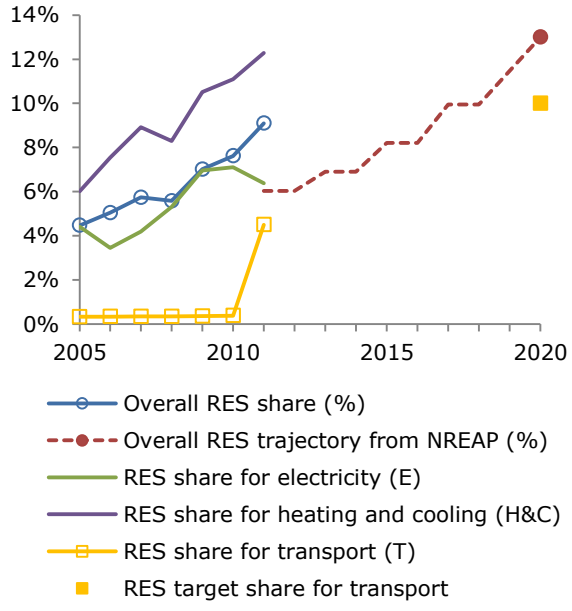
Primary and final energy consumption



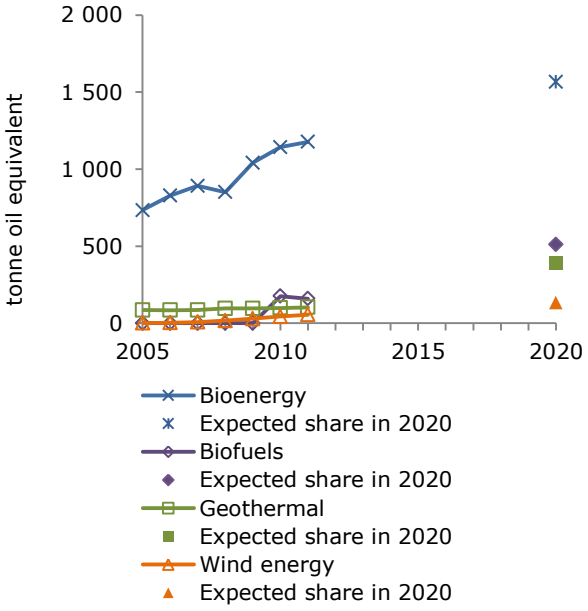
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The National Climate Change Strategy 2008–2025 (NÉS) was adopted by parliament in early 2008 and is currently being reviewed. The greenhouse gas (GHG) emission reduction target is between 16 % and 25 % by 2025 (compared to 1991 levels). The strategy underlines the importance of raising awareness of lifestyle needs, but also creates a regulatory and legal framework for the promotion of climate mitigation measures. The main intervention areas are energy efficiency in buildings, renewable energy utilisation, transport and afforestation. In addition, the National Environmental Protection Programme 2009–2014 includes several thematic action programmes (TACs) focusing on GHG mitigation, awareness-raising, waste management, etc.

In the current National Energy Strategy, Hungary states that due to the implementation of comprehensive energy efficiency programmes, the country's primary energy use shall not exceed 1 150 PJ/year by 2030; the growth rate of electricity consumption is limited to 1.5 % per annum. Reduction of residential heat demands by some 30 % through (building) energy efficiency programmes is also included in the National Energy Strategy.

The New Széchenyi Plan (ÚSZT) is an economic development programme implemented in 2011 which provides financial support for the strategic goals. It is the overall framework policy for all other relative strategies in Hungary regarding energy, transport and energy efficiency.

The current National Energy Strategy was adopted by parliament in October 2011, and the final document was published in 2012. The basic priorities, in line with the European strategy are threefold: safety of supply, increasing competitiveness and sustainability.

Main economic instruments for renewable energy and energy efficiency

Besides financial support from the ÚSZT, Hungary benefits from the sale of redundant assigned amount units which derive from the closing down of energy-intensive industries. The revenues from such transactions are managed by the so-called Green Investment Scheme (GIS). The GIS provides grants, loans and other financial support for all types of GHG mitigation measures including energy efficiency in buildings, promotion of renewable energy sources, creation of carbon sinks and emission reductions in the transport sector. In Hungary, electricity from renewable sources is supported mainly through a feed-in tariff. Additional support is provided by a subsidy programme for pilot projects on the use of renewable energy sources. For the use of biofuels, there is a quota system in place, including a reimbursement of excise duty for certain biofuels. Subsidies in Hungary are mostly part of the Operational Programme Environment and Energy financed by the European Regional Development Fund (ERDF). In the waste sector, co-financing of the EU Cohesion Fund is used, and likewise in agriculture, where EU funding to support cultivating energy crops (the European Agricultural Fund) is used as well.

European Union Emissions Trading System (EU ETS)

Hungary has 276 installations that fall under the EU ETS. In 2011, they represented a share of 34 % of total GHG emissions in the country.

Energy supply

Energy efficiency

Hungary wants to modernise its electric power stations and the grid by replacing the current low-efficient power stations by 2030. A total of 78 PJ of primary energy are expected to be saved, compared to the current situation. With particular regard to the fact that financing sources are currently very limited, cost-effectiveness is one of the critical factors during the first half of the period up to 2020. Carbon intensity of the energy sector should decrease from 370 g CO_2/kWh to below 200 g CO_2/kWh by 2030. Moreover, the share of district heating within the heat supply, the modernisation of the district heating systems and the utilisation of renewable energies should be increased. Nuclear energy also remains important for Hungary. Hungary foresees the extension of the technical lifetime by technical measures, and an increase of the capacity by improving efficiency and control systems. It is also expected that two new 1 000 MW units will be built from 2025 and 2030.

Renewables

In Hungary, electricity from renewable sources is supported mainly through a feed-in tariff. Additional support is provided by a subsidy programme for pilot projects on the use of renewable energy sources. According to Hungary's National Energy Strategy, the share of renewable energy in primary energy use shall increase from 7 % at present to around 20 % by 2030. The system of incentives concerning the utilisation of renewable energy sources shall be developed so as to prioritise combined heat and power (CHP) fuelled with biogas and biomass power plants. Heat generation from geothermal energy is also important: in accordance with the criteria of sustainability and energy efficiency, the local energy utilisation of the by-products from agriculture (e.g. straw and maize stalk), sewage water and sludge in biomass power and biogas plants, is supported.

Energy use

Energy efficiency

Several measures are taken in the household sector: upgrading projects in existing prefabricated buildings that are supplied with district heating; upgrading of existing buildings equipped with traditional technologies that are not district-heated, but have individual or central heating; increasing efficiency of lighting systems and household appliances, and supporting stand-by consumption and smart metering /smart grid systems. In the service and public building sector the Renewable Public Institutions Sub-Programme aims at upgrading buildings (similar to the household sector). It aims to reduce the electric power demand of public institutions, with efficient lighting systems and office equipment, stand-by consumption and smart metering/smart grid systems. For improving energy efficiency in the industry sector, the most cost-effective solution is the application of energy management systems and regular energy audits, and more specifically, the commitment of industrial stakeholders to energy-saving in long-term agreements (LTAs) with the government.

Renewables
In the 'Liveable panel buildings' sub-programme, Hungary aims to improve implementation of complex upgrading projects in existing buildings that are supplied with district heating. This includes energy efficiency improvements but also the modernisation of substations and installation of heat pump and solar panel applications. This policy is implemented via several policy instruments aimed at improving the utilisation of renewable energy sources and passive solar energy (among others). For existing buildings not supplied with district heating, Hungary has installed the 'Our Home' reconstruction sub-programme to improve application of renewable energy (solar boilers and heat pumps).

Transport

Renewables
Hungary has a quota system for biofuels in place: a target for biofuels was set, determined as the share of pure biofuels and biofuels added to conventional fuels in the total quantity of petrol placed in the market. In 2010, this target was 4.7 %, to be increased to 10 % in 2020. Only certified biofuels satisfying specific sustainability criteria can be taken into account for fulfilling the prescribed quota. There is also reimbursement of the excise duty in place for the alternative fuel E85, bioethanol and biodiesel, in case of engine development projects and vehicles used in the mining industry and in water management.

Transport efficiency
In 2007, Hungary introduced a toll for commercial vehicles exceeding 12 t of permitted gross weight on the majority of the national road networks,
There are plans to extend the toll to other lower priority roads as well. With the toll introduced, more environmentally friendly and more energy-efficient transportation modes are used. According to most recent information, the new electronic toll system of heavy vehicles will be operating from the summer 2013 and for all vehicles from 2020. Alongside the toll system, the development of the cycling route networks and creation of low-traffic zones should also contribute to a decrease of energy use for transport.

Modal shift and raising awareness
Hungary has measures in place to bring cargo and passenger transport from the roads to the railway: the electrification and modernisation of railway lines (currently two projects are planned); campaigns to promote railway transport; and the procurement of new, energy-efficient railway engines shall increase railway transport. Accompanying these measures were initiatives to redirect individual transport to public transport and to further develop the public transport system. This includes P+R systems, bus fleet modernisation/replacement and public transport promotion campaigns.

Industrial processes

Non-CO_2 gases
No specific strategies or measures have been reported in the industrial processes sector.

Energy efficiency
No specific strategies or measures have been reported in the industrial processes sector.

Agriculture

The New Hungary Rural Development Strategic Plan (2007–2013) is the continuation of the Agricultural and Rural Development Operational Programme (ARDOP). GHG-related actions of the New Hungary Rural Development Strategic Plan are the increase of energy crop production (+4 %); the increase of renewable energy production from agriculture and forestry (800 kt); additional agricultural area for biomass production (300 000 ha); additional area for energy forests (60 000 ha); reduced energy intensity of agriculture (– 2.5 TJ/billion HUF);and agri-environmental programmes that promote the sustainable use of agricultural land via organic farming, among others.
Another specific measure is a partial change in nitrogen fertiliser utilisation and cultivation methods. Farmers use such soil preparation and fertilisation practices in which nitrogen fertiliser can be limited to 50 kg/ha. Nutrients holding the capacity of the soil can be significantly improved and the loss of soil carbon per hectare can be reduced to 2 tonnes/ha/year. In relation to this measure, Hungary has a new Nitrate Action Programme (2006, amended in 2007). The decree identifies nitrate-sensitive areas and contains an extended list of settlements in these areas. In addition, it states the general rules of protection against nitrate pollution and prescribes an overall, coherent, nation-wide action plan. This shall lead to less nitrogen in water and a change in the N-cycle. Another specific measure is the replacement of old manure management systems with deep open lagoons, in order to avoid methane (CH_4) emissions. Manure will instead be transported from the barns to the gas-tight digesters of the biogas plant, where the methane is captured, stored and finally used for energy production. In Hungary, farmers can also get support for cultivating energy crops (via the European Agricultural Fund).

Waste

The basis of Hungary's waste management policy is the Act on Waste (Act No. CLXXXV in 2012) and the implementing regulations. It entered into force on 1 January 2013. The main goals are reduction of biodegradable residual wastes landfilled to maximum 820 000 t by 2016; the preparation of reuse and recycling of 50 % of papers, glass, metals and plastic by 2020; and the preparation of reuse and recycling of 70 % of construction and demolition wastes by 2020. The main measures are the introduction of a landfill tax that decreases yearly till 2016, and a compulsory door-to-door separate household waste collection for household paper, plastics and metal wastes by 1 January 2015. The implementation of several projects was cofinanced by the EU Cohesion Fund to establish regional waste management systems. These projects contain, among others, landfill gas collection and energy recovery, separate collection of household waste and the recycling/composting of separate collected waste fractions.

Land use, land-use change and forestry

The National Forest Programme 2006–2015 sets the objective of at least maintaining the current level of forestation, but preferably increasing it. The use of wood in society, as an environmentally friendly raw material, shall be encouraged. The forest management shall ensure that increased demands for wood will be met, without endangering sustainability. Knowledge and information on forests shall be increased in society. Alongside this, the Frame for Forestry Management and Forest Protection Act provides the comprehensive framework for sustainable forestry in Hungary. The National Agri-Environmental Programme (NAEP), a sub-programme of the National Environmental Programme, includes several horizontal and zonal targets. One of them is to increase the territorial proportion of

semi-natural forest management. The NAEP also considers afforestation a tool to increase forest plantations in flood areas in order to protect wetland habitats. The NAEP objectives were integrated into the agri-environmental measures of the National Rural Development Plan (NRDP) in 2004.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
HU-ENS-001: Promotion of renewables (ETS)	8,821
HU-ENS-002: Nuclear power (ETS)	5 173
HU-IND-001: Reducing the energy use of enterprises (non-ETS)	1 478
HU-RES-003: 'Power saving households' program (non-ETS)	1 117
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
HU-WST-006: Prevention plans for waste generation (non-ETS)	9
Measures with large expected savings specifically in the non-ETS sectors	
HU-IND-001: Reducing the energy use of enterprises (non-ETS)	1 478
HU-RES-003: 'Power saving households' program (non-ETS)	1 117
EU policies or measures related to measures expected to deliver the largest savings	
HU-ENS-001: Promotion of renewables: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
EU policies or measures expected to result in the largest emission savings	
RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC) Transport: Clean and Energy efficient road transport Directive 2009/33/EC Energy consumption: Recast of the Energy performance of buildings (Directive 2010/31/EC) amending 2002/91/EC	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Iceland

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	3.5	3.9	4.6	4.4	n/a
GHG per capita (t CO_2 eq./cap.)	13.8	13.9	14.5	13.9	n/a
GHG per GDP (g CO_2 eq./EUR)	424.1	364.3	350.0	325.1	n/a
Share of GHG emissions in total EU-28 emissions (%)	0.1 %	0.1 %	0.1 %	0.1 %	n/a
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	n/a	n/a	n/a
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	n/a	n/a	n/a
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	n/a	n/a	n/a
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	n/a	n/a	n/a

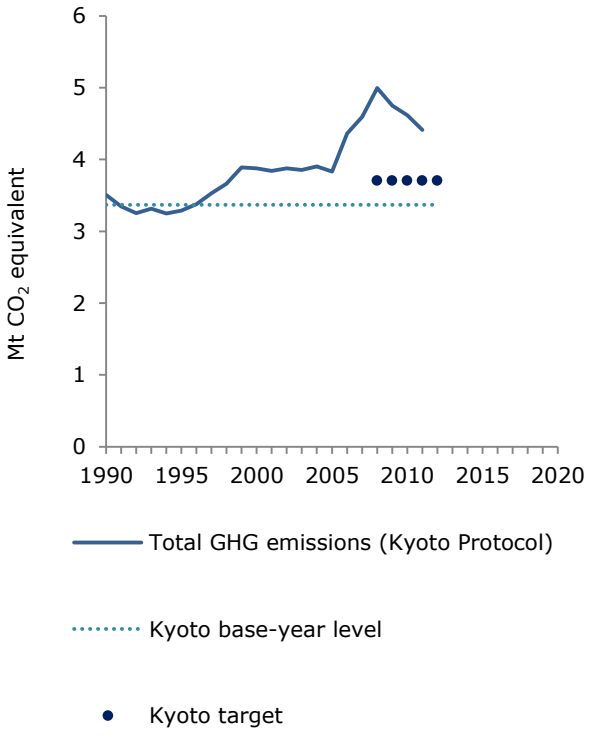
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	3.3
2008–2012 average non-ETS target	3.7
Gap to target (domestic emissions-target)	**– 0.4**
Expected effect of carbon sinks	– 0.3
Planned use of flexible mechanisms	0.0
Issued emission reduction units	0.0
Overall gap to target	**– 0.7**

Iceland is on track towards its Kyoto target. Its government does not plan on using the Kyoto flexible mechanisms to achieve its target.

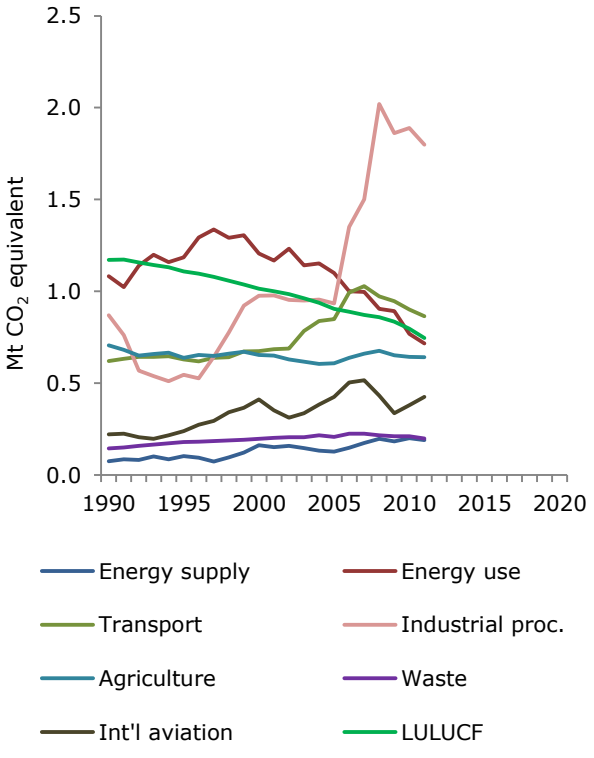
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	n/a
2013 ESD target	n/a
Gap to target (domestic emissions-target)	**n/a**
2020 ESD target (with art. 10 adjustment)	n/a
2020 non-ETS projections WEM	n/a
Gap to target WEM	**n/a**
2020 non-ETS projections WAM	n/a
Gap to target WAM	**n/a**

Iceland does not have a target under the ESD.

GHG trends and projections

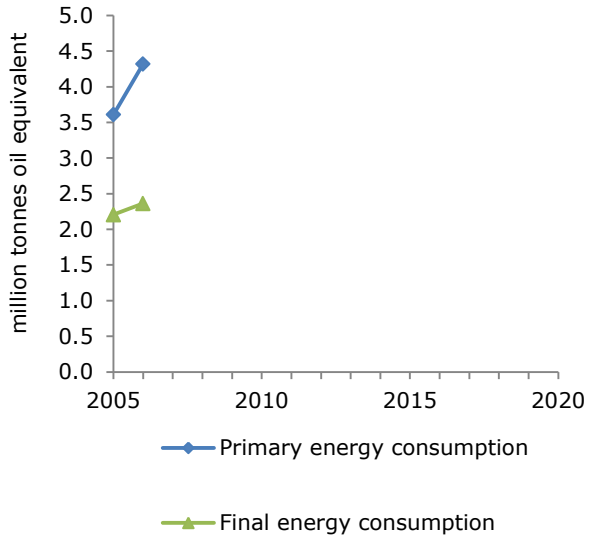


Sectoral GHG trends and projections

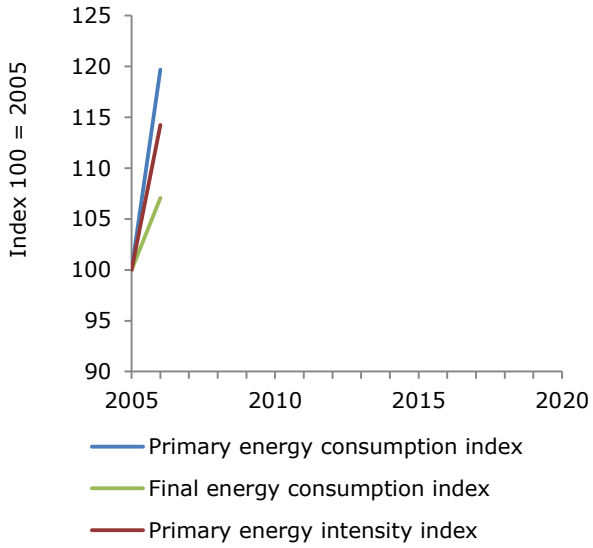


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	3.6	n/a	n/a	n/a	n/a
Final energy consumption (FEC) (Mtoe)	2.2	n/a	n/a	n/a	n/a
Iceland does not have a 2020 target on energy efficiency.					
Share of renewable energy in gross FEC (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — electricity (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — transport (%)	n/a	n/a	n/a	n/a	n/a
Iceland does not have a 2020 target on renewable energy.					

Primary and final energy consumption



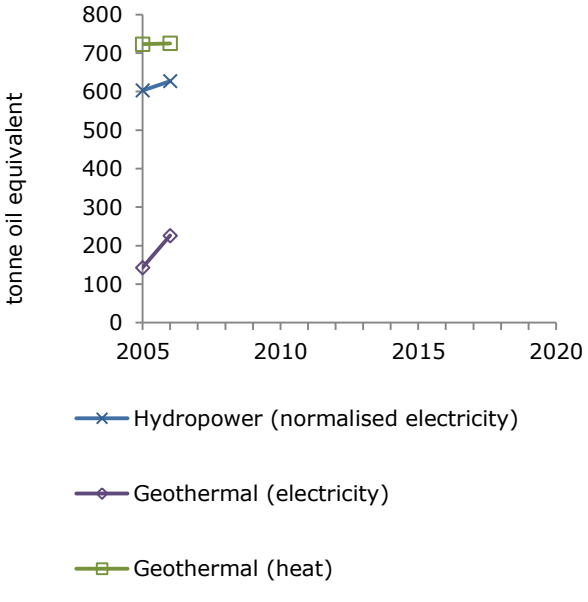
Primary energy intensity



Progress towards renewables targets

n/a

Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

Energy and electricity production in Iceland is mainly based on two primary energy sources covering 80 % of the total primary energy supply: hydropower and geothermal power. For this reason, the largest emission reduction potential can be identified in the transport sector.

The city of Reykjavik, the largest municipality in Iceland, adopted a Climate Change and Air Quality Policy that includes the goal of reducing net greenhouse gas (GHG) emissions by 35 % by 2020, compared to 2007 levels.

In February 2007, the Icelandic government adopted a new Climate Change Strategy, which sets a long-term vision for the reduction of net emissions of greenhouse gases by 50 % to 75 % by 2050, using 1990 emissions figures as a baseline.

Main economic instruments for renewable energy and energy efficiency

Iceland is currently implementing a carbon tax intended to reduce fossil fuel use, in addition to the already implemented 'Oil charge tax', which targets small diesel cars in order to make them more competitive. Low-pollution and non-polluting vehicles have also been targeted for reduction or exemptions in excise tax, in order to encourage purchases of such vehicles.

European Union Emissions Trading System (EU ETS)

In 2011 in Iceland, four stationary installations were included in the ETS.

Energy supply

Energy efficiency

Geothermal energy production is not completely climate neutral, as it causes dissolved CO_2 in geothermal fluid to be released more rapidly than would occur naturally. Such emissions are measured and accounted for in Iceland, and make up about 4 % of total GHG emissions. An experimental project (CarbFix) is under way at the Hellisheiði geothermal plant, injecting CO_2 captured in geothermal steam back into the basaltic rock underground. The aim of the Carbfix Project is to study the feasibility of sequestering the GHG CO_2 into basaltic bedrock and storing it there permanently as a mineral. The project's implications for the fight against global warming may be considerable, since basaltic bedrock susceptive of CO_2 injections are widely found on the planet, and CO_2 capture and storage and mineralisation in basaltic rock is not confined to geothermal emissions or areas.

Renewables

Iceland is working on an Energy Strategy 2011 which, among others, aims at replacing imported energy with renewable energy sources and the considering precautionary and protective aspects in terms of hydroelectric and geothermal energy production. During the preparation, existing hydropower and geothermal power plants were analysed in terms of sustainability.

Energy use

Energy efficiency

No specific strategies or measures have been reported for energy efficiency.

Renewables

No information available.

Transport

Renewables

Most energy-related GHG emissions in Iceland arise from mobile sources (transport on land and fishing vessels), where cuts in emissions are generally considered more difficult to achieve than from stationary energy sources. Iceland's 2002 strategy for sustainable development, 'Welfare for the future', states the goal of phasing out fossil fuels almost completely within a few decades. Given the high proportion of renewables in Iceland's electricity generation mix, this is intended to be achieved primarily through promotion of non-combustion powered vehicles. Vehicles that generate virtually no pollution and are powered by unconventional energy sources, such as electricity or hydrogen, have been exempt from excise tax. This exemption includes all motor vehicles that are imported to or manufactured in Iceland and are powered solely by pollution-free energy sources, such as electricity or hydrogen. It does not include vehicles that are powered by both polluting and non-polluting energy sources, such as automobiles with hybrid engines. Vehicles that are powered by electricity and are imported or built for experimental purposes are also exempt from excise tax.

Automobiles that are equipped with engines utilising methane or electricity to a substantial degree instead of gasoline or diesel fuel bear an excise tax that is ISK 240 000 (EUR 1 500) less than that on conventional vehicles. As a result of the reduced excise tax, hybrid automobiles could become more economical than conventional vehicles in some instances.

Transport efficiency

There has been significant renewal of the fishing fleet. In general, new ships are more efficient than comparable older ships in terms of fuel consumption; therefore, newer ships can represent substantial benefits for fisheries when fuel prices are high. Various fisheries companies have examined the possibility of equipping their ships with Icelandic-designed energy-saving devices based on information technology. The government has supported experimental projects in this field. The Marine Research Institute has also set up an energy-saving system in the research vessel Árni Fridriksson, and the Ministry of Justice has concluded a contractual agreement related to the installation of such a system in the coastguard's new cruiser.

Modal shift and raising awareness

Transportation is a big and growing source of GHG emissions in Iceland. A new oil charge system took effect on 1 July 2005. The pertinent legislation changed the taxation structure for diesel fuel, simplifying the use of diesel automobiles by charging fees in the same manner as is done for gasoline. This was expected to result in a gradual increase in the number of smaller diesel vehicles in use, thus reducing GHG emissions resulting from motor vehicle

traffic. The adoption of an oil fee coincided with the abolition of the weight tax, which has resulted in a reduction in fees charged for busses and long-distance coaches, making public transportation more affordable.
In addition, the Public Roads Administration has, in collaboration with the city of Reykjavík, worked on coordinating traffic lights in the Reykjavík area, which should reduce emissions, and in the past few years, a great deal of road construction has been done in order to shorten driving routes, with road improvements and tunnels. Work is also being carried out on proposals for changes in road placement in several populated areas, and this could affect driving times.

Industrial processes

Non-CO_2 gases

Reduction in perfluorocarbons (PFC) emissions from aluminium production is the greatest success story so far in reducing GHG emissions in Iceland. The 2002 climate change strategy set the goal of PFC emissions from aluminium smelters at 0.14 tons of CO_2 equivalent. This target has been achieved in the three aluminium smelters in operation in Iceland, with some temporary exceptions.

Energy efficiency

No specific strategies or measures have been reported for energy efficiency in the industrial sector.

Agriculture

No specific strategies or measures have been reported in the agriculture sector. The possibility of improved manure management is being studied as perhaps the most promising method to reduce agricultural emissions.

Waste

GHG emissions have declined due to the increased recycling and technological advances in the handling of waste. Another important measure is the collection of methane from the largest landfill in the country. Icelandic Waste Management Law and regulations on waste treatment define a target for organic waste going to landfills to be reduced by 50 % before mid 2013 and 65 % before mid 2020. Furthermore, it defines targets to reduce the total weight of other organic waste, such as biodegradable organic waste, to be landfilled by 50 % before mid 2013 and 65 % before mid 2020. A reduction in the landfilling of organic waste is intended to result in a reduction in methane emissions.

Land use, land-use change and forestry

The parliament has adopted action plans for the forestry sector, focusing on carbon sequestration through revegetation and reforestation. Due to the high proportion of devegetated and deforested land, there is significant potential to enhance carbon sequestration beyond the present level, and it is expected that mitigation by 2020 will reach 773 Gg CO_2 per annum.

Key policies and measures

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
n/a	n/a
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
n/a	n/a
Measures with large expected savings specifically in the non-ETS sectors	
n/a	n/a

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Ireland

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	55.2	68.2	61.5	57.5	57.7
GHG per capita (t CO_2 eq./cap.)	15.8	18.1	13.8	12.6	12.6
GHG per GDP (g CO_2 eq./EUR)	886.3	534.1	369.5	340.7	338.8
Share of GHG emissions in total EU-28 emissions (%)	1.0 %	1.3 %	1.3 %	1.3 %	1.3 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	17.4	15.8	16.9
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	28 %	27 %	29 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 18.2 %	– 27.5 %	– 22.3 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	6.5 %	12.4 %	15.0 %

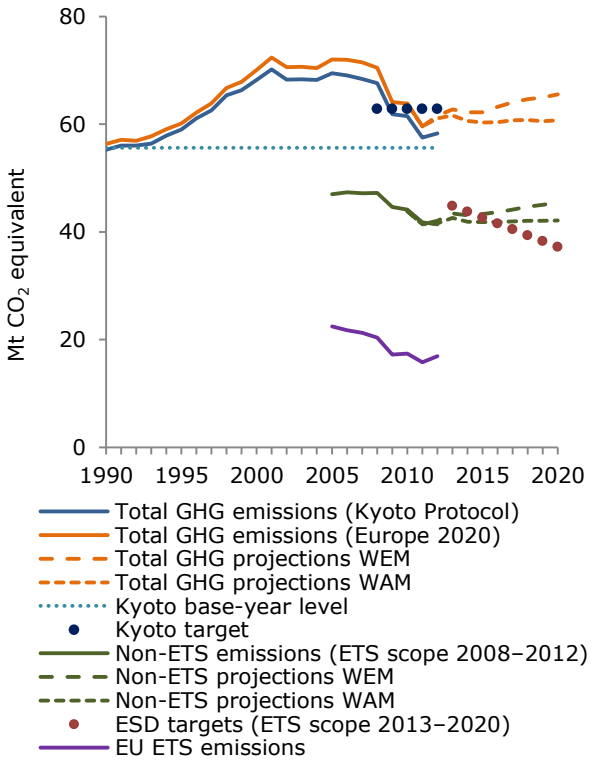
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	43.8
2008–2012 average non-ETS target	41.9
Gap to target (domestic emissions-target)	**2.0**
Expected effect of carbon sinks	– 3.4
Planned use of flexible mechanisms	1.9
Issued emission reduction units	0.0
Overall gap to target	**– 3.4**

Ireland is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 3 % of base-year emissions per year.

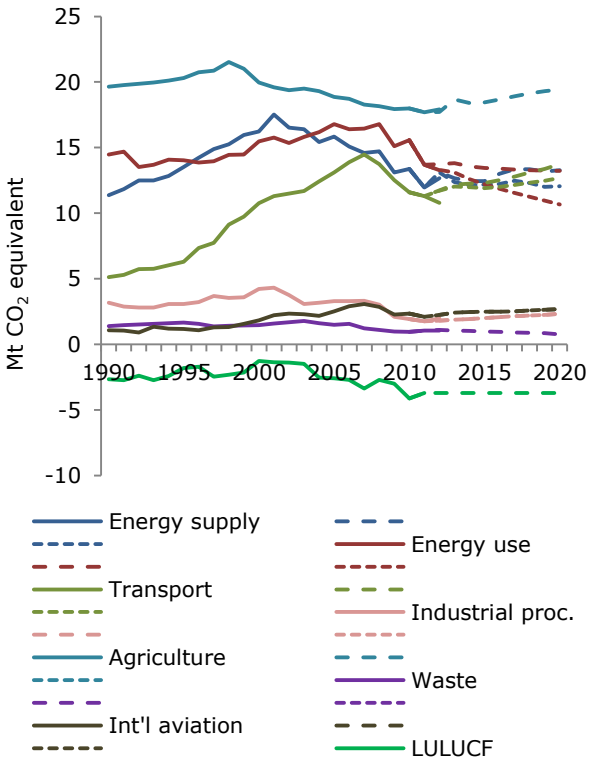
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	41.4
2013 ESD target	45.2
Gap to target (domestic emissions-target)	**– 3.8**
2020 ESD target (with art. 10 adjustment)	37.2
2020 non-ETS projections WEM	45.4
Gap to target WEM	**8.2**
2020 non-ETS projections WAM	42.1
Gap to target WAM	**4.9**

Ireland is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

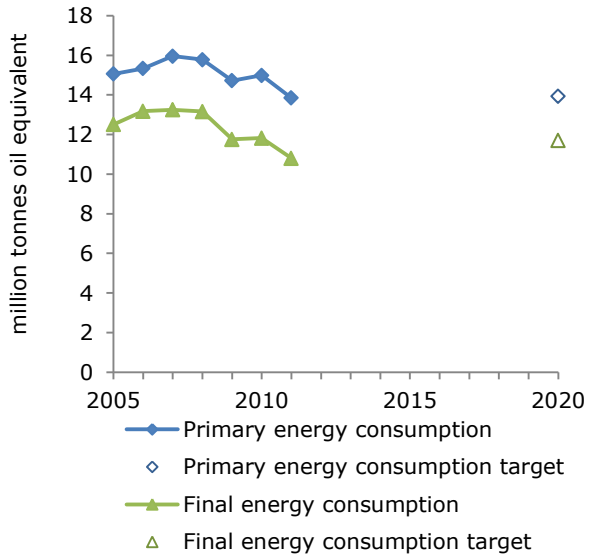


Sectoral GHG trends and projections

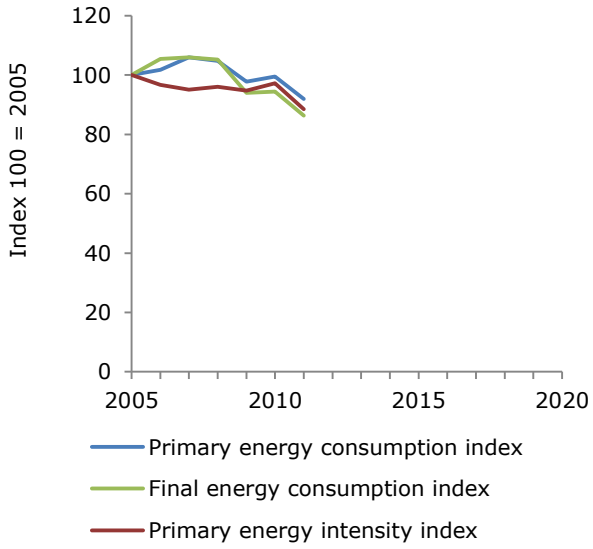


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	15.1	14.7	15.0	13.9	13.9
Final energy consumption (FEC) (Mtoe)	12.5	11.8	11.8	10.8	11.7
Ireland is making some progress in reducing energy consumption, but further improvements are necessary, in either energy efficiency policy implementation, the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	2.8 % (2.8 %)	4.5 % (5.2 %)	5.6 % (5.6 %)	6.7 %	16.0 %
Share of renewable energy in gross FEC — electricity (%)	7.2 %	13.7 %	14.9 %	17.6 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	3.5 %	4.2 %	4.4 %	5.0 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.0 % (0.0 %)	0.0 % (1.9 %)	2.4 % (2.4 %)	2.8 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 6.7 % (738 ktoe), which is higher than the indicative target for the 2011-to-2012 period (5.7 %). The three main technologies contributing to renewable energy use in 2011 were onshore wind (45 %), solid biomass for heat (25 %) and biodiesels (9 %). For the period from 2005 to 2011 the observed average annual growth rate in renewable energy amounted to 12.6 %. In order to reach the 2020 target, an average annual growth rate of 13.3 % is needed for the period from 2011 to 2020. This corresponds to 2.6 times the cumulative effort up to 2011.					

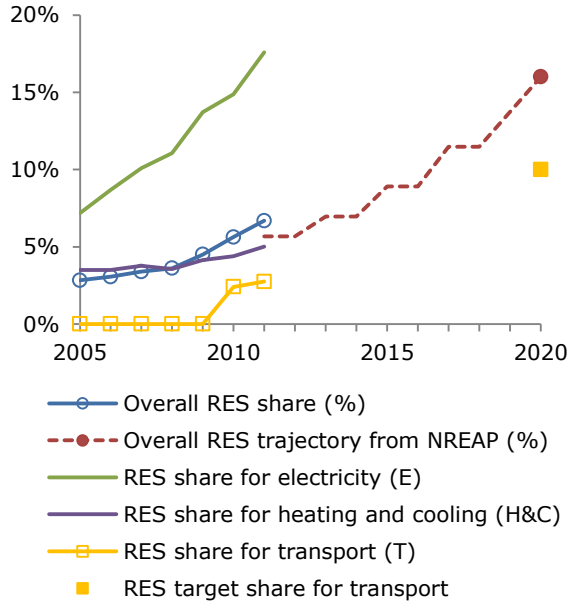
Primary and final energy consumption



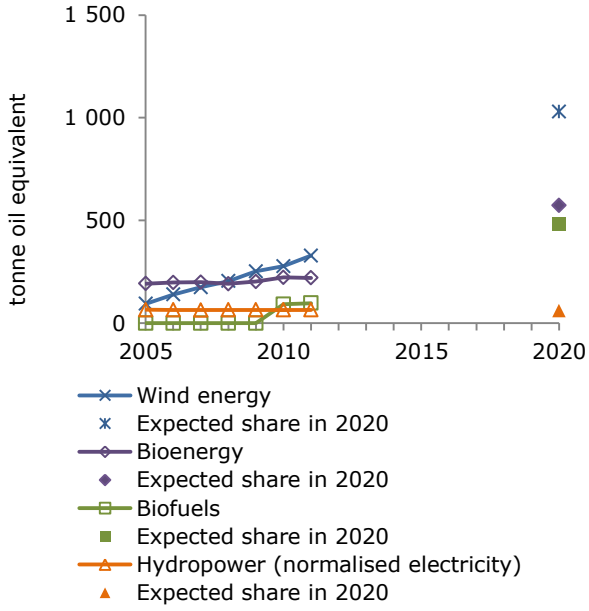
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

Ireland has outlined a plan to achieve 20 % improvement in energy efficiency by 2020 in line with commitments made in the *Energy* White Paper (2007) and the EU Energy Efficiency Action Plan. A national target of 20 % equates to a total of 31 925 GWh saved in 2020.

Ireland's main policies to implement this plan centre around the Renewable Energy Feed-in Tariff scheme (REFIT) scheme which aims to achieve 24 % renewable energy in final energy consumption by 2020, and the Better Energy Homes and Better Energy Retrofit Programmes, which aim to improve energy efficiency in residential, public and commercial buildings, ultimately leading to an improvement in energy efficiency of 60 % in the residential sector and 30 % in the non-residential sector.

Main economic instruments for renewable energy and energy efficiency

The economic instrument that will contribute the largest quantifiable emissions reductions in Ireland is REFIT (2007), which is working to increase the electricity generated from renewable energy sources, covering onshore wind (large and small scale), small-scale hydro, biomass landfill gas and other biomass.

Subsidies and other forms of financial support are also being offered by the government to encourage the retrofitting of the existing housing stock in Ireland, with the goal to improve energy efficiency in residential buildings by 60 % and in non-residential buildings by 30 %, compared to business as usual.

European Union Emissions Trading System (EU ETS)

In 2011 in Ireland, 125 stationary installations were included in the ETS. The share of ETS emissions amounted to 27 % of the total emissions.

Energy supply

Energy efficiency

The target of 20 % improvement in energy efficiency by 2020 will ensure that Ireland meets the requirements of Directive 2006/32/EC on energy end-use efficiency and energy services, i.e. to achieve energy efficiency savings of 9 % by 2016. A grant scheme for combined heat and power (CHP) was established to increase energy efficiency in the energy supply sector.

Renewables

REFIT (2007) has been working to increase the electricity generated from renewable energy sources, covering onshore wind (large and small scale), small-scale hydro, biomass and landfill gas and other biomass. Subject to state aid clearance, REFIT will also be offered for anaerobic digestion, high efficiency CHP, ocean (wave and tidal) energy and offshore wind.

The REFIT scheme is the main support scheme for RES-E, which is the Irish measure that will deliver the largest reduction in GHG emissions by 2020, with a with existing measures (WEM) goal of achieving 24 % gross energy consumption from renewables and a with additional measures (WAM) target of 40 %.

Energy use

Energy efficiency

Ireland has updated its national building regulations in the residential sector a number of times (2002, 2005, 2008 and 2011), with the most recent requiring an increase in energy efficiency of 60 % compared to business as usual. In the non-residential sector, building regulations were most recently updated in 2012 to require a 30 % increase in energy efficiency compared to business as usual. A number of programmes have been initiated to meet these targets, including the Supports Exemplar Energy Efficiency Projects (SEEEP) and Energy Efficiency Retrofit Fund (EERF) which ran from 2009 to 2011, for both the public and private sectors. In 2011, the Better Energy Homes programme was initiated for the residential sector, as was the Better Energy Retrofit programme for commercial and public buildings. These programmes provide financial support to promote retrofitting in order to deliver a major increase in the scale and depth of energy efficiency investments in upgrading the existing building stock in Ireland.

Renewables

A target of 12 % renewable heat by 2020 has been set. Work is nearing completion on a new framework to ensure delivery of this target, with an initial focus on the biomass sector, but also including geothermal resources, in due course.

ReHeat aims to increase deployment of renewable heating technologies in the commercial, industrial and public sectors by providing financial assistance for boilers fuelled by wood chips/pellets, solar thermal collectors and heat pumps. Financial assistance is provided for supported technologies meeting certain standards.

The Greener Homes scheme provides similar support in the domestic sector with a grant to help with the initial capital cost.

Transport

Renewables

Ireland has outlined a target of having 10 % electric vehicles as a percentage of the national car fleet by 2020. There is a memorandum of understanding with a number of motor manufacturers and a commitment to national roll out of electric vehicle infrastructure and support for customers. The energy White Paper of 2007 also outlined the RES transport policy which aims to increase renewables penetration from 3 % WEM to 10 % WAM by 2020.

Transport efficiency

The semi-state CIE group of public transport companies in Ireland are implementing a range of programmes aimed at improving energy efficiency: eco-driving within the bus fleet; reduced fuel use in rail through more efficient schedules and automatic train engine shutdowns; and a switch to lower voltage supply and regenerative breaking technologies in the electric train fleet.

Ireland has also adopted new regulations on CO_2 emissions from vans, which includes the transposition of Regulation 510/2011 into national policy, setting the average CO_2 emissions from new light commercial vehicles at 175 g

CO_2/km. From 2020, the regulation sets a target of 147 g CO_2/km.
Ireland also began a programme in 2010 to increase efficiency in traffic movements by enabling more fuel-efficient, inter-urban freight and private car movements through improved road infrastructure.
In the aviation sector, International Air Transport Association (IATA) airlines have adopted a voluntary fuel efficiency goal to reduce fuel consumption and CO_2 emissions (per revenue tonne kilometre) by at least 25 % by 2020, compared to 2005 levels.

Modal shift and raising awareness

No specific strategies or measures have been reported for modal shift and awareness raising in the transport sector.

Industrial processes

Non-CO_2 gases

Ireland has committed to reducing fluorinated gases through two policies: the Mobile air-conditioning systems (MAC) Directive (2006/40/EC), which came into effect in 2012, and the F-gas Regulation policy, which came into effect in 2007. The former aims to control the leakage of specific fluorinated gases in air-conditioning systems fitted to vehicles, prohibiting air-conditioning systems containing fluorinated greenhouse gases with a global warming potential higher than 150. The MAC Directive specifically targets hydrofluorocarbons (HFCs), while the F-gas Regulation targets perfluorocarbons (PFCs).

Energy efficiency

Ireland has outlined an additional policy (WAM scenario) on lime production, which would account for differing quantities of lime used for air pollutant abatement at a coal fired electricity generation plant. Specifically, this policy accounts for the reduced process emissions from lime production as a result of the lower quantities of peat forecasted to be combusted for electricity generation in the WAM scenario, when compared to the forecasted quantities of peat combusted for electricity generated in the WEM scenario. Lime is used for air pollutant abatement in Ireland's single peat-powered electricity generation plant.

Agriculture

Ireland has adopted two major EU policies into national legislation: the Water Framework Directive (2000/60/EC) and a suite of Common Agricultural Policy (CAP)-related regulations, which are being implemented by the Department of the Environment, Community and Local Government and the Department of Agriculture Food and the Marine, respectively.

Waste

Ireland's four reported policies in the waste sector involve the translation of EU waste directives into national policy. They are the Landfill Directive (1999/31/EC); WEEE Directive (2002/96/EC); Directives 94/62/EC, 2004/12/EC and 2005/20/EC; and the Waste Incineration Directive (2000/76/EC). It is estimated that the implantation of the former will contribute to a 190.7 kT CO_2/e per year reduction by 2020.

Land use, land-use change and forestry

No specific strategies or measures have been reported for the LULUCF sector.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
IE-ENS-005 24 % renewables by 2020 (RES-E)	1 487
IE-ENS-006 Electricity generation efficiency improvements	966
IE-TRA-005 Improved fuel economy of private cars (non-ETS)	790
IE-ENU-001 SEAI Large Industry Programme (both EU ETS and non-ETS)	413
IE-RES-003 2008 Building Regulations (both EU ETS and non-ETS)	322
IE-RES-004 2002 Building Regulations (both EU ETS and non-ETS)	304
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
IE-RES-002 Retrofit Scheme (Better Energy Homes) (both EU ETS and non-ETS)	1 385
IE-TRA-004 RES-T (non-ETS)	798
IE-ENS-007 40 % renewable by 2020 (RES-E)	785
IE-ENS-008 Reduced electricity demand from energy efficiency measures	451
IE-ENU-002 RES-H (Industry) (both EU ETS and non-ETS)	311
IE-TRA-006 More efficient traffic movements (non-ETS)	187
Measures with large expected savings specifically in the non-ETS sectors	
IE-RES-002 Retrofit Scheme (Better Energy Homes) (Both EU ETS and non-ETS)	1 385
IE-TRA-004 RES-T	798
IE-TRA-005 Improved fuel economy of private cars	790
EU policies or measures related to measures expected to deliver the largest savings	
IE-ENS-005 24 % renewables by 2020 (RES-E): 1 487 kt CO_2 • Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) • Energy supply: Electricity production from renewable energy sources (Directive 2001/77/EC) • Cross-cutting: National Emission Ceilings for certain pollutants (Directive 2001/81/EC) IE-RES-002 Retrofit Scheme (Better Energy Homes): 1 385 kt CO_2 (Both EU ETS and non-ETS) • Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC) IE-ENS-006 Electricity generation efficiency improvements: 966 kt CO_2 • Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC) • Energy supply: European Energy programme for Recovery (Regulation 2009/663/EC) • Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC IE-TRA-004 RES-T: 797.5 kt CO_2 (non-ETS) • Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) • Transport: Biofuels Directive (Directive 2003/30/EC) IE-TRA-005 Improved fuel economy of private cars: 790 kt CO_2 (non-ETS) • Transport: Regulation on CO_2 from cars 2009/443/EC • Transport: Clean and Energy efficient road transport Directive 2009/33/EC • Transport: Energy labelling for tyres with respect to fuel efficiency and other essential parameters (Regulation 1222/2009) IE-ENS-007 40 % renewable by 2020 (RES-E): 785 kt CO_2 • Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) • Energy supply: Electricity production from renewable energy sources (Directive 2001/77/EC) • Cross-cutting: National Emission Ceilings for certain pollutants (Directive 2001/81/EC)	
EU policies or measures expected to result in the largest emission savings	
Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) Energy supply: Electricity production from renewable energy sources (Directive 2001/77/EC) Cross-cutting: National Emission Ceilings for certain pollutants (Directive 2001/81/EC) Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC) Energy supply: European Energy programme for Recovery (Regulation 2009/663/EC) Cross-cutting: EU ETS Directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Italy

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	519.0	551.3	500.3	488.8	464.6
GHG per capita (t CO_2 eq./cap.)	9.2	9.7	8.3	8.1	7.6
GHG per GDP (g CO_2 eq./EUR)	444.9	403.1	352.7	343.3	334.2
Share of GHG emissions in total EU-28 emissions (%)	9.3 %	10.8 %	10.6 %	10.7 %	10.3 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	191.5	190.0	179.1
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	38 %	39 %	39 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 4.2 %	– 2.8 %	– 7.1 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	7.0 %	10.3 %	26.1 %

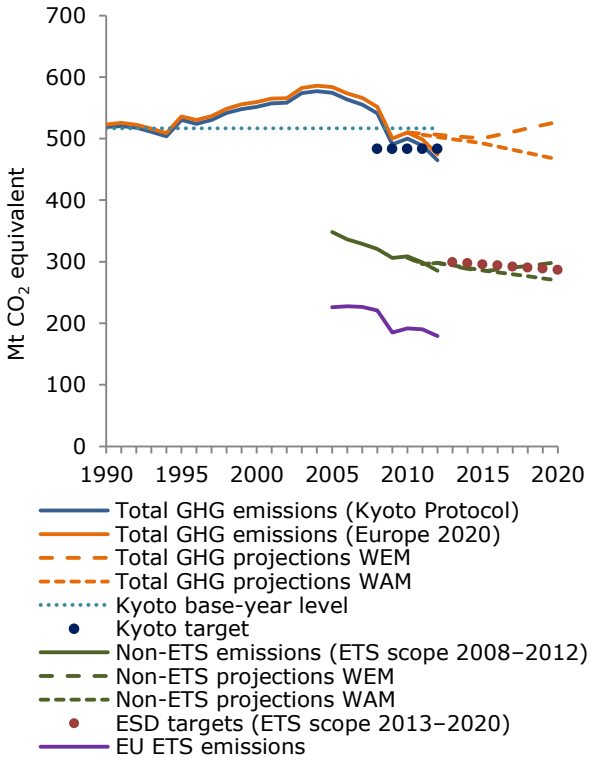
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	303.9
2008–2012 average non-ETS target	281.4
Gap to target (domestic emissions-target)	**22.5**
Expected effect of carbon sinks	– 16.8
Planned use of flexible mechanisms	2.0
Issued emission reduction units	0.0
Overall gap to target	**3.7**

Italy is not on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target with further use of the flexible mechanisms.

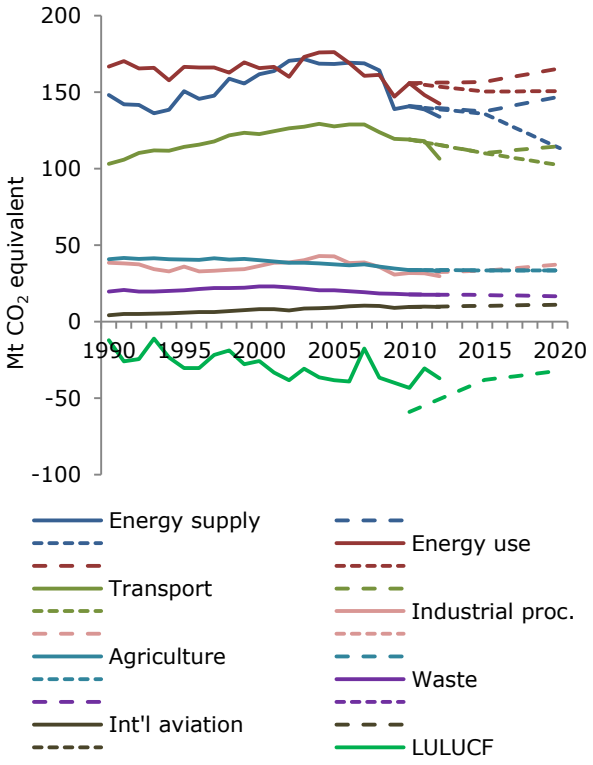
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	283.2
2013 ESD target	310.1
Gap to target (domestic emissions-target)	**– 27.0**
2020 ESD target (with art. 10 adjustment)	287.9
2020 non-ETS projections WEM	299.4
Gap to target WEM	**11.5**
2020 non-ETS projections WAM	269.9
Gap to target WAM	**– 18.0**

Italy is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

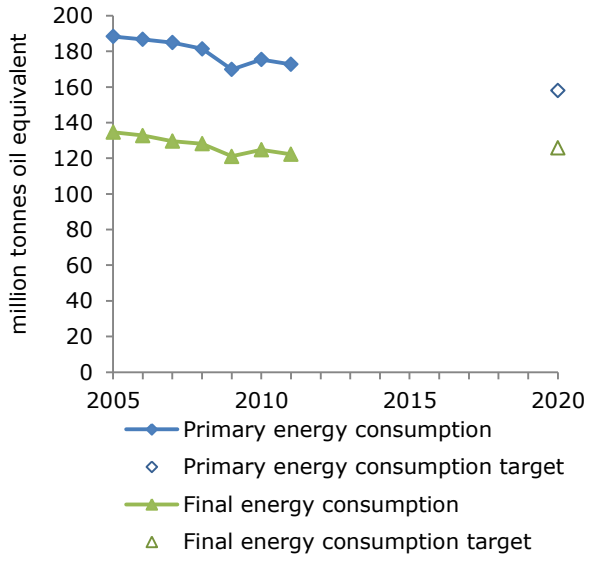


Sectoral GHG trends and projections

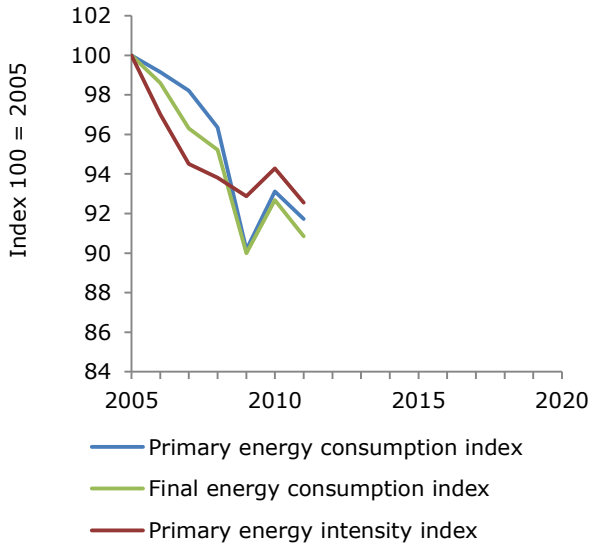


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	188.4	169.9	175.4	172.8	158.0
Final energy consumption (FEC) (Mtoe)	134.6	121.1	124.8	122.3	126.0
Italy has made limited progress in reducing energy consumption so far. Further improvements are necessary, in energy efficiency policy implementation as well as in policy package development.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	5.0 % (5.1 %)	7.6 % (8.6 %)	9.8 % (9.8 %)	11.5 %	17.0 %
Share of renewable energy in gross FEC — electricity (%)	16.3 %	18.4 %	20.1 %	23.5 %	
Share of renewable energy in gross FEC — heating and cooling (%)	3.1 %	7.7 %	9.0 %	11.0 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.4 % (0.8 %)	0.4 % (3.7 %)	4.7 % (4.6 %)	4.7 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 11.5 % (14 483 ktoe), which is higher than the indicative target for the 2011-to-2012 period (7.6 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (28 %), hydropower (26 %) and renewable energy from heat pumps (9 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 13.2 %. In order to reach the 2020 target, an average annual growth rate of 5.1 % is needed for the period from 2011 to 2020. This is equivalent to the cumulative effort up to 2011.					

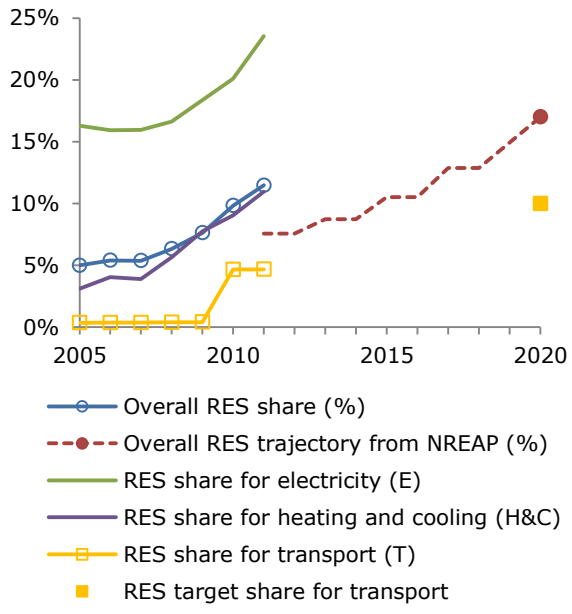
Primary and final energy consumption



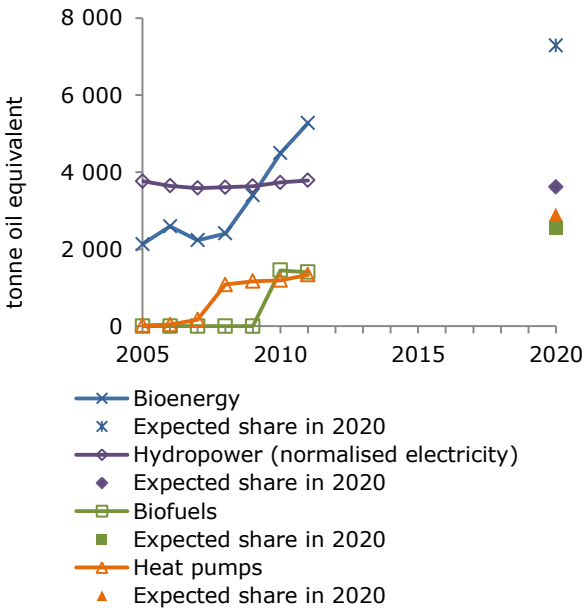
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The National Energy Strategy was approved by a decree in March 2013. This strategy contains a list of measures to be implemented under the EU Climate Energy Package.
Four main goals are set by the National Energy Strategy:
1. significantly reduce the energy cost cap and bring prices in line with EU levels;
2. achieve and exceed EU 20–20–20 targets; the national target for the renewable share is 17 % by 2020;
3. continue to improve energy supply and reduce dependency on imports;
4. foster sustainable economic growth by developing the energy sector.

The focus is on the improvement of energy efficiency and the development of renewable energy sources, but also the promotion of a competitive gas market and the interconnection with the EU electricity market. The refining industry and fuel distribution network shall be restructured and a national hydrocarbons production shall be promoted. All these measures need an efficient and effective decision-making process, achieved by modernising the governance of the sector.

Main economic instruments for renewable energy and energy efficiency

The white certificates system was introduced in 2001 and aims at promoting energy efficiency and emission reductions in the end-use sectors of industrial, residential and services. Within the system, electricity distributors and gas distributors can trade the certificates, either on the market or bilaterally. The Conto Termico is an incentive scheme that provides subsidies to cover a part of the investment costs for building renovation, exchange of heating systems and the production of thermal energy. The electricity sector is benefiting from financial incentives as well. According to the National Energy Strategy, EUR 170 billion are earmarked for the future. In the medium-long term, Italy plans to reduce subsidies, especially for photovoltaics, which were strongly supported during the last decade.

European Union Emissions Trading System (EU ETS)

Italy counts 1 232 installations that are included in the EU ETS; these were responsible for 39 % of total national emissions in 2011.

Energy supply

Energy efficiency

Cogeneration plants are supported by various incentive schemes rewarding the production of heat or electricity. Operators have the right to obtain white certificates and may benefit from green certificates when combined with district heating. In addition, authorisation procedures are simplified and tax reduction applies on natural gas if it is used as a fuel.
Through a new law in 2004 which facilitated the authorisation process for the construction of new power plants and energy infrastructure, new combined cycle gas turbine (CCGT) plants were built, and these are already producing short-term effects in emission reductions. After market liberalisation, existing plants sold to new market entrants had to be converted from fuel-oil steam plants to more efficient CCGT plants. The increased demand for natural gas requires the construction of infrastructure. Italy also created new coal power plants and further new plants are planned, mainly because of the replacement of old inefficient units.

Renewables

Since 1 January 2013, the green certificates and the Omnicomprensiva Feed-In-Tariff were replaced by a more effective support scheme which regulates access to incentives in a new way. It covers all renewable energy sources except photovoltaics. Access currently depends on the size and type of power plant. Operators of smaller power plants (up to 1 MW) receive all-inclusive feed-in tariffs, whereas operators of larger power plants (with a capacity of more than 1 MW) are subject to reverse auctions that start with a basic feed-in premium.
The third Conto Energia is supporting the expansion of photovoltaic plants and solar heat installation through feed-in tariffs for a fixed period of 20 or 25 years, and until a maximum capacity is reached of 3 000 MW and 8 000 MW, respectively.
The strong increase in photovoltaics is driven by high incentives provided by the government, and the cost reductions of this technology.

Energy use

Energy efficiency

In 2012, the White Certificate Decree was implemented defining national quantitative targets for electricity and gas distributors between 2013 and 2016. As part of this decree, the white certificates mechanism was extended. The implementation of Directive 2006/32/CE on energy end-use efficiency and energy services in the industrial sector and the Action Plan 2007 will impose new targets for white certificates to 2016. It is envisaged that the scheme will be extended to 2020.
The Conto Termico Decree implements a scheme that particularly encourages small-scale energy efficiency measures and heat production from renewable sources. Such measures are the insulation of buildings and replacement of heating installations.
The Fondo Rotativo Kyoto supports public and private investments in the building and industrial sector to promote high-efficiency systems for electricity production, heating and cooling. In the private sector, tax incentives were launched for owners and tenants of buildings to benefit from thermal insulation, reduced energy use of buildings, replacement of boilers and installation of solar heat installations. A total of 55 % of the costs for these actions are tax deductible.

Renewables

In the building sector, Italy promotes the installation of PV systems in all new buildings and existing buildings with a total floor area exceeding 1 000 m². Connections to the district heating system shall be made available for all new and existing buildings not farther afar than 1 km from the existing grid. Solar heat systems shall cover 50 % of the

hot water demand, in new buildings or in cases of replacement of old heating systems.

Transport

Renewables

The National Action Plan for Renewable Energy 2010 promotes the introduction of electric cars, the saving of petrol and a faster fleet update of cars and light commercial vehicles.

Transport efficiency

The exchange of older cars is granted with subsidies. Furthermore, an energy taxation of fuels was introduced to support low-carbon fuels.

Modal shift and raising awareness

Italy highlights the completion of high-capacity and high-speed networks and the tuning of regional networks. In urban areas, road circulation shall be improved, as with transport efficiency in private road transport. Intermodal measures focus on the shift from private to public road traffic. Freight road transport shall be shifted to the sea.

Industrial processes

Non-CO_2 gases

The main goal in the industrial processes sector is the reduction of N_2O emissions in nitric acid production plants. The expected reduction in 2020 is 740 Gg CO_2 eq. The most advanced technology is provided by selective catalytic reduction (SCR) systems, and this could be applied to the main production plants in Italy. This process has been included in the emission trading scheme starting from 2012.

Energy efficiency

The white certificates system also delivers emissions reductions in the industrial sector, as it is a cross-cutting policy. A recent initiative by the government aims at replacing inefficient electric motors. Tax deductions can be gained when installing high-efficiency engines and inverters. Several new additional measures are currently under discussion, e.g. a further extension of the Energy Efficiency Action Plan target to 2020 with the white certificate system.

Agriculture

Italy concentrates on two main policies in the agriculture sector, namely the rationalisation of the use of nitrogen fertilisers and the recovery of biogas from the animal storage system. Additional measures for the reduction of methane emissions are related to the two animal categories of cattle and swine.

Waste

In Italy, the European Directive 1999/31/EC has only been applied to landfills since 2005. Italy's main goal is to be compliant with the separate collection targets and the reduction of biodegradable waste disposed of into landfills. A further measure regards the pretreatment of all the biodegradable wastes which will be disposed of into landfills, encouraging the anaerobic digestion of municipal solid waste (MSW), also in codigestion with other types of waste (such as sludge from municipal wastewater treatment plants and animal waste).

Land use, land-use change and forestry

No specific strategies or measures have been reported in the LULUCF sector.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
IT-TRA-003: Emission standard for new cars (non-ETS)	10 200
IT-TRA-001: Infrastructural measures (non-ETS)	5 700
IT-ENU-001 & IT-COM-001: White certificates - decree December 2007 – Industry and Commercial	5 100
IT-ENS-003: Green Certificate - budget law 2008	4 000
IT-WST-001: Separate Collection (non-ETS)	3 700
IT-RES-001: Building Regulation (Legislative decree 192/05 as amended by legislative decree 311/06)	3 600
IT-RES-004: Legislative decree 201/07 (transposition of Directive 2005/32/EC) – Residential	2 600
IT-ENS-001: Third and Fourth Conto Energia	2 300
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
IT-ENU-004: National Action Plan for Renewable Energy 2010 and National Action Plan for Energy Efficiency 2011	10 600
IT-ENS-009: New measure of promoting and supporting RES-E	10 000
IT-ENS-008: National Action Plan for Renewable Energy 2010 - Legislative decree 28/2001 - Kyoto fund	6 300
IT-RES-006: Legislative decree 28/2011 Promoting energy saving in the civil sector (public, domestic, tertiary)	4 600
IT-RES-007: Directive 2010/31/EC - New standards of efficiency in buildings	4 000
Measures with large expected savings specifically in the non-ETS sectors	
IT-TRA-003: Emission standard for new cars (non-ETS)	10 200
IT-TRA-001: Infrastructural measures (non-ETS)	5 700
EU policies or measures related to measures expected to deliver the largest savings	
IT-TRA-003: Emission standard for new cars: Transport: Regulation on CO2 from cars 2009/443/EC	
IT-TRA-001: Infrastructural measures: Transport: The interoperability of the rail system within the Community (Directive 2008/57/EC) recast of Directive 2004/50/EC amending Council Directive 1996/48/EC (high-speed rail system) and Directive 2001/16/EC (conventional system)	
IT-ENU-001 & IT-COM-001: White certificates - decree December 2007 – Industry and Commercial: Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	
IT-ENS-003: Green Certificate - budget law 2008: Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
EU policies or measures expected to result in the largest emission savings	
See above.	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Latvia

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	26.3	10.1	12.0	11.5	11.3
GHG per capita (t CO_2 eq./cap.)	9.9	4.2	5.4	5.5	5.5
GHG per GDP (g CO_2 eq./EUR)	2 104.2	1 155.6	969.4	877.8	813.9
Share of GHG emissions in total EU-28 emissions (%)	0.5 %	0.2 %	0.3 %	0.3 %	0.2 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	3.2	2.9	2.7
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	27 %	25 %	24 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 32.0 %	– 36.7 %	– 45.1 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	7.1 %	2.6 %	27.1 %

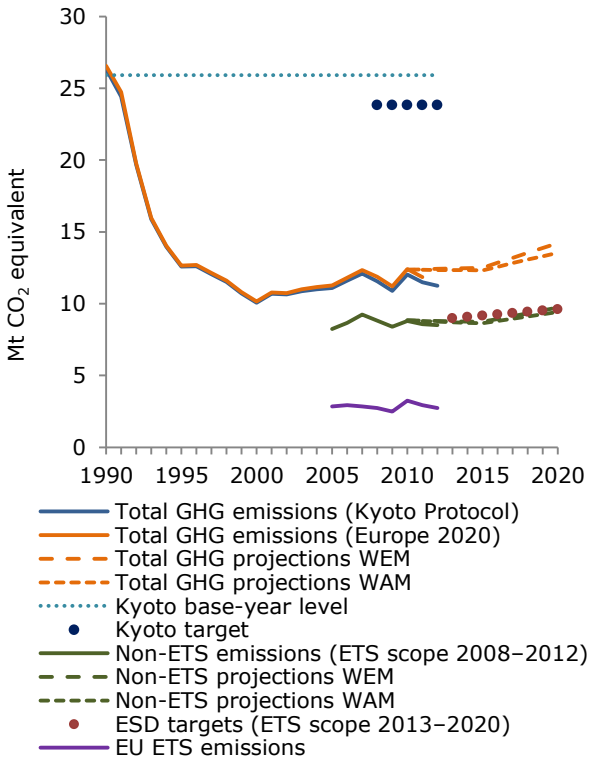
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	8.6
2008–2012 average non-ETS target	19.2
Gap to target (domestic emissions-target)	**– 10.6**
Expected effect of carbon sinks	– 1.2
Planned use of flexible mechanisms	– 8.1
Issued emission reduction units	0.0
Overall gap to target	**– 3.8**

Latvia is on track towards its Kyoto target. Its government intends to sell to other countries, through the Kyoto flexible mechanisms, a number of Kyoto units equivalent to 31 % of base-year emissions per year.

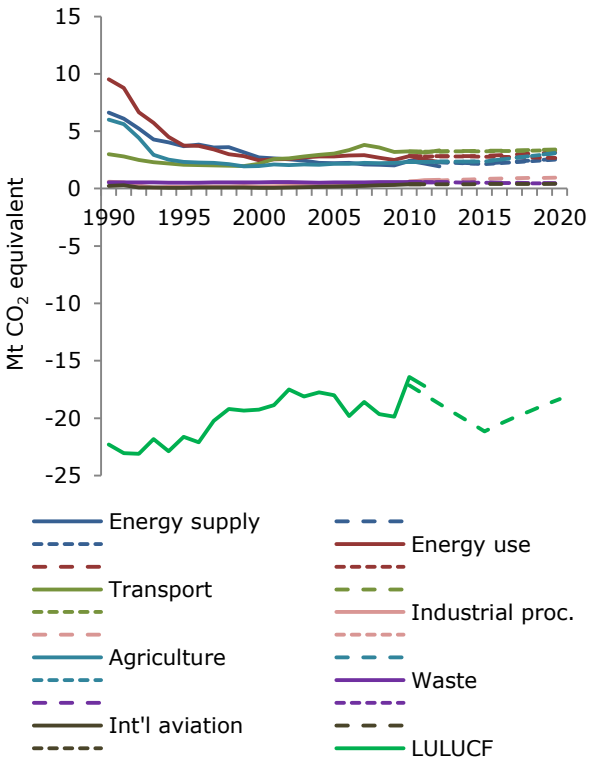
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	8.52
2013 ESD target	9.01
Gap to target (domestic emissions-target)	**– 0.48**
2020 ESD target (with art. 10 adjustment)	9.60
2020 non-ETS projections WEM	9.72
Gap to target WEM	**0.12**
2020 non-ETS projections WAM	9.42
Gap to target WAM	**– 0.18**

Latvia is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

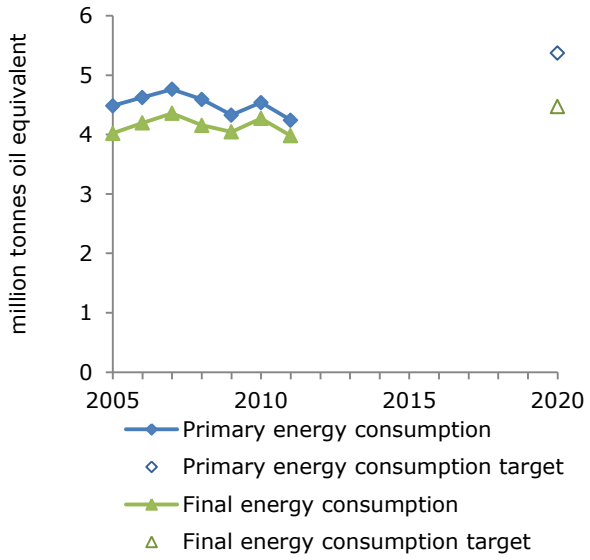


Sectoral GHG trends and projections

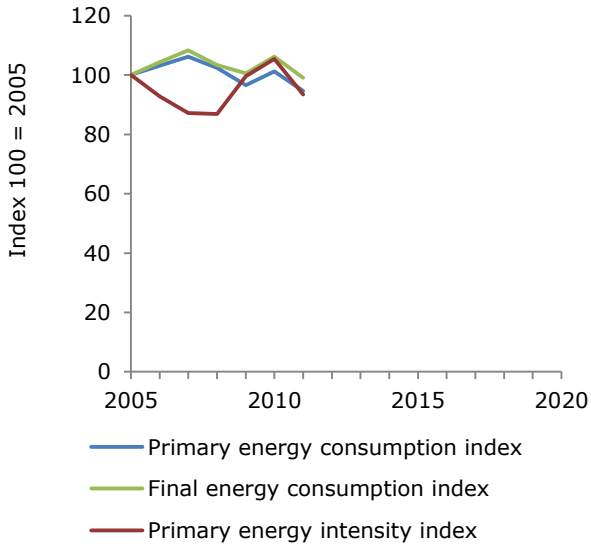


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	4.5	4.3	4.5	4.2	5.4
Final energy consumption (FEC) (Mtoe)	4.0	4.0	4.3	4.0	4.5
Latvia is making some progress in reducing energy consumption, but further improvements are necessary, either in energy efficiency policy implementation, the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	32.2 % (32.3 %)	34.2 % (34.3 %)	32.5 % (32.5 %)	33.1 %	40.0 %
Share of renewable energy in gross FEC — electricity (%)	43.0 %	41.9 %	42.0 %	44.7 %	
Share of renewable energy in gross FEC — heating and cooling (%)	42.7 %	47.9 %	43.8 %	44.7 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	1.1 % (1.3 %)	0.7 % (1.1 %)	3.3 % (3.3 %)	4.8 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 33.1 % (1 380 ktoe), which is lower than the indicative target for the 2011-to-2012 period (34.1 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (76 %), hydropower (19 %) and biodiesels (3 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 0.1 %. In order to reach the 2020 target, an average annual growth rate of 3.7 % is needed for the period from 2011 to 2020. This corresponds to 0.4 times the cumulative effort up to 2011.					

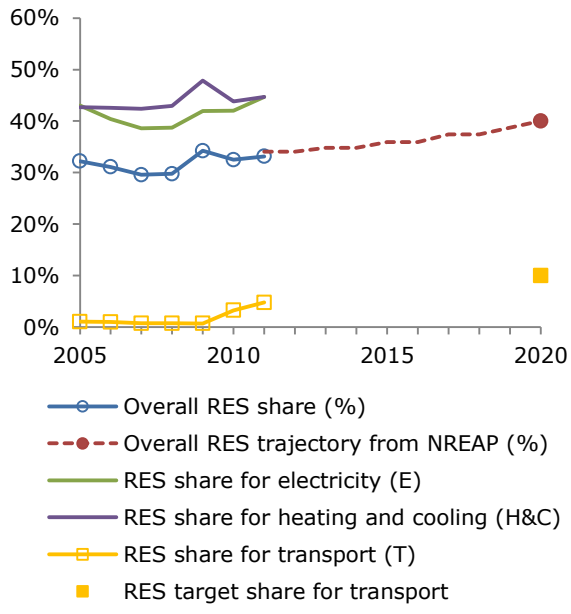
Primary and final energy consumption



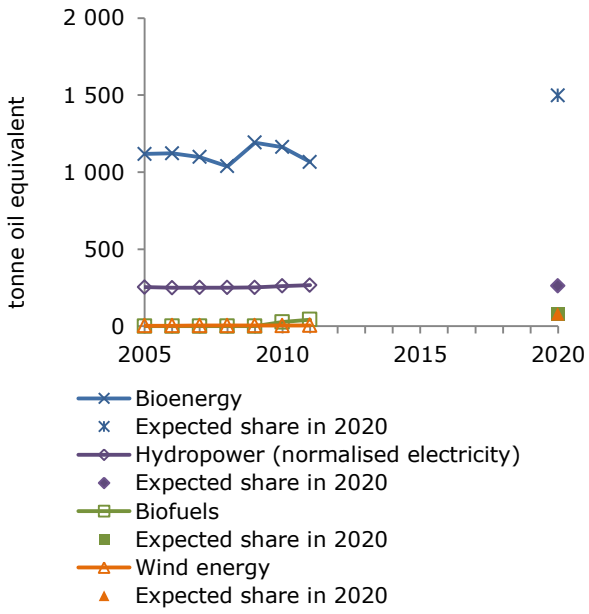
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The most recent strategy is the Latvia Energy Long-Term Strategy 2030 which aims to increase energy security and the promotion of sustainable energy. In 2030, renewable sources shall cover 50 % of gross final energy consumption. At the same time, the import of energy and energy resources of third country suppliers shall be reduced by 50 % by 2030. With regard to energy efficiency, the goal is to decrease the average heat consumption in the housing sector to 100 kWh/m².

The Environmental Policy Strategy 2009–2015 is Latvia's national environmental policy framework that also includes objectives for the national climate policy.

In addition, Latvia has set short-term national standards and developed the Energy Development Guidelines 2007–2016 and Guidelines on the Use of Renewable Energy Sources 2006–2013. These guidelines aim at achieving a rate of self-supply of 36 % to 37 % of the total primary energy consumption, and intend to increase the use of renewable energy sources for electricity production and in the transport sector.

Main economic instruments for renewable energy and energy efficiency

The Climate Change Financial Instrument (CCFI) is an investment support programme for renewable technologies in heat and electricity production to reduce greenhouse gas (GHG) emissions from municipal and business entities as well as households.

The planned support intensity varies from 65 % to 35 % depending on the beneficiary. The investment support programme for renewable technologies for heat and electricity production provides financial incentives for public institution and business (excluded from the ETS).

Electricity from renewable energy sources (RES) and combined heat and power (CHP) can benefit from feed-in tariffs.

Latvia introduced a tax on CO_2 emissions which has been gradually raised (EUR 2.846 per t CO_2 since 1 January 2013). CO_2 emission resulting from the use of renewable energy or local fuels (peat) or installations included in the ETS are not subject to this tax.

Another law stipulates an excise tax on oil products, coal, coke and lignite. If these fuels are used for CHP and electricity production, they are exempt from the tax, as are fuels used by private persons (e.g. for heating). A tax reduction applies for transport fuels blended with at least 5 % rapeseed oil or biodiesel. Natural gas is taxed as well, but at present this is being revised.

European Union Emissions Trading System (EU ETS)

In Latvia, 112 installations participate in the EU ETS, and they are responsible for 25 % of the total national emissions.

Energy supply

Energy efficiency

Minimum efficiency requirements for boilers, combined power and heat production equipment and maximum permitted losses in the district heating network are stipulated.

The operational programme 'Infrastructure and Services' of the Latvian National Development Plan 2007–2013 provides support for the implementation of measures to improve the efficiency of district heating systems. It aims to reduce the loss of heat energy in the transmission and distribution systems and to foster the replacement of imported fossil fuel types by renewable fuels. Currently, 10 CHP plants using renewables are operated, and 20 more plants are planned. It is expected to increase biomass-based heat production capacity to at least 200 MWh.

Renewables

RES are promoted in the fields of power generation and heat production. A tax on electricity applies for electricity operators and distributors. Autonomous producers are not included as long as the generated capacity does not exceed 2 MW, as well as power generation based on RES, hydropower and CHP. Moreover, Latvia supports the use of biomass and biogas for energy production, mainly for CHP plants.

Energy use

Energy efficiency

One of the priority measures in the sector energy use is the improvement of energy efficiency of the residential sector. The operational programme 'Infrastructure and Services' provides support for the implementation of measures concerning the renovation of multi-apartment houses and social residential building, and is co-financed by the EU Regional Development Fund. The goal is to increase energy efficiency of residential houses and the efficient use of energy resources. These measures are accompanied by information campaigns and technical support. Multi-apartment buildings whose annual heat consumption exceeds 230 kWh/m² are obliged to improve energy efficiency. Latvia also implements measures regarding energy efficiency in industrial and public buildings.

Renewables

Households receive financial support when installing microgeneration technologies such as solar heat collectors, photovoltaic, wind and wood-based heating systems, on condition that the produced energy be used in the household only. The maximum support amounts to EUR 9 960, covering not more than 50 % of the project's costs.

Transport

Renewables

Latvia has introduced the Biofuel Mix Obligation to ensure the growth of the share of renewable sources in the transport sector. For gasoline, it is mandatory to include 4.5 % to 5 % biodiesel; diesel must be blended also with biodiesel (4.5 % to 5 %). It is planned to increase the biodiesel mix to between 6.5 % and 7 % in 2014.

Transport efficiency

Fuels used in the transport sector are taxed. Biofuels and fuels blended with biofuels or biodiesel benefit from tax exemption: i) Gasoline which contains between 70 % and 85 % ethanol originating from agricultural raw materials;

ii) diesel with at least 30 % biodiesel or rapeseed oil; and (iii) pure biodiesel. Public transport and transportation of goods based on electricity are also exempt from electricity taxation.
To influence consumer choice, cars are subject to different tax rates depending on age, emissions and engine size.

Modal shift and raising awareness

The public transportation network shall become more attractive and there are plans to develop it further.

Industrial processes

Non-CO_2 gases

Latvia implemented the EU F-gas regulation in order to reduce ozone-depleting substances and fluorinated GHGs.

Energy efficiency

Latvia introduced a framework for signing agreements with the industry sector on energy efficiency, energy audits and energy management systems. Moreover, the government introduced requirements for the production processes of enterprises, which are obliged to use the best and most modern technologies

Agriculture

Part of the Latvian Climate Change Reduction Programme is promoting the introduction of methods in the agricultural sector, which preserve the environment and reduce direct GHG emissions. As an additional measure, reducing the use of synthetic fertilisers is under consideration. The National Development Plan of Latvia for 2014–2020 sets targets to expand the used area for organic farming from 9 % of the total area of agricultural land (2010) to more than 15 % in 2030.

Waste

To achieve the targets of the Climate Change Reduction Policy in the waste sector, the main goal is the establishment of a waste management system compliant with modern requirements, by ensuring the collection of biogas at household waste disposal sites. Latvia has to ensure full implementation of the Urban Waste Water Treatment Directive (91/271/EEC), but for the time being, it appears that full implementation cannot be achieved by 2015, as planned.

Land use, land-use change and forestry

The most important long-term measures to increase the CO_2 removals in forest lands are the renovation and expansion of forest drainage systems, forest regeneration and afforestation of non-arable farmlands.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
LV-TRA-004: New Passenger Cars Labelling on Fuel Economy Rating (non-ETS)	205
LV-ENS-003: Investment Support Programme in Renewable Technologies for Heat and Electricity Production to Reduce GHG emissions	195
LV-ENS-001: Investment Support Programme for District Heating (DH) Systems	176
LV-TRA-001: Biofuel Mix Obligation Requirement (non-ETS)	125
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
LV-ENS-001: Latvia National Renewable Action Plan	630
Measures with large expected savings specifically in the non-ETS sectors	
LV-TRA-004: New Passenger Cars Labelling on Fuel Economy Rating (non-ETS)	205
LV-TRA-001: Biofuel Mix Obligation Requirement (non-ETS)	125
EU policies or measures related to measures expected to deliver the largest savings	
LV-ENS-001: Investment Support Programme for District Heating (DH) Systems: • Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) • Energy supply: Combined Heat and Power (CHP) Directive Promotion of cogeneration 2004/8/EC • Energy supply: Biomass Action Plan COM(2005) 628 final LV-ENS-003: Investment Support Programme in Renewable Technologies for Heat and Electricity Production to Reduce GHG emissions: • Cross-cutting: Kyoto Protocol project mechanisms 2004/101/EC • Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) • Energy supply: Combined Heat and Power (CHP) Directive Promotion of cogeneration 2004/8/EC LV-TRA-001: Biofuel Mix Obligation Requirement: Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) LV-TRA-004: New Passenger Cars Labelling on Fuel Economy Rating: Transport: New Passenger Car Labelling on fuel economy rating 1999/94/EC	
EU policies or measures expected to result in the largest emission savings	
Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC) Energy supply: Combined Heat and Power (CHP) Directive Promotion of cogeneration 2004/8/EC Energy supply: Biomass Action Plan COM(2005) 628 final Cross-cutting: Kyoto Protocol project mechanisms 2004/101/EC New Passenger Car Labelling on fuel economy rating 1999/94/EC	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Liechtenstein

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	0.2	0.3	0.2	0.2	n/a
GHG per capita (t CO_2 eq./cap.)	8.1	7.9	6.5	6.1	n/a
GHG per GDP (g CO_2 eq./EUR)	n/a	n/a	n/a	n/a	n/a
Share of GHG emissions in total EU-28 emissions (%)	0.0 %	0.0 %	0.0 %	0.0 %	n/a
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	0.0	0.0	0.0
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	1 %	1 %	n/a
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 89.8 %	– 90.2 %	– 93.0 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	0.0 %	0.0 %	0.0 %

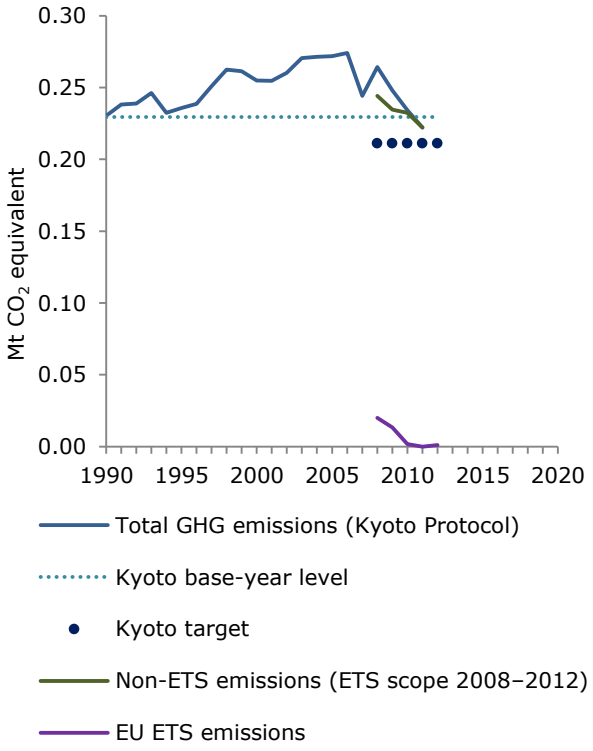
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	0.23
2008–2012 average non-ETS target	0.19
Gap to target (domestic emissions-target)	**0.04**
Expected effect of carbon sinks	0.0
Planned use of flexible mechanisms	0.05
Issued emission reduction units	0.0
Overall gap to target	**-0.01**

Liechtenstein is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 20 % of base-year emissions per year.

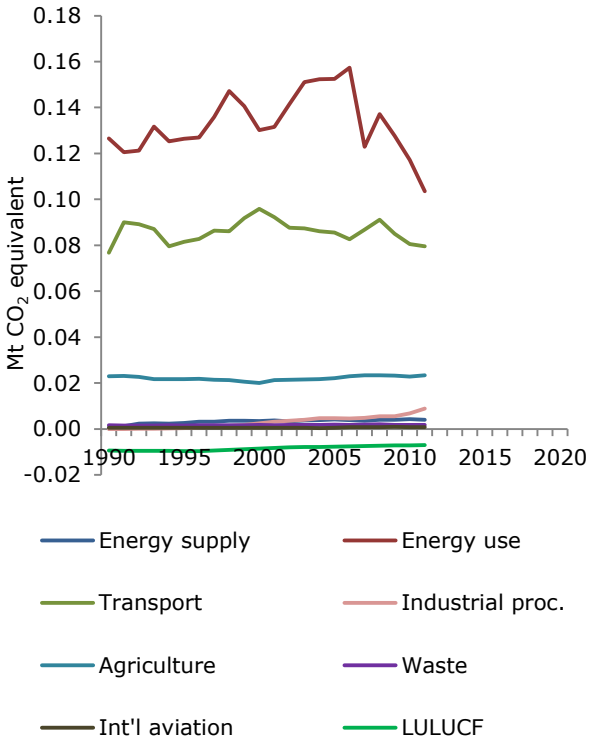
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	n/a
2013 ESD target	n/a
Gap to target (domestic emissions-target)	**n/a**
2020 ESD target (with art. 10 adjustment)	n/a
2020 non-ETS projections WEM	n/a
Gap to target WEM	**n/a**
2020 non-ETS projections WAM	**n/a**
Gap to target WAM	**n/a**

Liechtenstein is not a member of the EU and does not have any targets under the ESD.

GHG trends and projections



Sectoral GHG trends and projections



Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	n/a	n/a	n/a	n/a	n/a
Final energy consumption (FEC) (Mtoe)	n/a	n/a	n/a	n/a	n/a
Liechtenstein has an objective to stabilise energy consumption below the level of 2008 by 2020.					
Share of renewable energy in gross FEC (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — electricity (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — transport (%)	n/a	n/a	n/a	n/a	n/a
Liechtenstein has a 20 % target on the share of renewable energy sources for 2020.					

Primary and final energy consumption

n/a

Primary energy intensity

n/a

Progress towards renewables targets

n/a

Development of main renewable technologies

n/a

Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC ([8])

Policy framework and cross-sectoral measures

Climate and energy strategies

To ensure a coordinated implementation of climate policies within the various areas, the government of Liechtenstein passed a Climate Protection Strategy in 2007. This strategy requires an interdisciplinary coordination in the fields of environment, energy, building, transportation, agriculture and forestry with respect to the development of climate policy measures. Liechtenstein´s policies are often linked to Swiss policies and, therefore, cross-border cooperation is simplified in many areas. The Environmental Protection Act, which was implemented in 2008, regulates limitations of emissions of stationary installations, requirements of engine and heating fuels and the information to the public. It also includes the 'Air Action Plan' which is a non-legally-binding measure that shall guide future decisions of the government.

The Energy Strategy 2020 is inspired by the EU 20–20–20 goals and aims to set these targets in Liechtenstein. Energy consumption shall be stabilised and shall not exceed the level of 2008 by 2020. The share of renewable energy sources is planned to amount to 20 % and GHG emissions shall be reduced by 20 % by 2020.

Main economic instruments for renewable energy and energy efficiency

Liechtenstein promotes the major part of its measures within the framework of the Energy Efficiency Law (EEG). The EEG provides financial incentives, such as grants and subsidies for building renovation, change of heating systems, photovoltaics and combined heat and power (CHP). Feed-in tariffs are provided for CHP and photovoltaics as well.

European Union Emissions Trading System (EU ETS)

Liechtenstein is participating in the EU ETS, although it is not an EU Member State. Two installations are included in the EU ETS.

Energy supply

Energy efficiency

A levy on fossil fuel was established to promote the economic use of it in all sectors. The amount of the levy complies with the Swiss tax rates. CHP plants shall be promoted for electricity and heat production. Waste heat shall be avoided and reused, or fed into a district heating system where possible.

Renewables

One measure in the energy supply sector is the use of geological heat from deep thermal aquifers for heating and electricity generation. A hydrogeological map will be developed as a foundation for using near-surface geothermal energy. The new Act and the Ordinance on the Liberalisation of the Electricity Market provide mechanisms to support the conveyance of renewable energies. The Liechtenstein Power Authority also offers a 'Green Electricity' label. The use of biogas from agricultural residues and waste is currently assessed.

Energy use

Energy efficiency

One measure according to the energy efficiency law is that of minimum requirements in the residential sector for the insulation of buildings (heat insulation requirements), for devices such as heaters, air conditioners and ventilation systems and requirements for the maintenance of such devices. Building insulations can be supported with up to CHF 75 000 (EUR 60 600). Another measure is the promotion of the voluntary Minergy Standard, a quality label for new and renovated buildings, which achieves energy consumption that is lower by a factor of 3 than in conventional buildings.

In the industry sector, the use of waste heat is promoted. Another measure intends to improve the efficient use of electricity in large commercial and industrial buildings. This includes efficient lightening systems, appliances and motors.

Renewables

Liechtenstein aims at increasing the use of solar energy through solar panels with state subsidies and feed-in tariffs. The share of photovoltaics shall amount to 7 % by 2020. In addition, the use of biomass (wood and pellets) for heat production and heat pumps for heating buildings and water are promoted.

Transport

Renewables

The public bus fleet has largely been converted to natural gas. Three natural gas–fuelling stations have been built. The government is examining the establishment of a biogas facility to generate gas from organic waste.

Transport efficiency

Vehicles with environmentally friendly engines (solar, electric and/or hybrid vehicles) are exempt from the motor vehicle tax. This relative discount creates greater incentives to purchase and use such vehicles. The Liechtenstein state subsidies private purchases of electric scooters and electric bicycles by up to 50 %. This achieves an increased substitution of short automobile rides. Moreover the government considers a system of motor vehicle taxation which implements a bonus-malus system based on the energy efficiency and/or emissions of vehicles.

Modal shift and raising awareness

Public transport has a high priority in Liechtenstein. The public transport schedule has been significantly improved in

([8]) Sources:

- for policy framework and cross-sectoral measures, energy supply, energy use, transport and PAMs: Liechtenstein's Energy Strategy 2020 (2012) (http://www.regierung.li/fileadmin/dateien/downloads/Energiestrategie_Langfassung.pdf);
- for industrial processes, agriculture, waste, LULUCF: Liechtenstein's 5th National Communication under the UNFCCC.

recent years, especially in cross-border transport ('Liechtenstein Takt'). A Mobility Concept 2015 was adopted in order to enforce the promotion of public traffic. Slow traffic modes such as cycling and walking shall become more attractive. The regional train network is planned to be improved and adapted for commuters. Mobility and transport requirements shall be considered more in spatial planning. This includes transregional communication and coordination of spatial planning activities.

Industrial processes

Non-CO_2 gases

No specific strategies or measures have been reported in the industrial processes sector.

Energy efficiency

No specific strategies or measures have been reported in the industrial processes sector.

Agriculture

The Agricultural Law addresses the general demand for more efficient and sustainable farming procedures and promotes the trend towards more ecological agriculture in Liechtenstein. In parallel with Switzerland, the Ecological Performance Certificate was introduced for environmentally friendly and animal-friendly cultivation. Direct payments are only made if the cultivation corresponds to the provisions of the animal protection legislation and the environmental protection provisions. The Water Protection Act, which entered into force in 2003 and is also comparable to Swiss law, specifies the thresholds for cattle and horses per area unit.

Waste

The basis for waste legislation is the Environmental Protection Act (2008) which requires the separate disposal of different types of waste. On behalf of an ordinance, it may be required that certain waste must be recycled, if such recycling improves the ecological balance. The requirements are also based on the 'polluter pays' principle. All trash is incinerated in the waste incineration plant in Buchs, Switzerland and the energy generated is reused. The Ordinance on Dangerous Substances (1995) regulates dangerous substances and bans several substances (especially in fire extinguishers and spray cans). Registration, Evaluation, Authorisation and restriction of Chemicals (REACH) is a European Union Regulation (2006), which is also applicable in Liechtenstein. REACH addresses the production and use of chemical substances and their potential impacts on both human health and the environment.

Land use, land-use change and forestry

Important goals of the current Forestry Act (1991) include the qualitative and quantitative preservation (prohibition of clearing) of the forest stocks and the promotion of nature-friendly forest management. In 2001, Liechtenstein published a National Forest Programme, which includes the following principles: respect for national sovereignty and responsibility in the use of resources, compatibility with the domestic legal provisions, compliance with obligations arising from international conventions and agreements, establishment of partnerships and participation of all interested groups, use of a holistic approach to the preservation and cultivation of forests, and selection of a long-term and iterative planning, implementation and monitoring process.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
Geo-thermal energy	3.9
Minimum requirements for appliances, motors and lightening systems	1.7
New heating systems (wood and pellets, heat pumps, solar energy)	2.2
Electricity from PV	0.9
Electric vehicles	0.9
Increased efficiency of energy supply	0.8
Minergy Standard	0.09
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
Not available.	
Measures with large expected savings specifically in the non-ETS sectors	
Not available.	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Lithuania

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	48.8	19.6	21.1	21.6	22.0
GHG per capita (t CO_2 eq./cap.)	13.2	5.6	6.3	7.1	7.3
GHG per GDP (g CO_2 eq./EUR)	2 464.2	1 363.2	956.5	924.5	909.7
Share of GHG emissions in total EU-28 emissions (%)	0.9 %	0.4 %	0.4 %	0.5 %	0.5 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	6.4	5.6	5.7
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	30 %	26 %	26 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 21.6 %	– 36.9 %	– 47.3 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	13.3 %	27.1 %	43.3 %

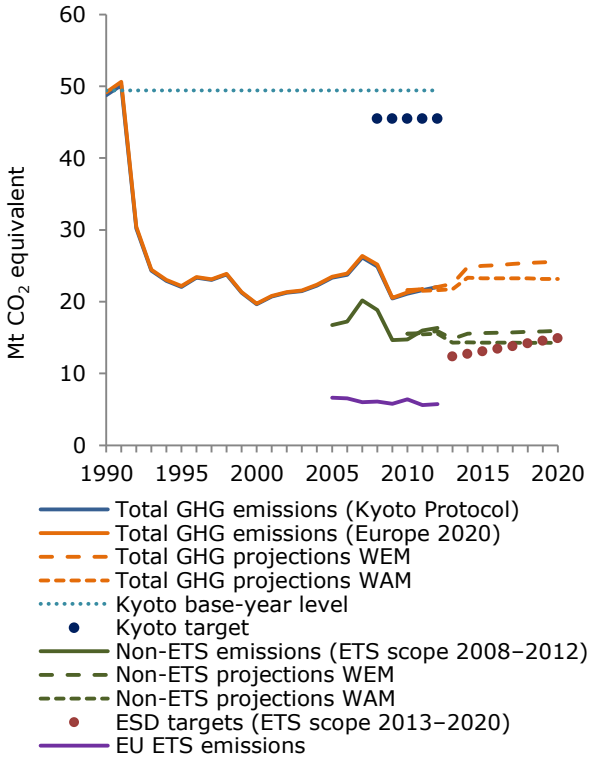
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	16.1
2008–2012 average non-ETS target	36.9
Gap to target (domestic emissions-target)	**– 20.8**
Expected effect of carbon sinks	– 1.1
Planned use of flexible mechanisms	– 14.1
Issued emission reduction units	0.0
Overall gap to target	**– 7.7**

Lithuania is on track towards its Kyoto target. Its government intends to sell to other countries, through the Kyoto flexible mechanisms, a number of Kyoto units equivalent to 29 % of base-year emissions per year.

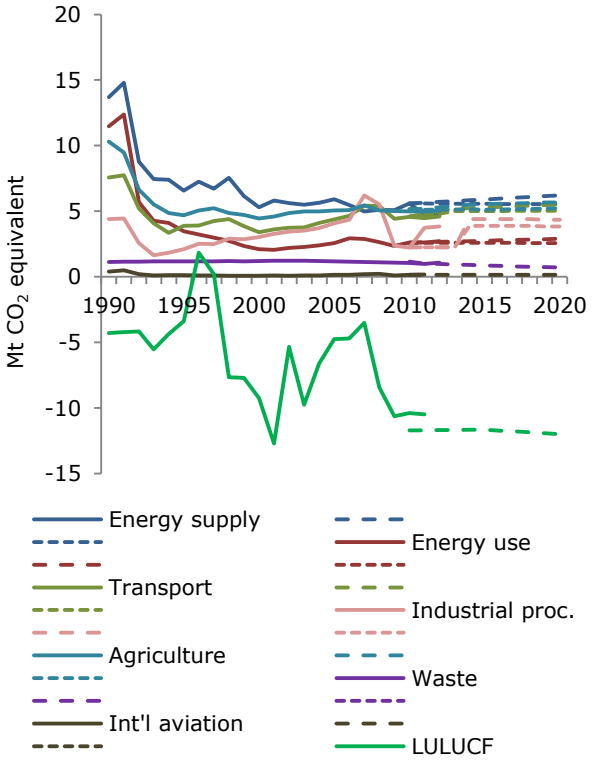
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	16.3
2013 ESD target	16.7
Gap to target (domestic emissions-target)	**– 0.3**
2020 ESD target (with art. 10 adjustment)	14.9
2020 non-ETS projections WEM	15.9
Gap to target WEM	**1.0**
2020 non-ETS projections WAM	14.3
Gap to target WAM	**– 0.6**

Lithuania is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

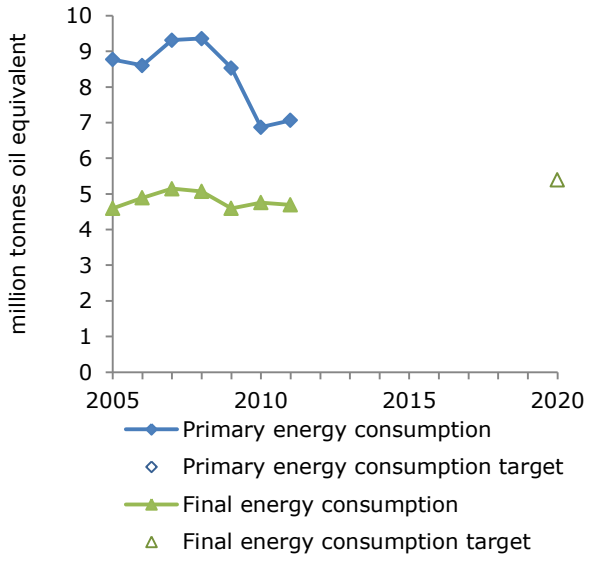


Sectoral GHG trends and projections

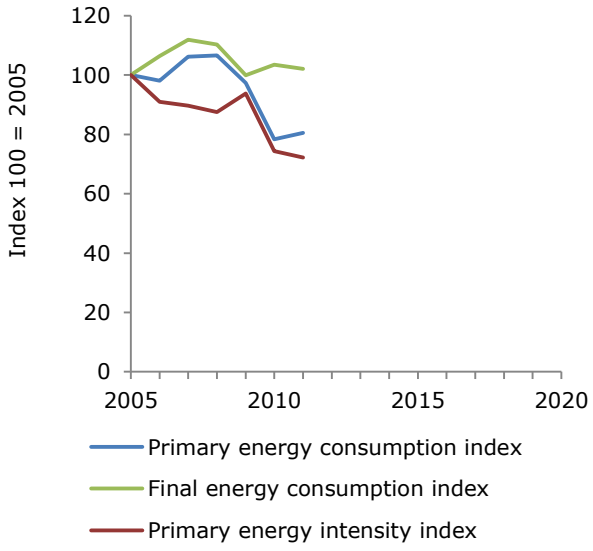


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	8.8	8.5	6.9	7.1	n/a
Final energy consumption (FEC) (Mtoe)	4.6	4.6	4.8	4.7	5.4
Lithuania is making some progress in reducing energy consumption, but further improvements are necessary, in either energy efficiency policy implementation or in the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	16.9 % (17.0 %)	19.0 % (20.0 %)	19.8 % (19.8 %)	20.3 %	23.0 %
Share of renewable energy in gross FEC — electricity (%)	3.8 %	5.9 %	7.4 %	9.0 %	
Share of renewable energy in gross FEC — heating and cooling (%)	30.1 %	34.4 %	33.2 %	33.8 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.2 % (0.5 %)	0.2 % (4.3 %)	3.6 % (3.6 %)	3.7 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 20.3 % (1 002 ktoe), which is higher than the indicative target for the 2011-to-2012 period (16.6 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (86 %), hydropower (4 %) and onshore wind (4 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 2.8 %. In order to reach the 2020 target, an average annual growth rate of 4.4 % is needed for the period from 2011 to 2020. This corresponds to 0.6 times the cumulative effort up to 2011.					

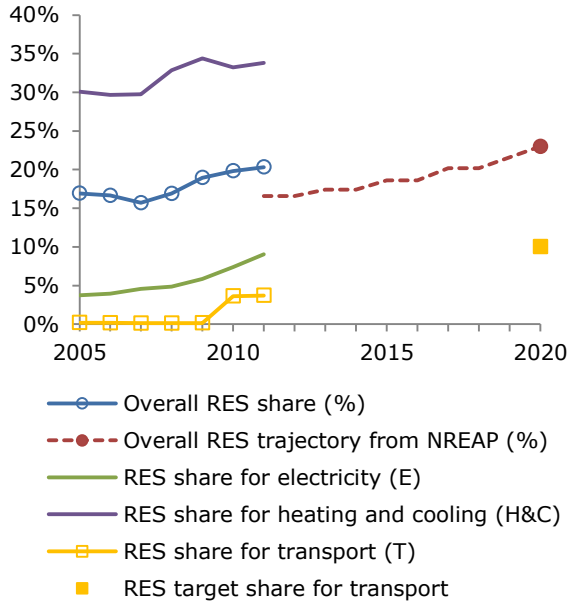
Primary and final energy consumption



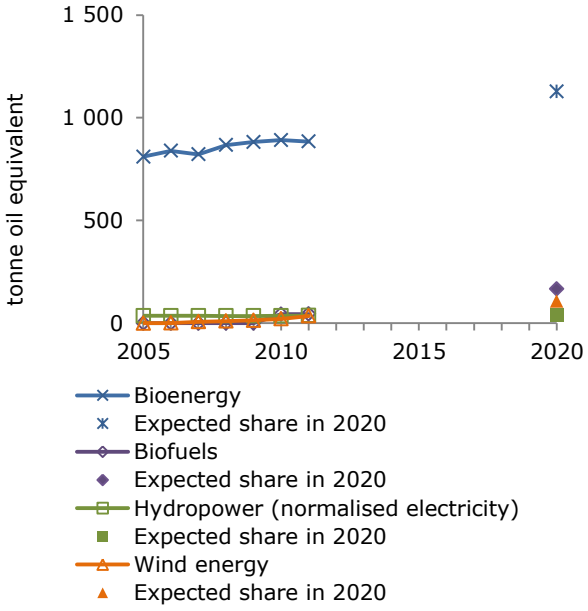
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The main goal of Lithuania's energy strategy is to increase its energy independence from Russia. For this reason, a new energy 2012 policy envisages the building of a new nuclear plant a new liquefied natural gas (LNG) terminal, and rebuilding the power grid. Energy reliance on Russia is to drop from 80 % in 2012 to 55 % by 2016 and to 35 % by 2020. Gas imports from Russia will halve when the new LNG terminal is commissioned in 2014. The Strategy for National Climate Change Management Policy by 2050, approved by the parliament in November 2012, sets long-term guidelines for climate change policy and specifies reduction targets for the ETS and non-ETS sectors. Currently, a draft Action Plan on the implementation of the goals and strategy for the period 2013 from 2020 is under preparation.

Since the closure of the last nuclear plant in 2009, Lithuania has made plans to build a new nuclear plant at Visaginas. In May 2012, the Lithuanian parliament approved the project, but in a non-binding referendum in October 2012, a majority of the voters were against a new nuclear power plant.

Main economic instruments for renewable energy and energy efficiency

Renewable electricity generation is promoted through a feed-in tariff. Heating and cooling from renewable energy sources is promoted through several support schemes. These include the suppliers' obligation to purchase all heat produced from renewable energy sources (RES), grants in the form of subsidies from the Lithuanian Environmental Investment Fund (LEIF), as well as environmental pollution tax reliefs. Renewable energy use in the transport sector is also promoted through several support schemes. These include the reimbursement, by the National Paying Agency of the Ministry of Agriculture, of raw materials for biofuel production, an excise tax relief and an exemption from environmental pollution tax. The government also signed voluntary agreements with the energy and industry sector to improve energy efficiency. In general, LEIF supports projects aiming to reduce environmental damage in the long term. The Fund for the Special Programme for Climate Change Mitigation supports projects aiming to reduce greenhouse gas (GHG) emissions; it provides loans and subsidies. In addition, Lithuania makes use of the European Structural Funds, World Bank loans, and private investors.

European Union Emissions Trading System (EU ETS)

In 2011, Lithuania had 115 installations that fall under the EU ETS. They represented a share of 26 % of total GHG emissions in the country.

Energy supply

Energy efficiency

Lithuania has set targets to increase the electricity produced with combined heat and power (CHP) up to 35 % (during the heating season) of the total electricity production balance by 2025. Alongside this, Lithuania wants to reach 75 % of heat supplied in heating systems from CHP plants in 2020. There are various types of instruments used to reach these targets; they are not explained further.

Renewables

Lithuania has set a target of 20 % of electricity to be generated by RES by 2020. In order to reach this goal, it requires 500 MW of installed wind energy capacity, 10 MW of solar energy, more than 355 MW of biomass, and 141 MW of hydro energy. Renewable electricity generation is promoted through a feed-in tariff. According to the National Control Commission for Prices and Energy (NCC), the operators of renewable electricity generation plants are entitled to receive payments from the grid operator for the electricity fed into the grid. All electricity produced by renewable electricity plants with a capacity of less than 10 kW shall be purchased at the feed-in tariff set by the NCC. Feed-in tariff contracts for the operators of these plants with a total installed capacity exceeding 10 kW are awarded through tenders. Tariff rates for these plants are set on a quarterly basis by the NCC. The feed-in tariffs are guaranteed for 12 years. Electricity from renewable sources is also exempt from excise tax.

Energy use

Energy efficiency

Starting from 1 January 2008, a 9 % final energy-saving over 9 years is planned, compared with 2005 final energy consumption levels. In the Second Energy Efficiency Action Plan, main measures reported are building regulations (horizontal measures), renovation of apartments (the 'Multi-apartment building renovation programme' where 504 buildings were renovated has now ended), renovation of public buildings and green procurement (services sector); improvement of energy efficiency in industry by upgrading cogeneration plants and boiler-houses and their connection to the heat supply systems; construction of high-efficiency cogeneration plants, including renewable energy systems like the installation of sun collectors; wind power plants; biofuel boilers and heat pumps. Also voluntary agreements with non-ETS industrial enterprises are planned, so that additional economic efficiency measures will be implemented. In the energy sector, voluntary agreements are planned to increase the end-use energy efficiency, such as the installation and operation of metering devices with end users.

Renewables

Lithuania has set a goal of 23 % RES in the final energy consumption balance by 2020, and of increasing the amount of renewable energy in the total energy balance to 20 % by 2025 (including biofuels). One concrete measure is an excise duty exception for energy products with substances of biological origin.

Transport

Renewables

Lithuania wants to increase biofuel consumption in the transport sector to 15 % by 2025. Lithuania promotes the production of biofuels by repaying the price of rape oil used for the production of rapeseed methyl (ethyl) ester (RME) and part of the price of rape seed and cereal grain purchased for the production of dehydrated ethanol. This measure is implemented by the National Paying Agency on behalf of the Ministry of Agriculture. The excise tax relief applies to biofuels for transport. The rate of excise tax is reduced in proportion to the percentage of biomass per

tonne of biofuel. The relief applies to bioethanol, biodiesel, bio-ETBE and vegetable oil. Natural and legal persons using biofuels in vehicles are exempted from environmental pollution tax on their mobile source emissions.

Transport efficiency

Lithuania lists several measures in the transport sector in the Second Energy Efficiency Action Plan. The most important are the strategy on the improvement of the transport and communications infrastructure, renewal of the vehicle fleet, promotion of efficient fuel use (which includes draft legislation for the differentiation of the tax levied on vehicle owners or managers, based on the vehicle energy efficiency indicators and the emission quantities), eco-vehicles and information campaigns.

Modal shift and raising awareness

The strategy on the improvement of the transport and communications infrastructure includes bike-sharing programmes, the development of short-distance bicycle transportation infrastructure in the cities and the organisation of information campaigns promoting the use of public transportation and walking.

Industrial processes

Non-CO_2 gases

Lithuania reduced N_2O emissions in nitrogen fertiliser production. A Joint Implementation project was launched in 2008, where a second catalyst was installed resulting in a reduction of N_2O emissions.

Energy efficiency

Lithuania plans to reduce the GHG pollution released during the cement production process, by changing manufacturing technologies to best available technologies.

Agriculture

One measure reported, concerning the protection of water from the pollution of nitrates from agriculture, is also leading to N_2O emissions. The Programme for Minimization of Water Pollution caused by agricultural activities sets requirements on the spreading and storing of manure and the amount of nitrogen input to soils. Effective measures were the implementation of good agricultural practices, according to the National Rural Development Strategy Programme 2007–2013. This included direct payments to farmers to apply new methods for managing agricultural waste and grassland areas (instead of burning).

Waste

Lithuania has set its main targets in the law on waste management and its amendments, including management of biodegradable and municipal waste. Biodegradable waste deposited in landfills shall be reduced, and CH_4 shall be collected and recovered from all landfills. Lithuania also follows the 'polluter pays' principle, where waste management expenses should be paid by the waste keeper or producer. According to the Law on Packaging and Packaging Waste Management, producers and importers not following the instructions of packaging and packaging waste collection and processing must pay charges for products placed on the national market.

Land use, land-use change and forestry

The main legal document regulating forest management (Law No XI-1830) was adopted in 2011. Together with its amendments, it creates legal conditions for better preserving forests and forest land in case of land use change. In the National Forest Area Expansion Programme 2012–2020, Lithuania foresees an increase in forest area with 3 % by 2020.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
Measures concerning the reduction of CH_4 by recovering CH_4 from landfills, reduction in N_2O by reducing water pollution from nitrate from agricultural sources. Most important measures are:	
LT-WST-002 Collection and recover of methane from all new and old landfills (non-ETS)	1 940
LT-AGR-001 Implementation of Nitrates directive (Reduced water pollution and the amount of nitrates from agriculture) (non-ETS)	1 700
LT-LUC-001 Afforestation of the poorly fertile soils (non-ETS)	1 680
LT-IND-002 To reduce the pollution with NO gas emissions in the nitrogen fertilizer-producing company (ETS)	1 467
LT-ENS-001 Promoting the consumption of renewable energy sources (both ETS and non-ETS)	1 417
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
No additional measures are reported	
Measures with large expected savings specifically in the non-ETS sectors	
LT-SWT-002 Collection and recover of methane from all new and old landfills (non-ETS)	1 940
LT-AGR-001 Implementation of Nitrates Directive (Reduced water pollution and the amount of nitrates from agriculture) (non-ETS)	1 700
LT-LUC-001 Afforestation of the poorly fertile soils (non-ETS)	1 680
EU policies or measures related to measures expected to deliver the largest savings	
LT-WST-002 Collection and recovery of methane from all new and old landfills : Waste: Landfill Directive 1999/31/EC	
LT-AGR-001 Implementation of Nitrates Directive (Reduced water pollution and the amount of nitrates from agriculture): Agriculture: Common Agricultural Policy (CAP) related regulations; Nitrates Directive (1991)	
LT-LUC-001 Afforestation of the poorly fertile soils: Agriculture: Common Agricultural Policy (CAP) - on support for rural development by the European Agricultural Fund for Rural Development (2603/1999, 1698/2005 and 1290/2005)	
LT-IND-002 To reduce pollution with N_2O gas emissions in the nitrogen fertilizer-producing company: Kyoto Protocol project mechanisms 2004/101/EC; EU ETS Directive 2003/87/EC	
LT-ENS-001 Promoting the consumption of renewable energy sources: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
EU policies or measures expected to result in the largest emission savings	
Landfill directive 1999/31/EC	
Agriculture: Common Agricultural Policy (CAP)-related regulations	
Nitrates Directive (1991)	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Luxembourg

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	12.9	9.8	12.3	12.1	12.2
GHG per capita (t CO_2 eq./cap.)	34.0	22.5	24.4	23.6	23.2
GHG per GDP (g CO_2 eq./EUR)	830.2	384.3	369.3	358.7	359.3
Share of GHG emissions in total EU-28 emissions (%)	0.2 %	0.2 %	0.3 %	0.3 %	0.3 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	2.3	2.1	2.0
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	18 %	17 %	16 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 9.5 %	– 17.5 %	– 20.0 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	8.3 %	11.8 %	12.9 %

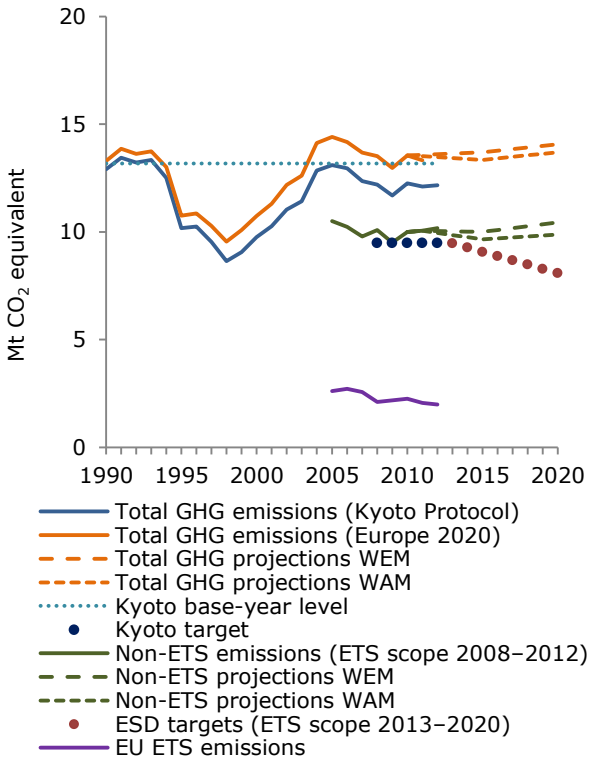
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	10.0
2008–2012 average non-ETS target	7.0
Gap to target (domestic emissions-target)	**3.0**
Expected effect of carbon sinks	0.1
Planned use of flexible mechanisms	2.8
Issued emission reduction units	0.0
Overall gap to target	**0.2**

Luxembourg is not on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 21 % of base-year emissions per year.

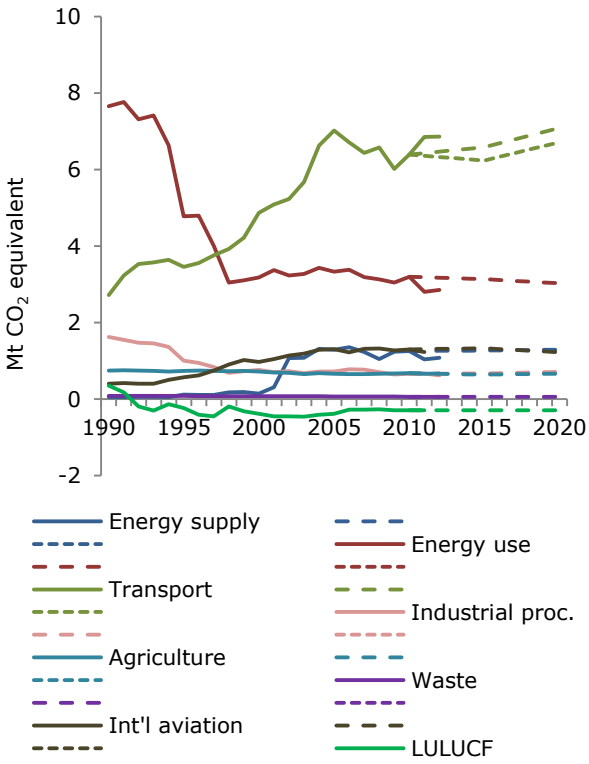
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	10.17
2013 ESD target	9.74
Gap to target (domestic emissions-target)	**0.43**
2020 ESD target (with art. 10 adjustment)	8.08
2020 non-ETS projections WEM	10.43
Gap to target WEM	**2.35**
2020 non-ETS projections WAM	10.06
Gap to target WAM	**1.97**

Luxembourg is not on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

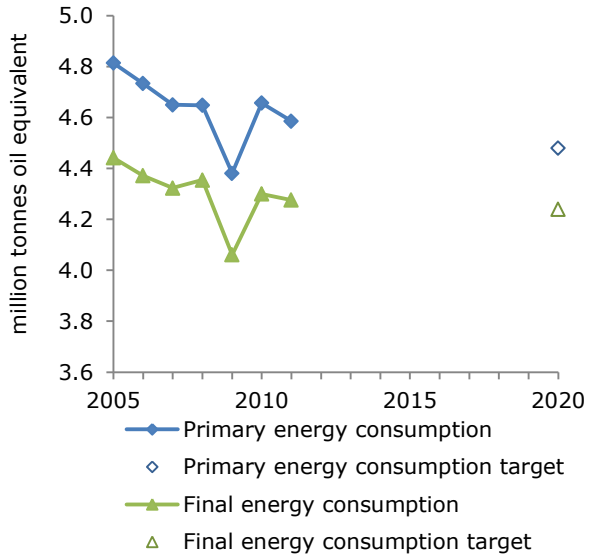


Sectoral GHG trends and projections

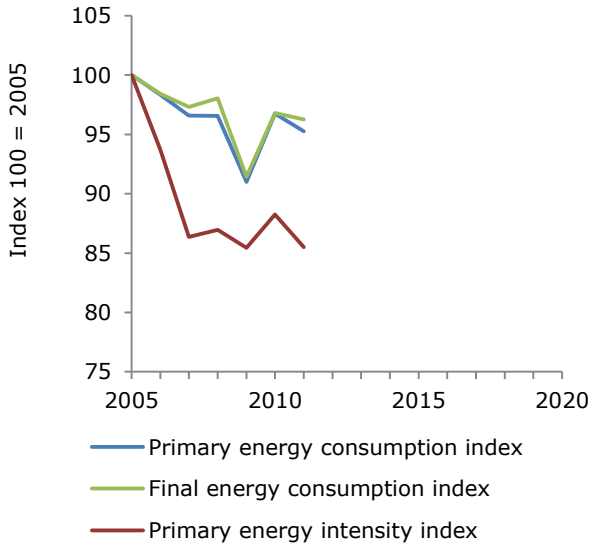


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	4.8	4.4	4.7	4.6	4.5
Final energy consumption (FEC) (Mtoe)	4.4	4.1	4.3	4.3	4.2
Luxembourg has made limited progress in reducing energy consumption so far. Further improvements are necessary, in energy efficiency policy implementation as well as in policy package development.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	1.4 % (1.4 %)	1.9 % (1.9 %)	2.9 % (2.9 %)	2.9 %	11.0 %
Share of renewable energy in gross FEC — electricity (%)	3.2 %	4.1 %	3.8 %	4.1 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	3.8 %	4.9 %	5.0 %	5.0 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.0 % (0.0 %)	0.1 % (0.1 %)	1.9 % (2.0 %)	2.0 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 2.85 % (118 ktoe), which is equal to the indicative target for the 2011-to-2012 period (2.92 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (35 %), biodiesels (33 %) and hydropower (7 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 11.7 %. In order to reach the 2020 target, an average annual growth rate of 16.9 % is needed for the period from 2011 to 2020. This corresponds to 2.8 times the cumulative effort up to 2011.					

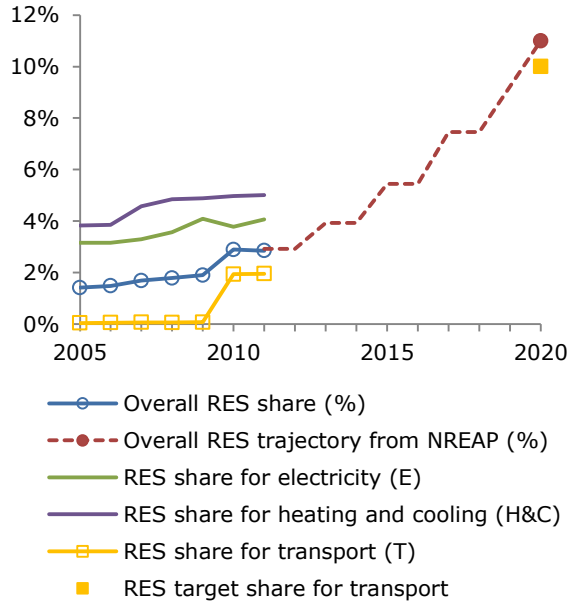
Primary and final energy consumption



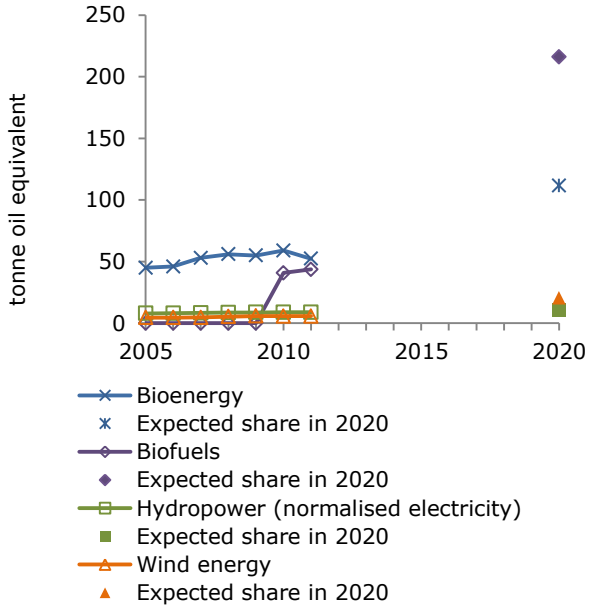
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

Sector specific strategies and action plans on climate change mitigation issues are incorporated in the 'Climate Package', a CO2 reduction action plan, NEEAP (National Energy Efficiency Action Plan), NREAP (National Renewable Energy Action Plan) and MoDu (Sustainable Mobility Strategy). In May 2011, the Luxembourgish government approved several documents bundled under the heading 'Climate Package' which is the results of extensive consultations with all the stakeholders in Luxembourg. This package is comprised of a summary document and a catalogue of 35 priority measures for the government. The priority measures are in the building and housing sector, mobility, energy and technology, biodiversity, agriculture and forests, information and awareness-raising campaigns. In addition, the 'Climate Package' contains an interim report summarizing progress of the talks and a presentation of the draft of a Climate Pact with the local authorities.A Sustainable Mobility Strategy (MoDu) was presented in April 2012, with 4 priorities presenting co-benefits with regard to CO2 emissions reduction: land use planning, soft mobility, public transport, and alternative use of automobiles. Beginning 2013, the Climate Pact entered into force. It reinforces the role of municipalities in the fight against climate change by implementing a legislative, technical and financial framework between the State and the municipalities. This Pact is based on the European Energy Award. Finally, in May 2013, the second National CO2 Emission Reduction Action Plan has been presented. It replaces the first Action Plan on CO2 Reduction of 2006 and presents 51 measures to act against climate change in Luxembourg. These measures are derived from the 35 priority measures obtained at the end of the talks for the 'Climate Package'.

Main economic instruments for renewable energy and energy efficiency

Luxembourg uses tax regulations and incentives, feed-in tariffs for renewable electricity, subsidies for renewable energy and energy efficiency measures.

European Union Emissions Trading System (EU ETS)

In 2011, Luxembourg has 13 installations falling under the EU ETS. In 2011, they represented a share of 17 % of total greenhouse gas (GHG) emissions in the country.

Energy supply

Energy efficiency

Luxembourg promoted decentralised combined heat and power (CHP) (excluding emissions trading) to increase the penetration of small CHP plants, as an 'early action' in the period from 1998 to 2007. This will result in an annual saving of 206 GWh in 2016. In Luxembourg, electricity from renewable sources is promoted through a feed-in tariff. The operators of renewable energy plants are entitled to close a contract with the grid operator on the purchase of the electricity they produce for a defined price. Furthermore, renewable energy plants are supported through subsidies: investments in renewable electricity generation are incentivised by investment grants. Private individuals operating small solar installations are entitled to tax benefits. Income from photovoltaic installations with a capacity ranging from 1 kW to 4 kW is exempt from income tax.

Renewables

The Luxembourgish National Renewable Energy Action Plan splits the overall renewable energy target into 11.8 % renewable electricity , 8,5 % renewable heating and cooling and 10 % renewable transport. To reach the target for renewable electricity production, national renewable energy production will have to increase substantially over the next 10 years: by a factor of 3 compared to 2005 figures. Despite well-designed support schemes, renewable electricity production in the period from 2005 to 2009 only increased by a factor of 1.3 (to reach the NREAP target, an increase with a factor of 3 compared to 2005 is necessary). The existing financial support schemes for renewable electricity (feed-in tariff, investment subsidies) are well designed.

Legislation in Luxembourg currently prohibiting municipalities from becoming active players in energy issues needs to be changed. This could be important for the development of renewable energy–based CHP grids or other similar projects at communal level.

Energy use

Energy efficiency

Luxembourg promotes new energy efficiency standards for new and existing buildings: setting of more restrictive energy efficiency standards for new or renovated residential buildings; setting of more stringent, minimum energy efficiency standards for heating equipment in residential buildings; and financial incentives for the renovation of existing residential buildings older than 10 years. Alongside this, there is a programme encouraging the construction of new 'low-energy' ('Niedrigenergiehaus') and 'passive' ('Passivhaus') residential buildings. Also, for newly built or renovated non-residential buildings, there is more restrictive energy efficiency. For the introduction of more energy-efficient electrical appliances, there are financial incentives for buying low-energy fridges, freezers or a combination of these two appliances. For the non-ETS industry, a voluntary agreement exists between the Luxembourg government and the Business Federation Luxembourg (FEDIL) on improving energy efficiency in the industrial sector.

Renewables

Investments in renewable electricity generation are subsidised by the state, which awards investment grants up to a certain maximum. New support conditions were introduced from 1 January 2013 for investments made between 1 January 2013 and 31 December 2016. According to the new regulation, aerothermal and geothermal heat pumps as well as renewable energy plants generating heat from solar thermal energy or wood-burning boilers are eligible for subsidy (Regime d'aides pour la promotion de l'utilisation rationnelle de l'énergie et la mise en valeur des énergies renouvelables). Companies investing in renewable energy plants are eligible for investment grants, with the exception of aerothermal and hydrothermal energy (Régime d'aide à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles). Luxembourg grants subsidies for companies investing in renewable energies for the production of heat or for CHP. These subsidies can be allocated in the form of capital grants or of interest-rate subsidies (Art. 8, Loi du 30 juin 2004, Régime d'aide en faveur des classes moyennes).

Transport

Renewables

According to the NREAP, nearly half of the Luxembourgish renewable energy target will be met through the use of biofuels. The NREAP indicates an increase of the percentage in the transport sector from 2.1 % in 2010 to 10 % in 2020. In order to fulfil this target, the NREAP relies on imported biofuels (mainly biodiesel) (95 %) and on the use of renewable electricity (the remaining 5 %). Luxembourg intends to promote the use of biofuels by increasing the share of 'second-generation' biofuels in road fuel sales.

Transport efficiency

Luxembourg introduced a CO_2-dependent motor vehicle tax to influence purchasing decisions in favour of more fuel-efficient vehicles. The annual energy savings potential from the vehicle tax reform is expected to reach 122 GWh by 2016. Since 2007, there has been a financial incentive for the purchase of energy-efficient cars by individuals, which has been amended several times ('CAR-e', and 'CAR-e plus'). The annual energy savings potential is expected to reach 71 GWh in the year 2016. A rise in domestic fuel prices (introduction of the so-called 'Kyoto cents' on road fuel sales) to influence driving behaviours that focused on lower fuel consumption (in the short term), as well as buying decisions in favour of more fuel-efficient vehicles (in the long term) should lead to an annual saving of 104 GWh. Luxembourg is also reviewing the fiscal measures in place for company cars to see if the share of low-emission vehicles in this fleet can increase.

Modal shift and raising awareness

Luxembourg is also defining actions and measures to reach at the horizon 2020 a modal-split of 25 % for non-motorized traffic and a modal-split of 19 % in favour of public transport. These main measures should contribute to the national objectives to reduce greenhouse gas emissions. Two policies have been therefore introduced as instruments in support of this goal, one dealing with mobility as a whole (Sustainable Mobility Strategy 'MoDu') and another focusing on non-motorized traffic ('Plan d'action national pour la promotion de la mobilité douce'). Furthermore the Transport Sector Plan, which sets the regulatory framework for the implementation of these measures, has been finalized and should enter the legal procedure at the end of 2013.

Industrial processes

Non-CO_2 gases

No specific strategies or measures have been reported in the industrial processes sector.

Energy efficiency

No specific strategies or measures have been reported in the industrial processes sector.

Agriculture

No specific strategies or measures have been reported in the industrial processes sector.

Waste

No specific strategies or measures have been reported in the waste sector.

Land use, land-use change and forestry

No specific strategies or measures have been reported in the LULUCF sector.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
Measures concerning road transport are considered to have the highest impact on emission reduction: further use of biofuels and also the rise in fuel prices (by the introduction of the 'Kyoto cent').	
LU-TRA-003 raising excise duties on gasoline & diesel ('Kyoto Cent') (non-ETS)	309
LU-TRA-004 use of biofuels in road transport (non-ETS)	158
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
The increase of the share of 'second-generation' biofuels in road fuel sales, which is only considered in the WAM scenario, will have the highest impact according to Luxembourg.	
LU-TRA-007 further use of biofuels in road transport (non-ETS)	557
Measures with large expected savings specifically in the non-ETS sectors	
LU-TRA-003 raising excise duties on gasoline & diesel ('Kyoto Cent') (non-ETS)	309
LU-TRA-004 use of biofuels in road transport (non-ETS)	158
EU policies or measures related to measures expected to deliver the largest savings	
LU-TRA- 003 raising excise duties on gasoline & diesel ('Kyoto Cent')& use of biofuels in road transport: Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
EU policies or measures expected to result in the largest emission savings	
Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Malta

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	2.0	2.5	3.0	3.0	3.1
GHG per capita (t CO_2 eq./cap.)	5.7	6.7	7.2	7.3	7.5
GHG per GDP (g CO_2 eq./EUR)	n/a	549.1	547.3	542.4	558.0
Share of GHG emissions in total EU-28 emissions (%)	0.0 %	0.0 %	0.1 %	0.1 %	0.1 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	1.9	1.9	2.1
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	63 %	64 %	65 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 13.0 %	– 10.9 %	– 4.9 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	n/a	0.0 %	52.2 %

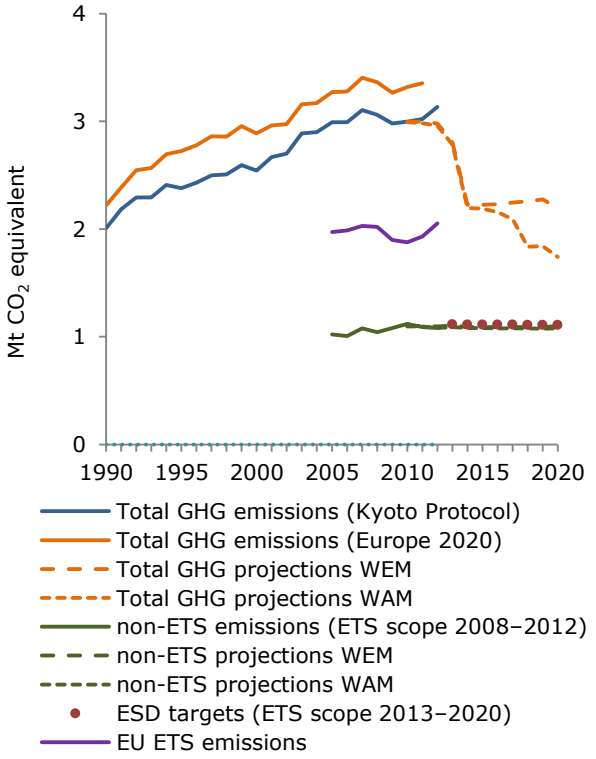
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	n/a
2008–2012 average non-ETS target	n/a
Gap to target (domestic emissions-target)	n/a
Expected effect of carbon sinks	n/a
Planned use of flexible mechanisms	n/a
Issued emission reduction units	n/a
Overall gap to target	n/a

Malta does not have any targets under the Kyoto Protocol's first commitment period, from 2008 to 2012.

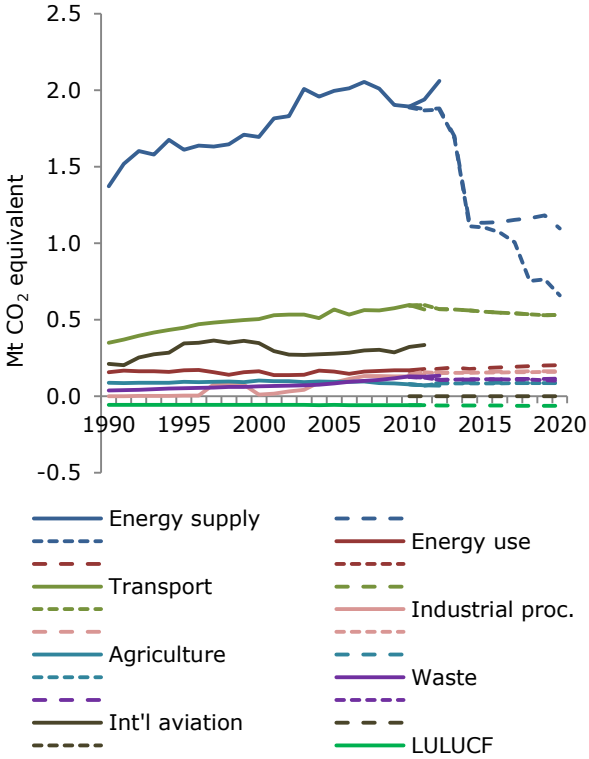
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	1.1
2013 ESD target	1.1
Gap to target (domestic emissions-target)	**0.0**
2020 ESD target (with art. 10 adjustment)	1.1
2020 non-ETS projections WEM	1.1
Gap to target WEM	**0.0**
2020 non-ETS projections WAM	1.1
Gap to target WAM	**0.0**

Malta is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

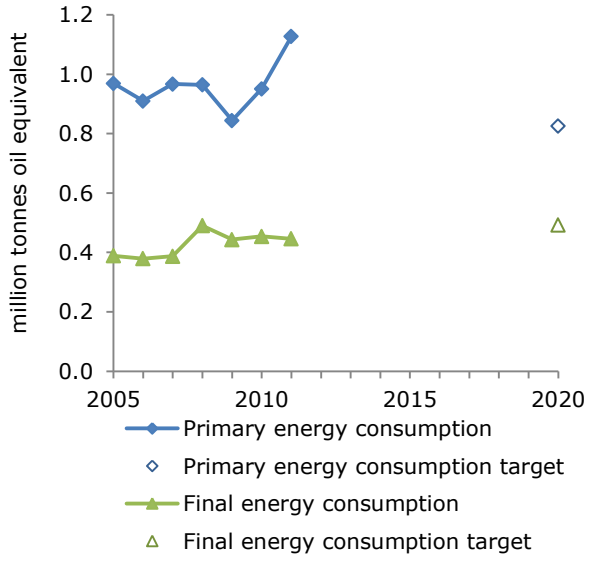


Sectoral GHG trends and projections

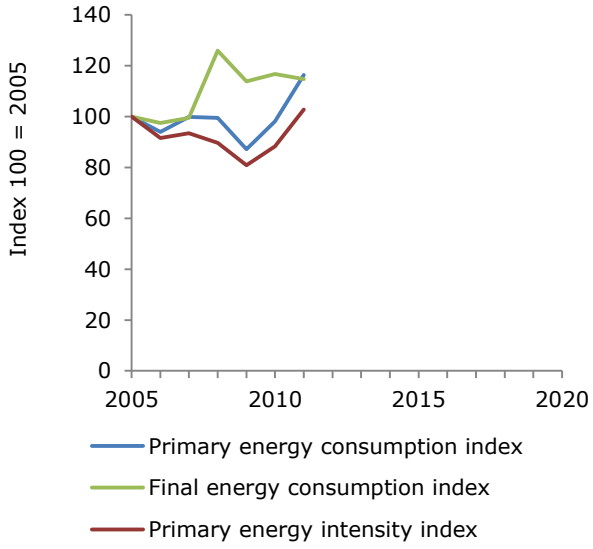


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	1.0	0.8	1.0	1.1	0.8
Final energy consumption (FEC) (Mtoe)	0.4	0.4	0.5	0.4	0.5
Malta has made limited progress in reducing energy consumption so far. Further improvements are necessary, in energy efficiency policy implementation as well as in policy package development.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	0.0 % (0.0 %)	0.0 % (0.0 %)	0.2 % (0.2 %)	0.4 %	10.0 %
Share of renewable energy in gross FEC — electricity (%)	0.0 %	0.0 %	0.1 %	0.1 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	0.0 %	0.0 %	2.2 %	5.6 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.0 % (0.0 %)	0.0 % (0.0 %)	0.0 % (0.0 %)	0.0 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 0.4 % (2 ktoe), which is lower than the indicative target for the 2011-to-2012 period (2.0 %). The main technology contributing to renewable energy use in 2011 was solar thermal for heat (55 %), solid biomass for heat (21 %) and solar PV (17 %). In order to reach the 2020 target, an average annual growth rate of 48.4 % is needed for the period from 2011 to 2020. This corresponds to 34.9 times the cumulative effort up to 2011.					

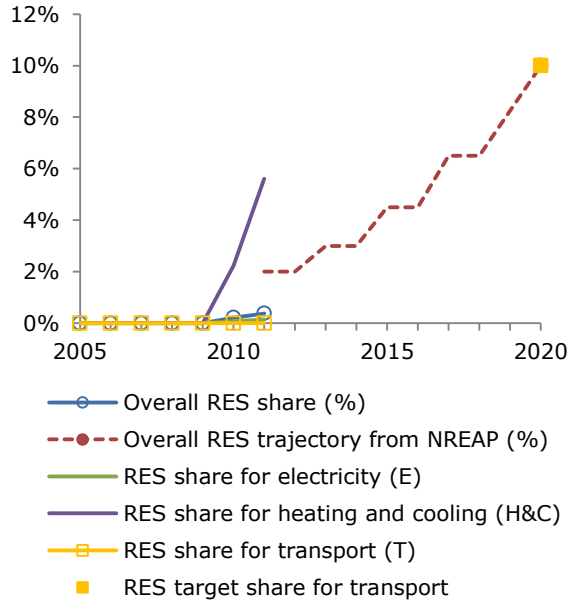
Primary and final energy consumption



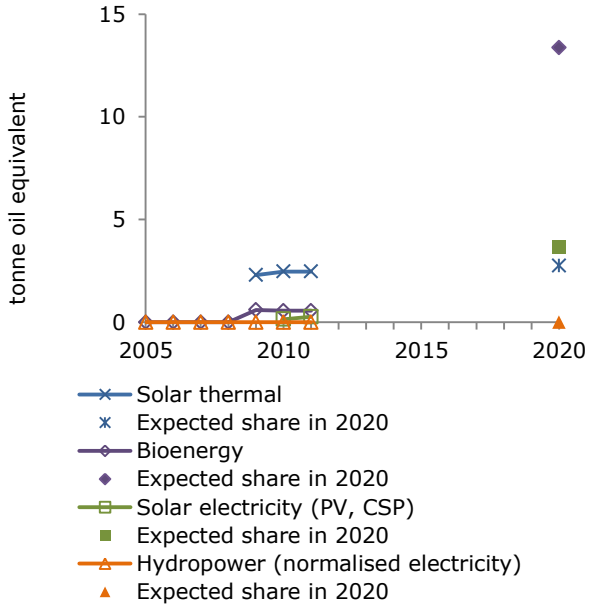
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Energy Policy of Malta is based on five principles: energy efficiency and affordability, security, diversification, flexibility and sustainability. The targets set by EU directives are a share of 10 % renewable energy in the final energy consumption by 2020 and an increase of energy efficiency by 9 % by 2016.

In general, a shift towards more efficient technologies and low-carbon fuels is desired, especially in the power generation sector. Malta has a relatively isolated energy system, typical of islands, but is also supplied by only two main power plants. It therefore seeks more independence and flexibility. It is expected that the situation will be improved when the Maltese electricity grid is connected with the European grid.

Main economic instruments for renewable energy and energy efficiency

The government provides EUR 15 million from structural funds for energy efficiency measures and EUR 10 million for supporting renewable energy sources. An excise duty is collected from the use of petrol and diesel to fund alternative energy sources.

European Union Emissions Trading System (EU ETS)

In Malta, two installations are included in the EU ETS, which cover 64 % of the total national emissions.

Energy supply

Energy efficiency

The existing power generation depends on two power generation plants fuelled with heavy fuel oil and gas oil. It is planned to decommission the Marsa Power Station and to install new capacity at the Delimara plant, which is more efficient.

In addition, the first electrical interconnection to the European electricity grid is expected in 2013. The interconnection will ensure that existing and new generation capacity is utilised in the most efficient manner, by allowing local plants to operate at or as close to the base-load, as possible. A second submarine electrical interconnection to the European network is planned for 2016.

Demand management is supported; increased efficiency of the distribution network will bring down discrepancies between peak and minimum loads.

A combined heat and power (CHP) plant was granted in 2011; it is fired by biogas produced in the onsite solid waste treatment plant.

Renewables

In order to encourage electricity generation through technologies other than conventional generating plants, the government has launched schemes to promote the installation of renewable energy generation equipment in the domestic sectors.

A feed-in tariff implemented in 2010 for photovoltaic systems in the residential and non-residential sector has increased the number of such installations.

According to Malta's National Renewable Energy Action Plan, three large wind farms will be installed. At the moment, three sites, one offshore and two onshore, are undergoing assessments.

Energy use

Energy efficiency

Energy efficiency and renewables for industry and small and medium-sized enterprises (SMEs) are promoted by a support scheme launched in 2009, which also provides energy audits. Cheap loans are provided to hotels, restaurants and other tourist businesses, to implement energy efficiency measures.

In the residential sector, grants have been provided since 2012 for roof insulations, double glazing and energy-efficient appliances. Market-based instruments to encourage refurbishments and nearly zero-energy buildings are under assessment. Large-scale building projects are required to prepare energy and water management plans.

In the public sector, the government started an initiative called Green Leaders that aims to improve energy efficiency. In each Ministry, a Green Leader was nominated, responsible for promoting environmentally friendly practices, energy efficiency and renewable energy. Local councils are able to receive grants for investments in energy savings or renewable energy.

Seawater desalination plants were retrofitted with the most efficient energy recovery systems available.

At present, automatic meter management systems with smart electricity meters have been implemented, in order to improve demand management on the consumer side. This will help consumers to optimise their behaviour and save energy.

Renewables

A grant scheme was introduced to encourage households and businesses to invest in solar water heaters. Small photovoltaic systems benefit from fast-track permission procedures in order to accelerate the installation process.

Transport

Renewables

The Substitution Obligation stipulates that diesel be blended with biodiesel in Malta. In addition, the introduction of bio-ETBE (ethyl tertiary butyl ether) is planned. In 2012, the first liquefied petroleum gas (LPG) station was opened. Electric vehicles are promoted by a reduced registration tax and a grant of 15 % of the purchase price. At present, the Ministry for Resources and Rural Affairs is conducting a study assessing the use of photovoltaic energy for the charging of electric vehicles.

Transport efficiency

Malta reformed its vehicle registration tax in order to support the purchase of cleaner and smaller cars. The tax also favours hybrid and electric vehicles. A scrappage scheme was set up to replace old vehicles. In the capital city Valletta, park and ride schemes and the 'controlled vehicular access' scheme were implemented. These measures help ease traffic congestion in peak hours. An integrated traffic management system is being planned, that will

manage traffic flows, congestion, incidence management and emissions monitoring. Priority will be given to buses to make public transport more attractive.

Modal shift and raising awareness

The public transport system is being reformed to increase the modal shift by 8 %. This reform includes the upgrade of the national bus system offering more routes, more frequent service and night services. New bus terminals, new vehicles and information services will improve bus transportation. In addition, free parking will be restricted; infrastructure improvements for pedestrians and cyclists are planned.

Industrial processes

Non-CO_2 gases

EU Regulation 842/200618 on certain fluorinated greenhouse gases has been implemented through the establishment of sector-specific subsidiary regulations. These regulations include the minimum qualification courses for fixed air conditioning and refrigeration equipment, vehicle air conditioning, high-voltage switchgear and fire protection equipment.

Energy efficiency

No specific strategies or measures have been reported in the industrial processes sector.

Agriculture

The Government of Malta has launched the Nitrates Action Programme, which aims to reduce nitrates pollution. Regarding manure management, some of the measures relate to the type and capacity of on-farm storage of manure and slurry. This action programme requires the users of organic and/or inorganic fertilisers to register at the competent authority responsible for nitrates. The implementation and monitoring of the Nitrates Action Programme was supported by the Rural Development Programme (RDP). All farmers are eligible to apply for funding under the RDP for the installation of waste storage, management and treatment structures, for instance, in order to meet the requirements of the Nitrates Action Programme. Furthermore, the InfoNitrates Campaign is an information and communications campaign designed to provide farmers with information and training, for compliance with the requirements of the EU Nitrates Directive (91/676/EEC) and the Nitrates Action Plan.

Waste

Malta aims at the reduction of emissions from open and closed landfill sites, while also seeking to exploit the energy potential of waste. At the same time, Malta's obligations under EU legislation, in particular the Landfill Directive (1999 /31/EC) and Urban Waste Water Treatment Directive (91/271/ EEC) are addressed by Malta's waste policy. Furthermore, measures were implemented to prevent landfilling which can be achieved through increased recycling and waste-to-energy options. Regarding wastewater management, three wastewater treatment plants were constructed for the upgrading of the national wastewater infrastructure.

Land use, land-use change and forestry

The government has implemented a number of afforestation projects. One measure, implemented since 2004, involves the planting of indigenous trees, both in urban environment as well as in the course of afforestation projects. This measure is intended to limit soil erosion and re-establish tracts of Mediterranean woodland, as well as increase biodiversity.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
MT-ENS-001: Plant Loading and Fuel Switching	1 150
MT-IND-001: Implementation of F-Gas Regulation	130
MT-TRA-002: Biofuel substitution obligation	55
MT-TRA-006: Promotion of Transport Modal Shift towards Public Transportation	40
MT-WST-001: Aerial Emissions Works at Maghtab and Qortin + Capping and Extraction of Gases from managed Landfills	35
MT-AGR-003: Nitrates Action Programme	25
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
MT-ENS-030: Supply of natural gas to fuel existing and future generating plant at DPS in 2018	1 500
MT-ENS-010: Offshore wind farms	100
Measures with large expected savings specifically in the non-ETS sectors	
MT-IND-001: Implementation of F-Gas Regulation	130
MT-TRA-002: Biofuel substitution obligation	55
MT-TRA-006: Promotion of Transport Modal Shift towards Public Transportation	40
MT-WST-001: Aerial Emissions Works at Maghtab and Qortin + Capping and Extraction of Gases from managed Landfills	35
MT-AGR-003: Nitrates Action Programme	25
EU policies or measures related to measures expected to deliver the largest savings	
MT-ENS-001: Plant Loading and Fuel Switching: Energy supply: Large combustion Directive 2001/80/EC	
MT-IND-001: Implementation of F-Gas Regulation: Industrial Process: F-gas regulation (Regulation 842/2006)	
MT-TRA-002: Biofuel substitution obligation: Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
MT-TRA-006: Promotion of Transport Modal Shift towards Public Transportation	
MT-WST-001: Aerial Emissions Works at Maghtab and Qortin + Capping and Extraction of Gases from managed Landfills: Waste: Waste Framework Directive (2008/98/EC) amending Directive on waste 2006/12/EE	
MT-AGR-003: Nitrates Action Programme: Agriculture: Common Agricultural Policy (CAP)-related regulations	
EU policies or measures expected to result in the largest emission savings	
See above	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — The Netherlands

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	211.8	213.0	209.2	194.4	192.7
GHG per capita (t CO_2 eq./cap.)	14.2	13.4	12.6	11.7	11.5
GHG per GDP (g CO_2 eq./EUR)	601.7	443.0	380.4	350.1	350.3
Share of GHG emissions in total EU-28 emissions (%)	3.8 %	4.2 %	4.4 %	4.2 %	4.3 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	84.7	80.0	76.4
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	41 %	41 %	40 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 8.7 %	– 13.9 %	– 16.0 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	2.4 %	4.4 %	26.6 %

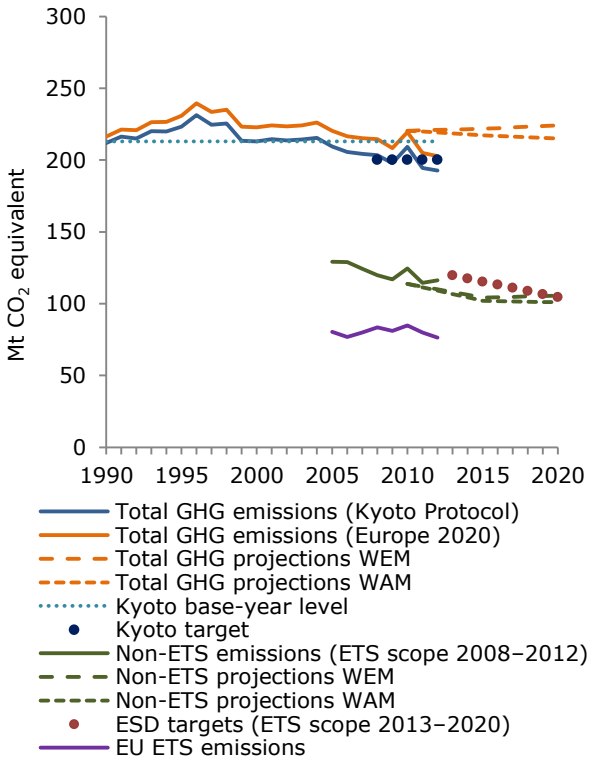
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	118.3
2008–2012 average non-ETS target	112.8
Gap to target (domestic emissions-target)	**5.5**
Expected effect of carbon sinks	0.4
Planned use of flexible mechanisms	9.2
Issued emission reduction units	0.0
Overall gap to target	**– 3.3**

The Netherlands is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 4 % of base-year emissions per year.

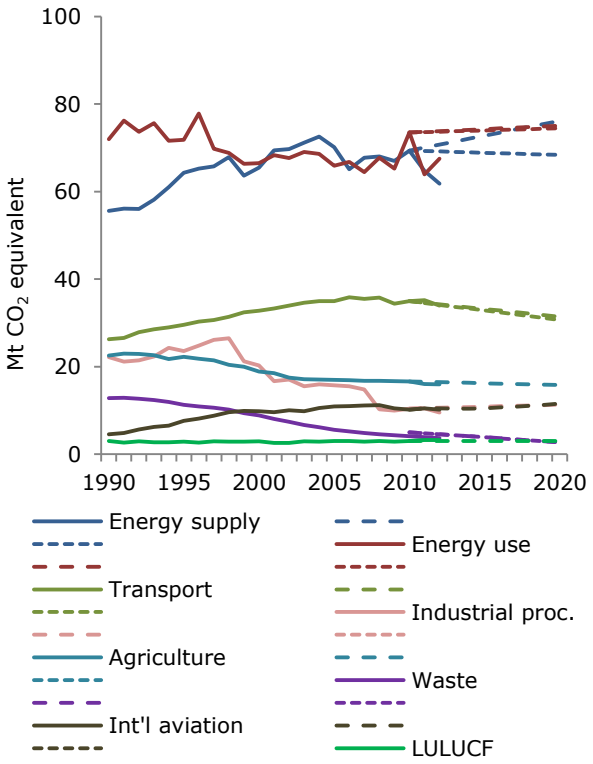
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	116.2
2013 ESD target	121.8
Gap to target (domestic emissions-target)	**– 5.6**
2020 ESD target (with art. 10 adjustment)	104.5
2020 non-ETS projections WEM	105.5
Gap to target WEM	**1.1**
2020 non-ETS projections WAM	101.0
Gap to target WAM	**– 3.5**

The Netherlands is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

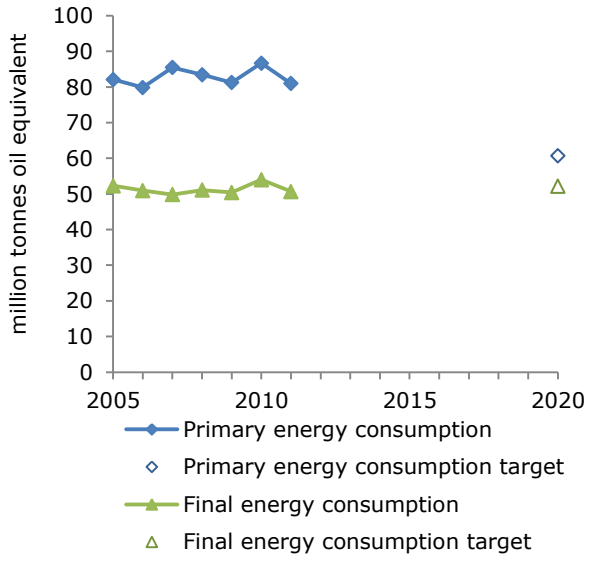


Sectoral GHG trends and projections

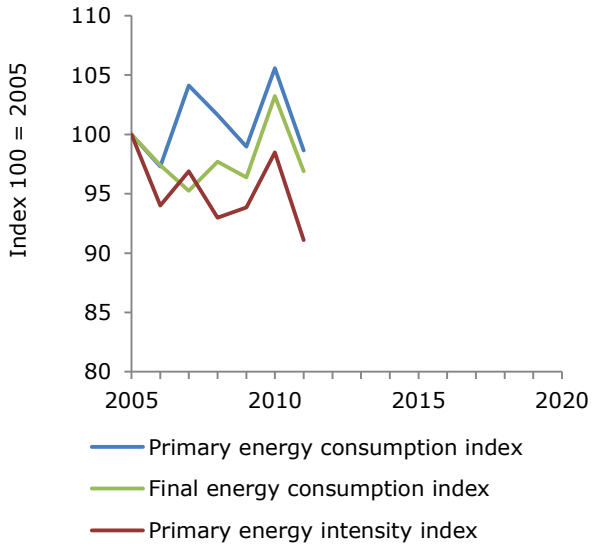


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	82.1	81.3	86.7	81.0	60.7
Final energy consumption (FEC) (Mtoe)	52.3	50.4	54.0	50.7	52.2
The Netherlands is making some progress in reducing energy consumption, but further improvements are necessary in either energy efficiency policy implementation or the policy package development or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	2.1 % (2.1 %)	3.3 % (4.0 %)	3.3 % (3.7 %)	4.3 %	14.0 %
Share of renewable energy in gross FEC — electricity (%)	5.1 %	9.0 %	9.7 %	9.8 %	
Share of renewable energy in gross FEC — heating and cooling (%)	2.0 %	2.9 %	2.7 %	3.3 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.2 % (0.2 %)	0.2 % (0.2 %)	0.2 % (3.6 %)	4.6 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 4.3 % (2 229 ktoe), which is lower than the indicative target for the 2011-to-2012 period (4.7 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (27 %), solid biomass for electricity (23 %) and onshore wind (15 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 12.6 %. In order to reach the 2020 target, an average annual growth rate of 14.2 % is needed for the period 2011 from 2020. This corresponds to 2.8 times the cumulative effort up to 2011.					

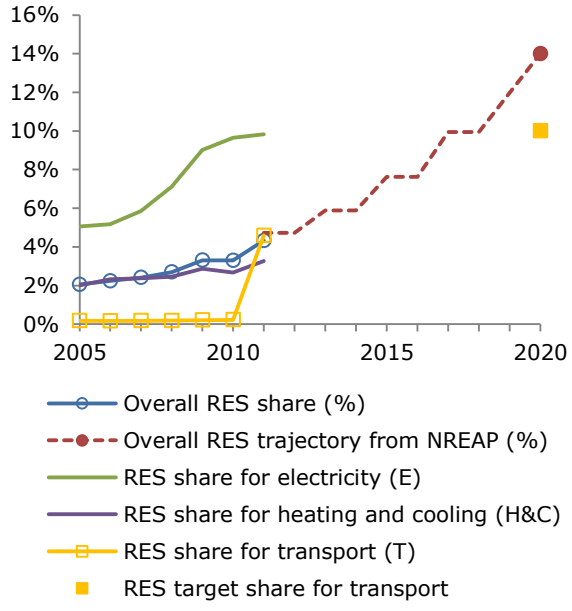
Primary and final energy consumption



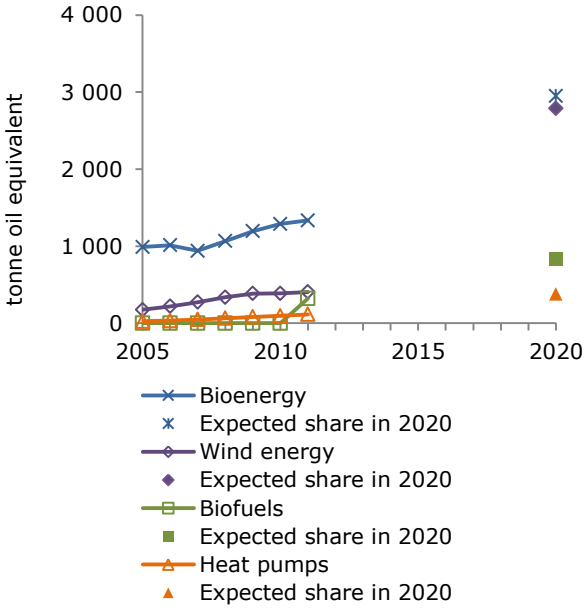
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Dutch Climate and Energy Strategy involves a number of directions to achieve the 2020 goals of a 16 % greenhouse gas (GHG) reduction (compared to 2005) by 2020 and to strive for a low-carbon economy by 2050. The ambitions are outlined in such strategic policy reports as the Sustainability Agenda (Agenda Duurzaamheid). In this agenda, the government advocates green growth through international agreements, smart and efficient regulations and, where needed, improved financial incentives. It focuses on the international climate agenda, the National Roadmap Climate 2050 and the Local Climate Agenda 2011–2014: these concentrate on sustainable buildings, mobility, companies, production and climate neutral cities/regions. Moreover, the Netherlands puts an emphasis on decentralised sustainable energy production, natural gas, increased energy efficiency in the building sector and the promotion of electric vehicles.

In 2013, an energy agreement is to be drafted between the government and various societal groups (including employers, labour and environmental organisations) to further shape sustainable energy development.

Main economic instruments for renewable energy and energy efficiency

The Netherlands uses environmental taxation and a number of subsidies. The Regulatory Energy Tax (REB) was introduced in 1996. The energy tax is levied on electricity and natural gas; it depends on the energy consumption of a customer (the higher the consumption, the lower the energy tax), and on specific agreements between different sectors and the government.

Additionally, the Energy Investment Allowance (EIA) Scheme is a tax relief programme which gives a direct financial advantage to companies that invest in energy-saving equipment and sustainable energy. For 2012, the available budget amounts to EUR 115 million.

At provincial and municipal level, further support schemes exist for energy efficiency (e.g. sustainable buildings) and renewable energy (the Incentive Scheme for Sustainable Energy Production known as SDE+, smart metering, photovoltaic (PV) subsidies and energy investment allowances). To stimulate 'green growth', projects with economic and ecological benefits can be subsidised as 'green deals'.

European Union Emissions Trading System (EU ETS)

The Netherlands has 449 installations falling under the EU ETS. In 2011, they represented a share of 41 % of total GHG emissions in the country.

Energy supply

Energy efficiency

Natural gas holds a privileged position; it supplies 47 % of the country's energy needs. The market share of oil accounts for less than 38 %, and has been increasing over the past decade (from 35 % in 1990). The Netherlands is also testing some small-scale carbon capture and storage (CCS) applications. Combined heat and power (CHP) plants are fostered by lowering investment costs.

Renewables

According to the new energy agreement, the SDE+ regulation will remain the main instrument for stimulating investment in large-scale renewable energy such as wind on land and sea. This financial instrument was introduced in 2008, as the successor of the Environmental Quality of Electricity Production (MEP) incentive scheme. The SDE+ offers long-term financial support (12 to 15 years) for the production of renewable energy (electricity, gas or heat) by covering the unprofitable component of projects. The unprofitable component is determined by including a basic amount in the decision to grant a subsidy. Agreements with banks and investors have been made to improve the profitability of major renewable energy projects. The following technologies (among others) are covered by the scheme: wind energy (on and off shore), solar PV (certain types of applications), waste incineration, biomass fermentation, incineration and thermal conversion, hydropower, geothermal energy and solar thermal energy (>100m^2).

Energy use

Energy efficiency

In the Netherlands, energy efficiency is promoted amongst others through the covenant energy efficiency in the building sector ('More with Less'). This large programme includes the support of housing cooperatives to participate in energy-saving projects, customised advice for building owners to get information on subsidies, costs and savings of their planned projects and several subsidy schemes to increase energy efficiency in homes. The value added tax has been reduced on new building insulations (6 % instead of 19 %).

Since 1995, minimum requirements for new residential and non-residential buildings have been in place; these grown stricter in the last years. Smart metering is being tested in a pilot project.

In the industry, services and agricultural sector, the Long-Term Agreements (LTAs) are negotiated agreements aimed at promoting energy savings. This measure has been superseded by the second-generation Long-Term Agreements (LTA2) that focus on the less energy-intensive companies (<0.5 PJ), medium-sized and small industrial companies and companies in the service and agricultural sector.

The Long-Term Agreement on Energy Efficiency for ETS enterprises (MEE Covenant) is a follow-up of the benchmark covenant. This covenant was signed in 2009 and is also set to run until 2020.

The government's energy-saving programme (MJA) for non-ETS large and medium-sized companies and institutions in industry, agriculture and the service sector covers the period from 2001 to 2020 and is targeted at improving energy efficiency by 30 % between 2005 and 2020. In return, the government agrees not to impose additional specific national measures aimed at energy conservation or CO_2 emission reductions on the companies. Besides this, industrial companies acting under the covenants are largely exempt from energy and carbon taxes.

Renewables

According to the new energy agreement, citizens will be offered financial incentives to generate renewable energy in

cooperatives through tax reductions. The EIA Scheme provides financial incentives in the form of a tax deduction of up to 41.5 % of the investment costs for renewable energy and energy savings. It has been estimated that this tax deduction leads to a reduction of investment costs by 10 %.

Transport

Renewables

Fuel suppliers in the Netherlands are legally obliged to blend transport fuels with a certain share of sustainable biofuels, from 4.25 % in 2011 to 5.5 % in 2014. Biofuels permitted to count towards the target must meet certain sustainability criteria. Contributions made by biofuels produced from wastes, residues, non-food cellulosic material, and ligno-cellulosic material are considered to be twice that made by other biofuels. For imported biofuels, a partial exemption of fuel taxes was introduced in 2006. Tax deductions similar to the EIA Scheme exist for biofuel and hydrogen related investments (MIA/V scheme).

Transport efficiency

To increase the efficiency of cars, a fiscal policy on car efficiency to stimulate the purchase of low-carbon passenger cars is in place.

The Passenger Car and Motorcycle tax is levied on the purchase of new cars. Since 1 July 2006, a new Private Motor Vehicle & Motorcycle Tax regulation (bonus–penalty scheme) has been implemented, aiming at stimulating the purchase of more energy-efficient cars. Each new passenger car can receive a reduction, depending on the car's energy label. Starting in 2010, the scheme has changed: the level of tax depends on the absolute CO_2 emissions per km of a car. From 2012 onwards, the tax only depends on the absolute CO_2 emission per km of a car.

The level of the Motor Vehicle Tax (MVT) is differentiated by the weight of the car. An exemption is provided until 2014 for vehicles with an emissions factor below 110g CO_2/km using petrol and 95 gCO_2/km using diesel. In 2015 only vehicles emitting fewer than 50 g CO_2/km are exempted from the tax.

In the Netherlands, leased cars that employees use for private purposes are considered part of their income. The employee must pay income tax, according to the price including tax. Since 2008, the system has been designed in such a way that car drivers with a leased car are fiscally encouraged to obtain an energy-efficient car.

The EU CO_2 emission standards for cars have also been adopted.

Modal shift and raising awareness

No measures promoting a modal shift are reported, but in general, transport networks for bicycles as well as the public transport system are considered to be well developed.

Industrial processes

Non-CO_2 gases

The Netherlands aims to reduce nitrous oxide (N_2O) gases through the ETS to limit the absolute amount of GHG emissions at the lowest cost. The Netherlands realised an opt-in for nitrous dioxide from industrial processes into the ETS system.

The government has also taken action on emission reductions of non-CO_2 gases in industry, in cooling systems (hydrofluorocarbons (HFCs), perfluorocarbons (PFCs)). HFC emissions shall further be reduced by promoting afterburner systems.

Energy efficiency

Agriculture

Measures include the Covenant Clean & Efficient Agrosectors to curb the emissions of CO_2 as well as non-CO_2 emissions in the various agricultural sectors, emission regulation for gas engines to curb the emission of methane (CH_4) from gas engines, and an Innovation Programme Horticulture (greenhouses as an energy source) to achieve energy-saving. This programme focuses on innovative energy-saving technologies, energy supply and new ways of cultivation practices that contribute towards this end.

The Netherlands is investigating and preparing a system for sectoral GHG emission trading in the horticulture sector.

Waste

A landfill policy is in place to reduce landfill waste and CH_4 emissions from landfill sites.

Land use, land-use change and forestry

No specific strategies or measures have been reported in the LULUCF sector.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
NL-ENS-002 Subsidy incentives application renewables (SDE+) (non-ETS)	18 000
NL-TRA-004 Decision biofuels as renewable energy for transport (non-ETS)	900
NL-ENS-001 Emission Trading System (ETS)	900
NL-RES-002 Covenant energy efficiency in the built environment (More with Less) (non-ETS)	810
NL-ENU-002 Energy investment tax allowance scheme [EIA]. Including Green investment and finance [MIA/Vamil] (both ETS / - non-ETS)	300
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
NL-ENS-004 Demonstration projects CCS (non-ETS)	220
NL-AGR-001 Convenant Clean & efficient Agrosectors (non-ETS)	200
NL-AGR-002 Emission regulation CH_4 emission gas engines [Besluit Emissie-eisen Stookinstallaties (BEMS)] (ETS)	100
NL-AGR-003 Long-term Agreement on Energy Efficiency for non-ETS enterprises [MJA] (non-ETS)	100
NL-WST-001 Energy performance standards (new buildings) (non-ETS)	16
NL-AGR-001 Smart metering [dissemination of smart meters] (non-ETS)	3
Measures with large expected savings specifically in the non-ETS sectors	
NL-IND-002 Subsidy incentives application renewables (SDE+) (non-ETS)	18 000
NL-TRA-004 Decision biofuels as renewable energy for transport (non-ETS)	900
NL-RES-004 Covenant energy efficiency in the built environment (More with Less) (non-ETS)	810
EU policies or measures related to measures expected to deliver the largest savings	
NL-ENS-002 Subsidy incentives application renewables (SDE+) 18000 kt CO_2 (non-ETS): Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
NL-TRA-004 Decision biofuels as renewable energy for transport 900 kt CO_2 (non-ETS): Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
NL-ENS-001 Emission Trading System 900 kt CO_2 (ETS): Cross-cutting: EU ETS Directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	
EU policies or measures expected to result in the largest emission savings	
Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
Transport: Voluntary agreement with car manufacturers to reduce specific CO_2 emissions (ACEA, KAMA, JAMA)	
Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	
Energy supply: Carbon Capture and Storage (CCS) Directive (2009/31/EC)	
Cross-cutting: EU ETS Directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Norway

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	50.4	54.0	54.3	53.4	52.9
GHG per capita (t CO_2 eq./cap.)	11.9	12.1	11.2	10.8	10.6
GHG per GDP (g CO_2 eq./EUR)	330.3	246.2	213.8	207.5	199.4
Share of GHG emissions in total EU-28 emissions (%)	n/a	n/a	n/a	n/a	n/a
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	19.3	19.2	18.6
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	36 %	36 %	35 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	+34.9 %	+30.4 %	+2.1 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	17.4 %	11.8 %	14.3 %

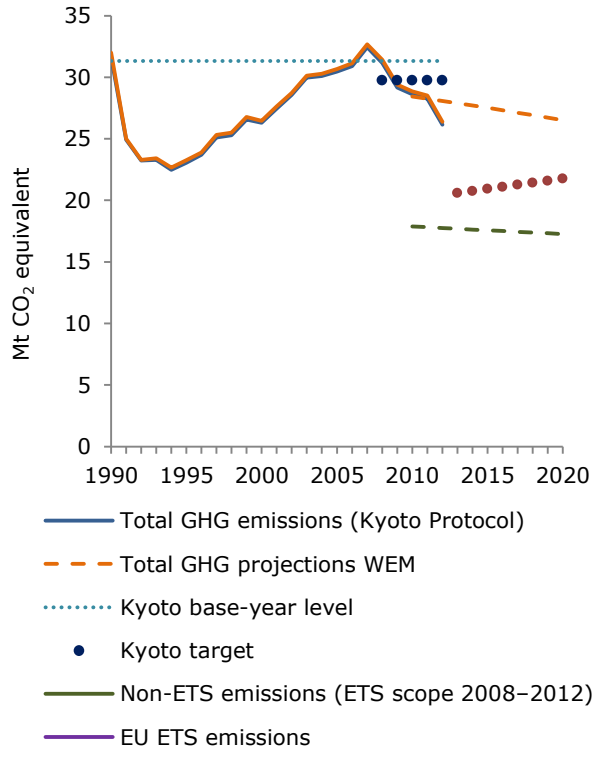
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	34.2
2008–2012 average non-ETS target	35.0
Gap to target (domestic emissions-target)	**– 0.8**
Expected effect of carbon sinks	0.5
Planned use of flexible mechanisms	4.2
Issued emission reduction units	0.0
Overall gap to target	**– 4.5**

Norway is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 9 % of base-year emissions per year.

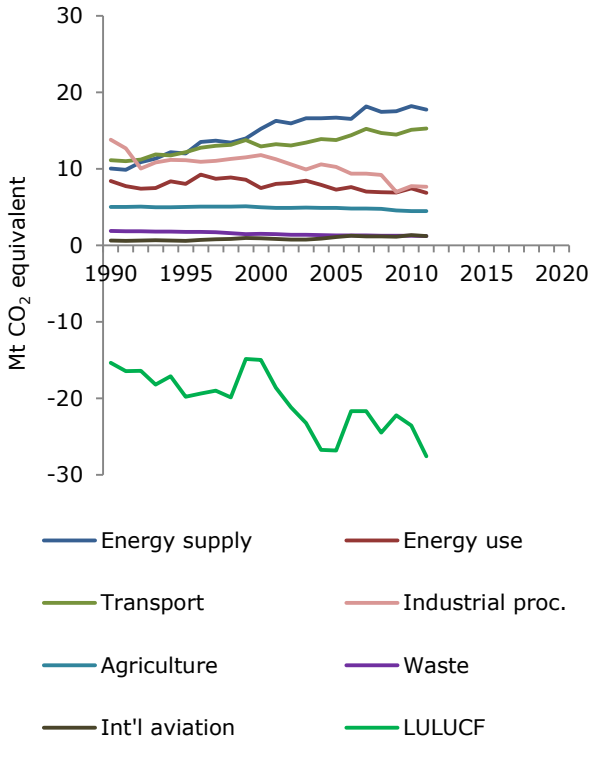
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	n/a
2013 ESD target	n/a
Gap to target (domestic emissions-target)	**n/a**
2020 ESD target (with art. 10 adjustment)	n/a
2020 non-ETS projections WEM	n/a
Gap to target WEM	**n/a**
2020 non-ETS projections WAM	**n/a**
Gap to target WAM	**n/a**

Norway is not a member of the EU, and as such, does not have any targets under the ESD.

GHG trends and projections



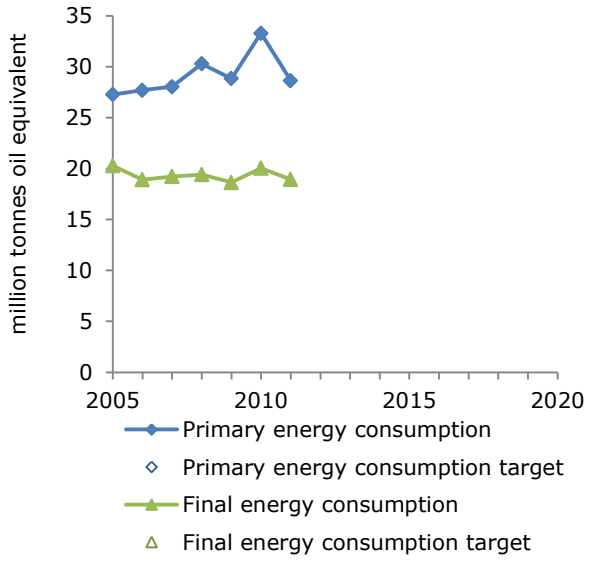
Sectoral GHG trends and projections



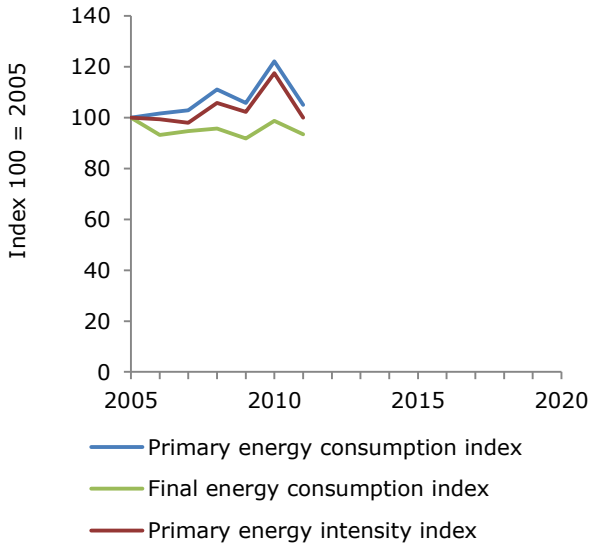
Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	27.3	28.9	33.3	28.6	n/a
Final energy consumption (FEC) (Mtoe)	20.3	18.6	20.0	19.0	n/a
Norway has not defined any absolute targets on primary or final energy consumption.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	60.2 % (60.2 %)	64.7 % (65.2 %)	61.4 % (61.4 %)	65.0 %	67.5 %
Share of renewable energy in gross FEC — electricity (%)	97.0 %	104.8 %	97.9 %	104.8 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	33.3 %	37.5 %	37.4 %	38.6 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	1.3 % (1.3 %)	1.3 % (3.6 %)	4.0 % (4.0 %)	4.2 %	n/a

In 2011, the share of renewable sources in gross final energy consumption was 65.0 % (13 029 ktoe), which is higher than the indicative target for the 2011-to-2012 period (60.1 %). The three main technologies contributing to renewable energy use in 2011 were hydropower (85 %), solid biomass for heat (10 %) and renewable energy from heat pumps (4 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 1.4 %.

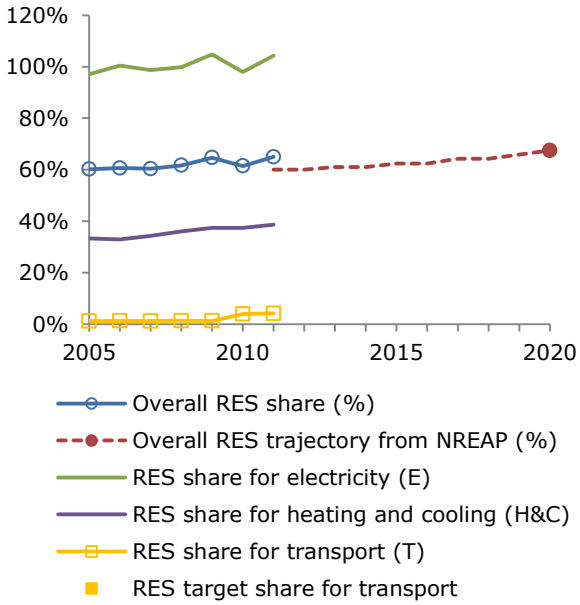
Primary and final energy consumption



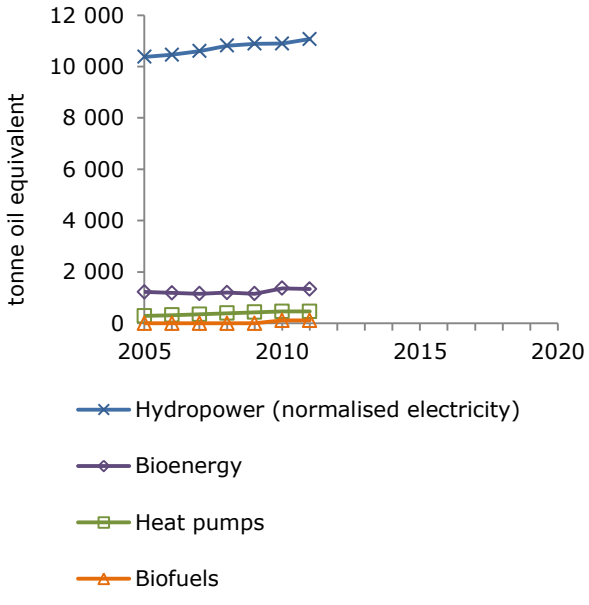
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

Norway has made a political pledge to achieve carbon neutrality, undertaking to reduce global greenhouse gas emissions by the equivalent of 100 % of its own emissions by 2050 at the latest. If an ambitious global climate agreement is achieved in which other developed countries also take on extensive obligations, Norway will undertake to achieve carbon neutrality by 2030 at the latest. In 2012, The Government presented a new white paper on climate change and entered into a new broad, political Climate Agreement. I.e. the CO2 tax for the petroleum sector on the Norwegian Continental Shelf was raised by NOK 200 per tonne from 1 January 2013. (This corresponds to an emissions charge of roughly NOK 410 per tonne of CO_2), and it was also decided to establish a new fund for climate change mitigation, renewable energy and energy conversion on the basis of the Basic Fund for Renewable Energy and Energy Efficiency.

Main economic instruments for renewable energy and energy efficiency

Norway installed two CO_2 taxes. The first applies to mineral products (for instance mineral oil, petrol, auto diesel and natural gas). The second tax applies to emissions from the petroleum industry. The tax is paid per litre of oil and natural gas liquids, and per standard cubic metre of gas burnt off or emitted directly to air on platforms, installations or facilities. Via electricity taxes, the Norwegian government provides incentives for energy efficiency. On 1 January 2012, a Norwegian-Swedish electricity certificate market was established. Under the scheme Norway and Sweden have a combined goal of establishing 26.4 terawatt hours (TWh) of new electricity production based on renewable energy by 2020. The electricity certificate system is a technology-neutral support system.

Another important policy instrument to promote energy efficiency, the promotion of renewable energy and the development of energy and climate technologies is the availability of investment aid through the public enterprise Enova. Enova is owned by the Ministry of Petroleum and Energy and its activities are financed by resources in a dedicated fund, 'the Energy Fund'. Enova's management of the assets in the fund shall contribute to increased use of other energy carriers than electricity, natural gas and oil for heating. Enova's areas of priority are the promotion of:

- **Renewable Heat production** (District heating , small-scale heating plants and larger district heating plants in buildings and in the industry, the conversion from the use of fossil fuels to the use of renewable energy sources in the industry).
- **Energy Savings** (Energy efficiency and energy recovery in the industry, energy efficiency in buildings, energy efficiency and environmentally friendly heating solutions in households).
- **New Technologies** (Demonstration activities of new energy and climate technologies in order to contribute to early market introduction, including the promotion of technological advances in the industry that has the potential to reduce greenhouse gas emissions).

The funds managed by Enova shall, in the period leading up to 2015, contribute to combined energy and climate results corresponding to minimum 6 $^1/_4$ TWh. Furthermore, it is stipulated that for the work related to energy and climate technology, the efforts shall contribute to a reduction in greenhouse gas emissions and support the development of energy diversification in the long run, through the development and market introduction of new technologies and new solutions which can contribute to this. Enova's efforts shall be directed towards the development of new technology and support for technologies and solutions close to market introduction.

European Union Emissions Trading System (EU ETS)

Norway has 121 installations under the EU ETS. In 2011, they represented 36 % of total GHG emissions in the country.

Energy supply

Energy efficiency

With Enova, the Norwegian government has a support scheme for district heating.

Renewables

As part of the European Economic Area, Norway adopted the Renewable Energy Directive (2009/28/EC). The target for Norway is set to 67.5 % of renewable energy in 2020. Under the Norwegian-Swedish electricity certificate market electricity producers receive one certificate for each MWh of renewable electricity produced. Demand for certificates is created by the statutory duty of electricity suppliers and certain end-users to purchase electricity certificates equivalent to a particular proportion of their electricity sales or electricity use.

Furthermore, the Norwegian Government has a support scheme in place, through Enova, which promotes renewable energy. In the 2008 Climate Policy Agreement, Norway set a national target of achieving an increased use of bioenergy of 14 TWh by 2020. The Bioenergy Strategy, that was elaborated to meet this target, has the primary aim to increase the use of bioenergy for heating, followed by a balanced increase in the supply of wood- and forest-based fuels.

Energy use

Energy efficiency

Through Enova, the Norwegian Government has a support scheme in place aimed at reducing the energy use. Emissions from industry are partly covered by the emission trading scheme. In addition, the government has concluded a number of agreements concerning the reduction of GHG emissions in specific sectors of industry not covered by the ETS.

In the Planning and Building Act and the Technical Building Regulations (TEK), the Norwegian government imposes stringent requirements concerning the energy performance of new buildings and buildings undergoing significant reconstructions.

Renewables

Through Enova, the Norwegian Government has a support scheme in place aimed at promoting renewable energy use. The Planning and Building Act and the Technical Building Regulations (TEK) also includes requirements

concerning use of renewable energy sources in large buildings.

Transport

Renewables

To increase the use of biofuels, there is a mandatory biofuels turnover in Norway, set at 3.5 %. Sustainability criteria for biofuels will be introduced.

In addition, the Norwegian government is working on a strategy for increased research and development on second-generation biofuels. Currently biodiesel is also exempted from the fuel tax on auto diesel.

Transport efficiency

Norway aims to provide the necessary infrastructure for vehicles that can use renewable energy (electric vehicles, hydrogen vehicles and flexifuel vehicles on biofuels). In 2009, the government established a subsidy programme, called Transnova, to subsidise demonstration projects and the market introduction of climate-friendly transport technologies. Norway provides tax incentives for zero-emission vehicles. Electrical and hydrogen cars are exempted from registration tax and value added tax and benefit from reductions in annual tax. The Norwegian purchase tax for new cars is further differentiated by CO_2 emissions. Norway also has a CO_2 tax and fuel taxes. These taxes encourage ecodriving and use of more energy-efficient transport modes.

Modal shift and raising awareness

In the recent National Transport Plan 2014–2023, Norway set outs to increase the public transport infrastructure. Significant amounts of funding will be directed towards rail transport, and there will be a shift of individual transport in urban areas to public transport services.

Industrial processes

Non-CO_2 gases

Norway installed a tax on hydrofluorocarbon (HFC) and perfluorocarbon (PFC) imports, introduced explicitly as a climate mitigation measure. After installation, a reimbursement system was introduced to the tax, offering companies the same refund as the tax for the quantities of HFC or PFC they destroyed.

Energy efficiency

No specific strategies or measures have been reported in the industrial processes sector.

Agriculture

The Norwegian Ministry of Agriculture and Food presented the White Paper Agriculture and Climate Change in 2009. The agricultural sector is making efforts to improve the use of fertilising schemes based on analyses of soil, harvest crop residues and more efficient use of manure. Furthermore, the Norwegian government wishes to increase ecological farming. Biogas production based on manure is a high political priority but is still in an initial phase.

Waste

The most important Norwegian measures to reduce GHG emissions in the waste sector are the regulations under the Pollution Control Act. These includes prohibition of depositing biodegradable waste, requirements to extract methane from landfills and the requirement to utilise the energy from incineration. The latter is included in the concessions of the plants under the condition that at least 50 % of the energy from the incineration should be utilised. In 1999, a tax on the final treatment of waste was introduced, accompanied by an extended producer responsibility for specific waste fractions. It comprises a tax on the final disposal of waste, with tax rebates for energy utilisation.

Land use, land-use change and forestry

The White Paper *Agriculture and Climate Change* (2009) aims at maintaining a high level of wood production in order to further increase carbon sequestration in forests, by facilitating planting, plant breeding, fertilisation and forest management so as to increase forest production. As a densely forested country, Norway has several regulations in place concerning forestry planning and sustainable forest management.

Key policies and measures

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
n/a	n/a
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
n/a	n/a
Measures with large expected savings specifically in the non-ETS sectors	
n/a	n/a

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Poland

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	457.0	385.4	401.7	399.4	377.1
GHG per capita (t CO_2 eq./cap.)	12.0	10.1	10.5	10.4	9.8
GHG per GDP (g CO_2 eq./EUR)	3 154.5	1 835.3	1 305.4	1 241.9	1 151.1
Share of GHG emissions in total EU-28 emissions (%)	8.2 %	7.6 %	8.5 %	8.7 %	8.3 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	199.7	203.0	196.6
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	50 %	51 %	52 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 2.9 %	– 2.0 %	– 7.7 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	7.9 %	12.2 %	20.3 %

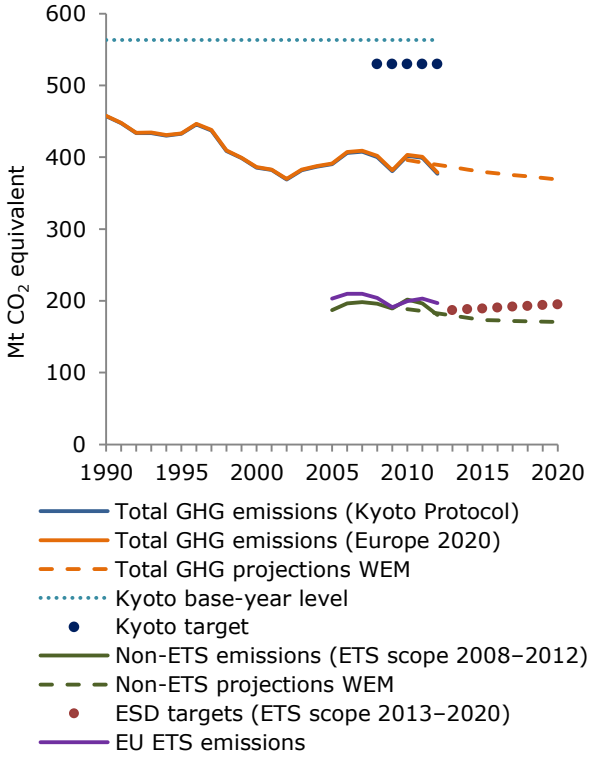
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	192.9
2008–2012 average non-ETS target	323.9
Gap to target (domestic emissions-target)	**– 131.0**
Expected effect of carbon sinks	– 8.4
Planned use of flexible mechanisms	0.0
Issued emission reduction units	– 2.7
Overall gap to target	**– 136.7**

Poland is on track towards its Kyoto target. Its government does not plan on using the Kyoto flexible mechanisms to achieve its target.

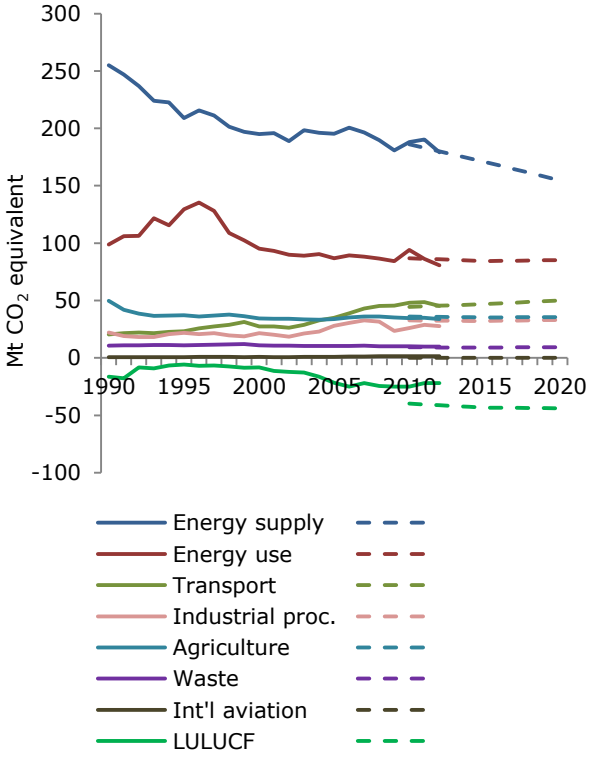
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	180.4
2013 ESD target	198.0
Gap to target (domestic emissions-target)	**– 17.6**
2020 ESD target (with art. 10 adjustment)	195.0
2020 non-ETS projections WEM	170.5
Gap to target WEM	**– 24.5**
2020 non-ETS projections WAM	n/a
Gap to target WAM	**n/a**

Poland is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

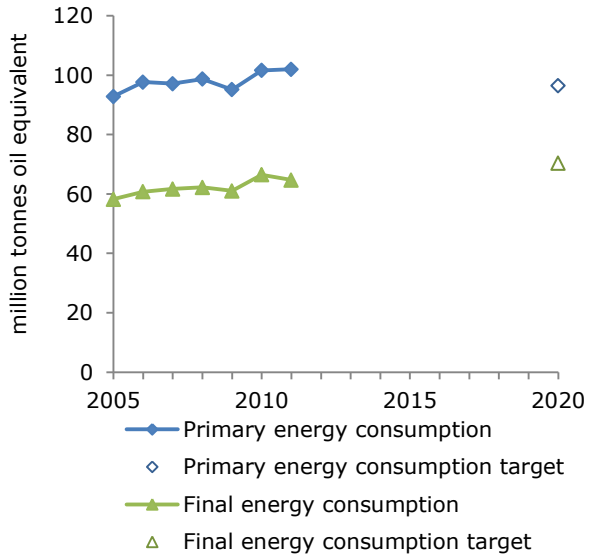


Sectoral GHG trends and projections

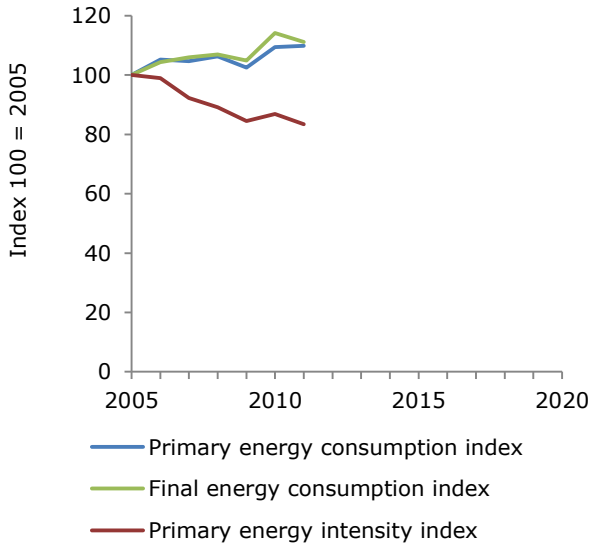


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	92.8	95.1	101.6	102.0	96.4
Final energy consumption (FEC) (Mtoe)	58.2	61.0	66.5	64.7	70.4
Poland is making some progress in reducing energy consumption, but further improvements are necessary, in either energy efficiency policy implementation, the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	6.9 % (7.0 %)	7.8 % (8.8 %)	9.3 % (9.3 %)	10.4 %	15.0 %
Share of renewable energy in gross FEC — electricity (%)	2.8 %	5.9 %	6.7 %	8.2 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	10.4 %	11.9 %	11.9 %	13.3 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.5 % (1.0 %)	0.3 % (5.0 %)	6.3 % (6.3 %)	6.5 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 10.4 % (6 949 ktoe), which is higher than the indicative target for the 2011-to-2012 period (8.8 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (69 %), solid biomass for electricity (9 %) and biodiesels (8 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 8.7 %. In order to reach the 2020 target, an average annual growth rate of 4.9 % is needed for the period from 2011 to 2020. This corresponds to 0.9 times the cumulative effort up to 2011.					

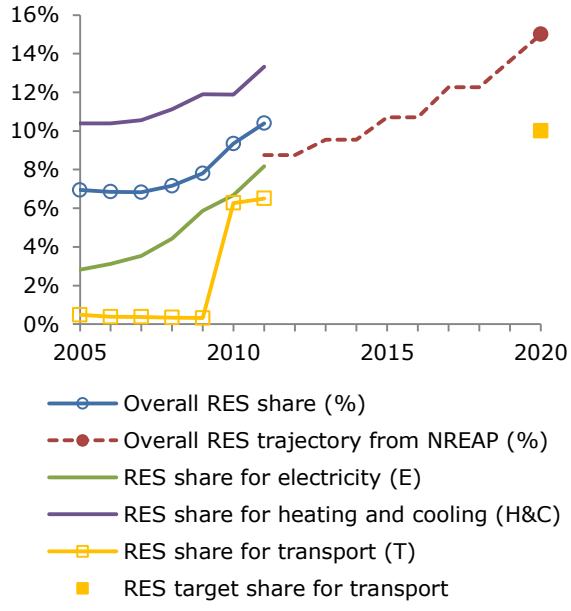
Primary and final energy consumption



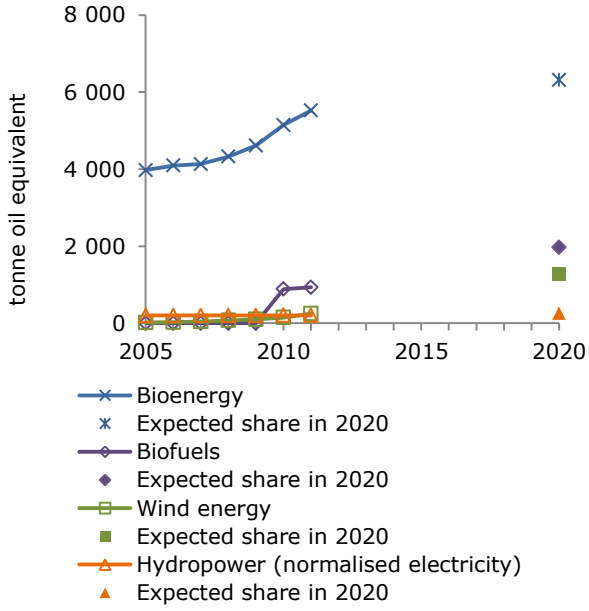
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

Poland's climate policy, Strategies for Greenhouse Gas Emission Reductions in Poland until 2020, formulates the national climate policy and sets out basic objectives, priorities and tasks for the economic sectors.
It's worth noting that Poland has no comprehensive monitoring of the implementation of policies and measures. The monitoring covers only the measures which are financed using public resources or those of the EU.

Main economic instruments for renewable energy and energy efficiency

There is an Eco-Fund for the modernisation of energy and renewable energy sources and grants from EU funds under the Integrated Operational Programme Regional Development. Since the late 1990s, tax credits have been established for liquefied petroleum gas (LPG) and biocomponents for motor fuels (dehydrated alcohols, ethers and esters). The Energy Act introduces green certificates to support the use of renewable energy sources (RES).

European Union Emissions Trading System (EU ETS)

In 2011 in Poland, 812 stationary installations were included in the ETS. The share of ETS emissions amounted to 51 % of the total emissions.

Energy supply

Energy efficiency

The Act of 10 April 1997 on Energy Law introduces provisions that define the principles of energy management and the saving of resources, and support the development of the use of RES. In this context, green certificates play an important role. It is important to note the requirement to prepare consistent development plans for enterprises and communities, which must contain, for instance, projects to use RES. The Combined Heat and Power (CHP) Directive (2004/8/EC), transposed into national law, promotes the use of CHP through 'red certificates'. The certificates are issued for the energy supply companies who produce electricity from cogeneration.

Renewables

There are also financial mechanisms in place to support the production of energy from renewable sources; energy companies selling electricity to final consumers are required to obtain a certain number of certificates of origin for electricity produced from RES, i.e. 'green certificates', or to pay replacement fees.

Energy use

Energy efficiency

The Energy Efficiency Act sets a national target for efficient energy management in order to achieve final energy savings by 2016 of 9 % of the national average consumption of energy, based on averaging covering the period from 2001 to 2005.
One of the basic mechanisms of the act is the introduction of so-called energy efficiency certificates. These 'white certificates' confirm that action has been taken in specific energy savings. The white certificate system supports pro-efficiency projects, particularly the modernisation of district heating networks and heat sources, buildings, lighting and appliances intended for domestic use and for use in industrial processes.
Through the amendment of the Construction Law (2009), an energy rating system of buildings was introduced, including the obligation to provide energy performance certificates of buildings. There have been improvements in the energy standards in the construction sector, aiming at boosting energy efficiency and rational energy use by limiting consumption, promoting the use of RES and reducing the demand for non-renewable primary energy for new buildings and those undergoing renovations. Technical building regulations concerning the thermal insulation of buildings were extended and modified (with regard to heat transfer, heating efficiency, ventilation, air-conditioning systems and the preparation of hot water). There are financial support measures for thermo modernisation projects in the form of repayment of part of the loan taken for the project. Support in the same form is also provided for renovation projects carried out in multifamily residential buildings occupied before 1961. After thermal modernisation, energy demand falls on average by 50 %. There is continuation of measures to raise the awareness of building managers and owners.

Renewables

No specific measures reported.

Transport

Renewables

Poland has introduced several measures in relation to biofuels: tax relief for LPG and biocomponents for motor fuels; the adoption of mechanisms to support the construction of installations for generating biocomponents and biofuels; and new mechanisms to promote the use of these fuels.

Transport efficiency

Differentiated fee rates were introduced, dependent on exhaust emission levels to promote the use of 'cleaner' vehicles, promoting the use of vehicles with lower pollutant emissions and/or lower fuel consumption. This is supported by a system of information for consumers on the fuel consumption and CO_2 emissions in the marketing of new passenger cars. The control of exhaust emissions is also a mandatory element of technical vehicle checks, and local councils have adapted their road tax rates, taking into account vehicles' environmental impacts or year of production.
A number of measures are being introduced in the rail transport sector, such as modernisation of non-traction energy equipment and its replacement by energy-saving installations, modernisation of the rolling stock, rail infrastructure and railway buildings. New rail vehicles are characterised by lower energy consumption, and there is focus on electrification for new systems.
Measures to limit exhaust emissions from buses have included the purchase of hybrid buses with energy savings of 30 %, and the use of biofuels, CNG and LPG, and purchase of rolling stock with better emission parameters than currently required by current EURO standards.

The 'Action Plan of the Assumptions of the Marine Policy of the Republic of Poland until 2020' aims to limit greenhouse gas (GHG) emission from marine transport. From the Fund for Inland Navigation, aid for inland waterway ship-owners is granted for the replacement of engines in ships, for low-emission and energy-efficient engines.

Modal shift and raising awareness

No measures reported.

Industrial processes

Non-CO_2 gases

The Polish government has introduced a policy for the reduction of F-gases, which are commonly used in applications such as refrigerants in refrigeration, air conditioning and heat pumps, as blowing agents for the production of foams, as fire-fighting agents in fire protection systems and fire extinguishers, and as solvents. Regulations were also introduced to reduce methane emissions from fuel production and distribution.

Energy efficiency

Energy efficiency measures have been introduced for industry: implementation of best available techniques (BATs) (integrated permits are granted to installations and plants which implement BATs and/or best environmental practices (BEPs)); support for the development of environmentally friendly and technically viable methods for the reduction of GHG emissions; enhancing energy efficiency and the development of the use of RES. Further measures target energy-saving, fuel diversification, defining research and development priorities that are focused on modern environmentally friendly, material- and energy-saving production technologies and ensuring their financing; and technological modernisation at industrial plants.

Agriculture

Measures under the Rural Development Programme for 2007 to 2013 to support investment, such as the construction of tanks for liquid manure and slurry and manure, will require purchasing of new machinery and equipment, which leads in many cases to energy savings and carbon emissions reductions at farm level. The 'Directions of development of agricultural biogas plants in Poland in 2010–2020', approved by the Council of Ministers on 13 July 2010, assumes that every Polish town until 2020 will create on average one biogas plant that uses biomass of agricultural origin, on the assumption that the municipality has the right conditions to launch such a project.

The main purpose of the document is to optimise the legal and administrative system in the establishment of biogas plants in Poland, and there is therefore a possibility of co-financing this type of installation through national and regional operational programmes, both nationally and by the European Union. It is expected that biogas plants will be established in rural areas and those with significant biomass resources, and as such, this is a harmonisation of national government and the priorities of the EU Common Agricultural Policy.

Waste

The National Waste Management Plan 2014 adopted measures to achieve integrated waste management in Poland in a way that protects the environment, taking into account current and future opportunities, economic conditions and the technological level of existing infrastructure. The plan's objectives and tasks cover the period from 2011 to 2014, and the prospective period of 2015 to 2022. The National Act of 20 January 2005 on the recycling of end-of-life vehicles regulates the handling of such vehicles in a manner that protects human health and the environment in accordance with the principle of sustainable development; the National Act of 29 July 2005 on waste electrical and electronic equipment creates a system of management to reduce the amount of waste and negative impacts on the environment by introducing an obligation in their separate collection and recovery, including recycling. Furthermore, the National Act of 24 April 2009 sets out the requirements for product launches in the form of batteries and accumulators, waste generated from these products.

The National Act of 10 July 2008 on mining waste specified the rules for the management of extractive waste and unpolluted soil, the principles of extractive waste facility, procedures for obtaining permits and licenses relating to mining waste management and for the prevention of major accidents in the mining waste facilities in Category A. Poland also participates in the Global Methane Initiative, which focuses on economically viable methods enabling methane to be recovered and used as a clean energy source. The measures are cross-sectoral, covering waste landfills (landfill gas), the hard coal mining sector, agriculture and crude oil and gas systems.

Land use, land-use change and forestry

The Act on Forests (1991) sets out the principles for preservation, protection and enhancement of forest resources and forest management. Forest management includes afforestation of non-forest areas, reforestation, the increase of standing stocks and timber harvesting at ~50 % to 60 % of the annual biomass growth. The national programme to increase forest cover adopted by the Council of Ministers in 1995 and updated in 2003 sets goals to increase forest cover to 30 % by 2020 and 33 % after 2050, specifies the quantitative transfer of land from agriculture to forestry and presents a comprehensive action plan to rationalise the structure of the natural use of the country. New afforestation is an element of multifunctional and sustainable development in Poland. In 2007, three research projects were launched: 'The balance of carbon in the biomass of the main commercial species of trees in Polish forests', 'Climate change and forest ecosystems: the absorption of CO_2 and changes in forest structure and functions' and 'Estimation of net carbon flows exchanged between the forest ecosystem and the atmosphere'.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
n/a	n/a
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
n/a	n/a
Measures with large expected savings specifically in the non-ETS sectors	
n/a	n/a
EU policies or measures related to measures expected to deliver the largest savings	
n/a	
EU policies or measures expected to result in the largest emission savings	
n/a	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Portugal

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	61.0	84.3	71.4	70.0	69.8
GHG per capita (t CO_2 eq./cap.)	6.1	8.3	6.7	6.6	6.6
GHG per GDP (g CO_2 eq./EUR)	557.1	569.5	450.2	448.4	462.0
Share of GHG emissions in total EU-28 emissions (%)	1.1 %	1.7 %	1.5 %	1.5 %	1.5 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	24.2	25.0	25.2
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	34 %	36 %	36 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 25.6 %	– 24.4 %	– 23.6 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	6.6 %	12.0 %	26.1 %

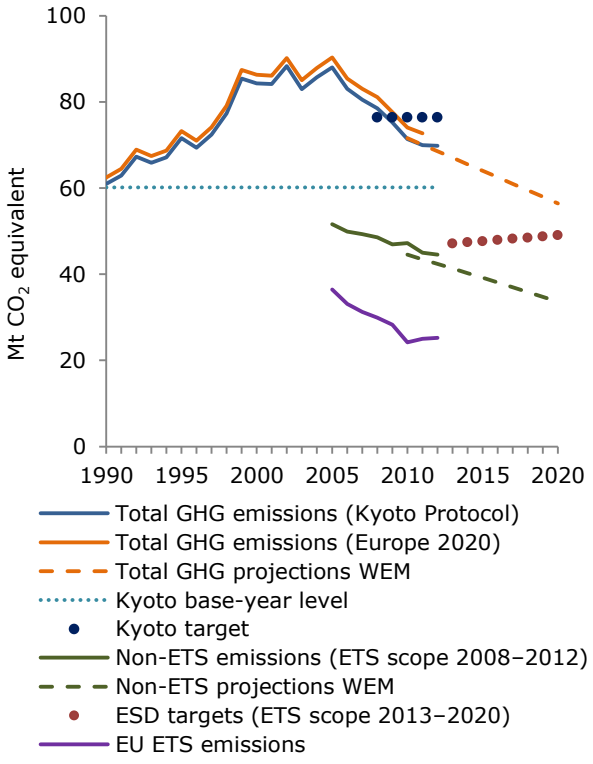
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	46.5
2008–2012 average non-ETS target	44.4
Gap to target (domestic emissions-target)	**2.1**
Expected effect of carbon sinks	– 9.8
Planned use of flexible mechanisms	1.6
Issued emission reduction units	0.0
Overall gap to target	**– 9.4**

Portugal is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 3 % of base-year emissions per year.

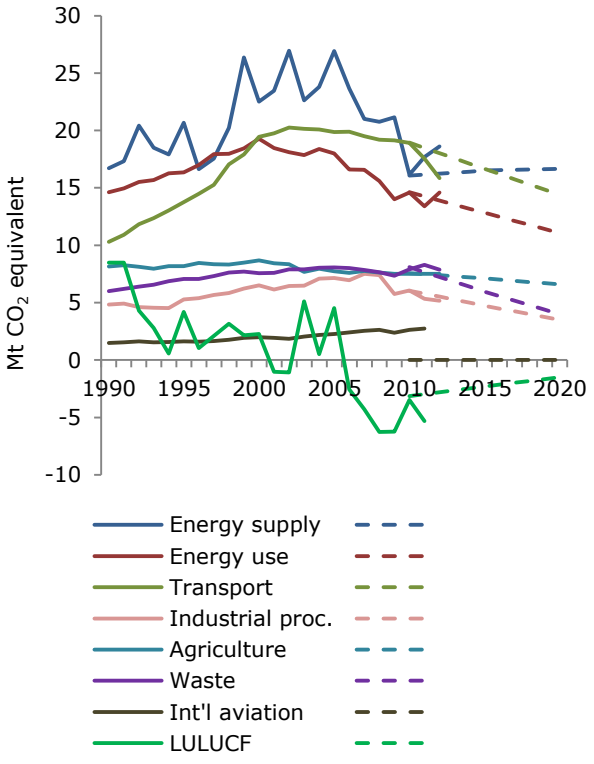
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	44.2
2013 ESD target	47.7
Gap to target (domestic emissions-target)	**– 3.4**
2020 ESD target (with art. 10 adjustment)	49.0
2020 non-ETS projections WEM	33.6
Gap to target WEM	**– 15.4**
2020 non-ETS projections WAM	n/a
Gap to target WAM	**n/a**

Portugal is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

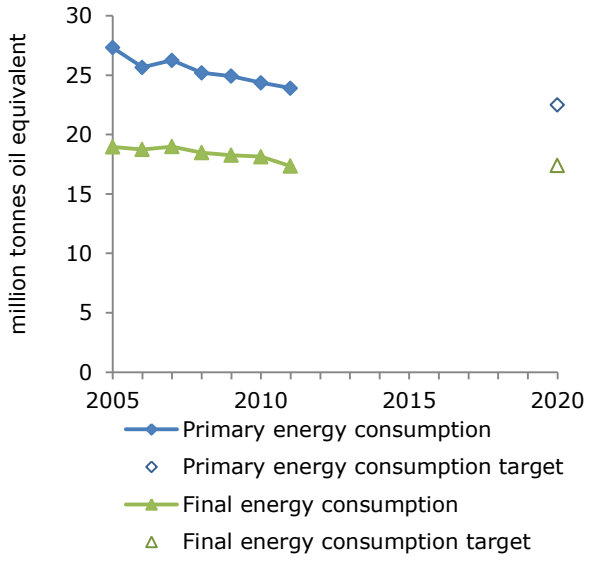


Sectoral GHG trends and projections

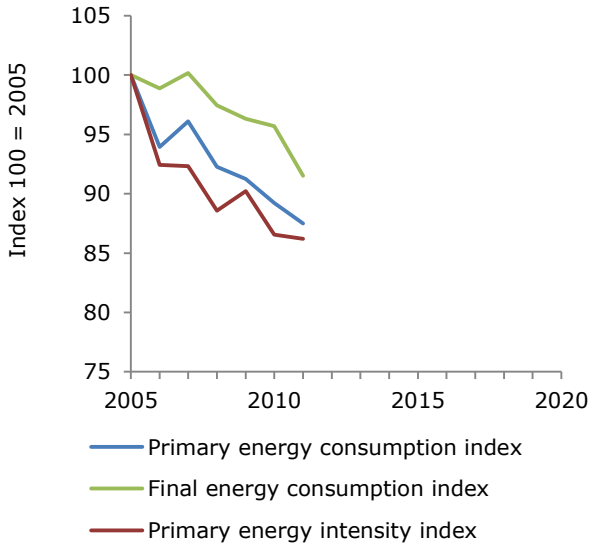


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	27.3	24.9	24.4	23.9	22.5
Final energy consumption (FEC) (Mtoe)	19.0	18.3	18.1	17.4	17.4
Portugal is making some progress in reducing energy consumption, but further improvements are necessary in either energy efficiency policy implementation or the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	19.8 % (19.8 %)	23.4 % (24.6 %)	22.7 % (24.4 %)	24.9 %	31.0 %
Share of renewable energy in gross FEC — electricity (%)	28.9 %	38.2 %	41.2 %	46.5 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	31.9 %	37.8 %	33.9 %	35.5 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.2 % (0.2 %)	0.2 % (3.8 %)	0.4 % (5.4 %)	0.4 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 24.9 % (4 418 ktoe), which is higher than the indicative target for the 2011-to-2012 period (22.6 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (49 %), hydropower (24 %) and onshore wind (18 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 2.3 %. In order to reach the 2020 target, an average annual growth rate of 3.5 % is needed for the period from 2011 to 2020. This corresponds to 0.5 times the cumulative effort up to 2011.					

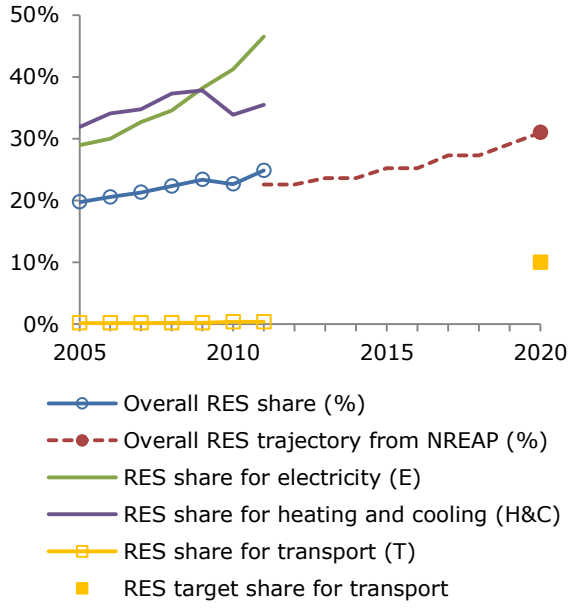
Primary and final energy consumption



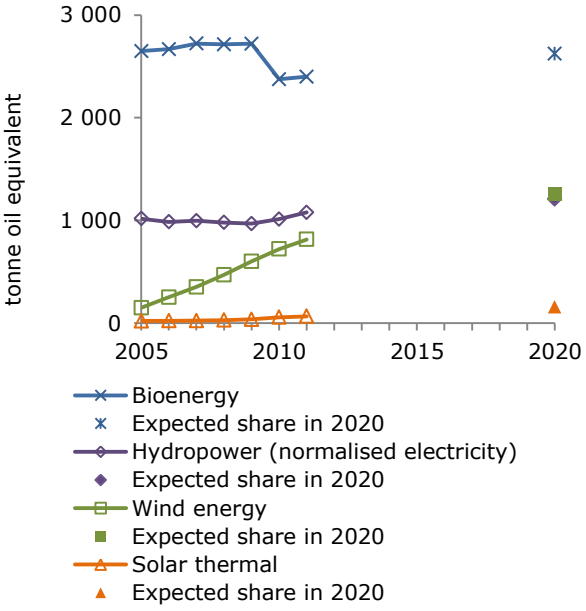
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

There are three important policy instruments for the post-2012 climate regime in Portugal: the National Low Carbon Roadmap (RNBC), the National Climate Change Programme (PNAC 2020) for the 2013–2020 period and the Sectoral Low Carbon Plans (PSBC). In addition, the new National Energy Strategy for 2020 (ENE 2020) reinforces the previous strategy's core objectives to increase electricity from renewable energy sources (RES), improve energy efficiency, enable reduction of imports and increase security of supply, and reduce environmental impact and CO_2 emissions. These policy instruments set out Portugal's national policy targets.

As an EU Member State, Portugal shares the EU goal of a reducing emissions by at least 20 % in the Community, compared to 1990 levels. To help meet these targets, Portugal's Pacote Energia Clima has outlined goals to have 31 % of final energy consumption coming from renewable sources in final energy consumption (10 % of which will be in transport). Internally, Portugal also plans to reduce energy consumption by of 25 % (30 % for the state) and increase energy efficiency by 20 %.

Main economic instruments for renewable energy and energy efficiency

Portugal is using economic instruments and tax policies to promote renewable energy and energy efficiency in a number of different sectors. For example, in 2010 Portugal used economic policy to promote the construction of over 1 million m² of solar panels, as well as increasing the share of electricity generation from cogeneration by 18 % — although it is not specified precisely what economic instruments were used. Portugal has also increased taxes on industrial fuels and is harmonising taxes on diesel for heating and transport by 2014, in an effort to reduce greenhouse gas (GHG) emissions.

European Union Emissions Trading System (EU ETS)

In 2011 in Portugal, 286 stationary installations were included in the ETS. The share of ETS emissions amounted to 36 % of the total emissions.

Energy supply

Energy efficiency

The government policy MAe1 aims to improve energy efficiency in the electricity generation sector. By 2010, the policy aimed for a reduction of the rate of loss in the energy transport and distribution network to 8.6 %.

The MAe2 policy, 'Energy efficiency improvement in the energy supply systems, considering electricity generation from cogeneration' increased electricity generated from cogeneration systems, up to a share of 18 % of the gross national consumption of in 2010.

Renewables

Portugal's MA2007e3 policy on biomass combustions aims to have a 5 % to 10 % substitution for coal in the Sines and Pego thermic power plants, with biomass- or waste-derived fuel, resulting in a reduction of between 380 kt $_{CO2}$ and 761 kt CO_2 by 2015.

The MAe4 'Promotion of electricity produced from renewable energy sources' policy aims to improve the capacity of wind farms in Portugal to 5 100 MW and to reduce GHGs by 185 kt CO_2 in 2015.

Energy use

Energy efficiency

A total of 40 % increase in the energy efficiency of buildings is expected through the adoption of new regulation(s) on acclimatisation and thermal behaviour of buildings, in substitution of present regulations. By 2020, the annual GHG emission savings are expected to be between 331 kt and 500 kt CO_2 eq./year.

Tax harmonisation between diesel fuel for heating and for transport by 2014 is expected to achieve GHG reductions of between 323 kt and 330 kt CO_2 eq. per year by 2020 for the services sector and between 53 kt and 54 kt CO_2 eq. per year for the residential sector.

The Regulation on the Management of Energy Consumption promotes energy efficiency in the industrial sector through voluntary agreements, and is expected to have delivered 32 kt CO_2 eq./year in 2010. Future estimates suggest it will become more influential, delivering savings of between 54 kt and 60 kt CO_2 eq./year by 2020.

An increase in the fuel tax (ISP) on industrial fuels aims to create an incentive structure for GHG emissions reduction. By 2020, this is expected to deliver annual GHG emission savings of between 93 kt and 102 kt CO_2 eq./year.

Renewables

A key measure for increasing renewable heat is the 'Solar Hot Water for Portugal Programme', which promotes the use of solar energy for domestic water heating. The initial target was 1 million m^2 of solar panels installed by 2010 (around 150 000 m^2 per year). An installation rate of 100 000 m²/year is considered for the following years (2007–2020). By 2020, annual savings from this measure are expected to be in the range of 312 kt to 322 kt CO_2 eq./year.

Transport

Renewables

The Biofuels Directive (MRt10) promotes the reduction in the consumption of fuels responsible for the emission of GHGs through the promotion of the use of biofuels in the transport subsector (2 % by 2005; 5.75 % by 2010). In 2010, annual GHG savings were estimated to be 1 149 kt CO_2 eq./year. This policy was subsequently updated to increase the biofuel composition from 5.75 % to 10 %, which will lead to savings of a further 1 047 kT CO_2/year by 2020. It also provides for the mandatory incorporation of biofuel for substitute gasoline of 2.5 % (minimum % in energy content) for the period 2015–2020. A new model for supporting biofuels development will be in force between 2011 and 2020, seeking the promotion of the use of waste materials and new non-food raw materials, thereby contributing to a greater environmental social and economic sustainability.

Transport efficiency

The Auto-Oil Programme – Voluntary agreement with the car manufacturing associations (ACEA, JAMA, KAMA) aims

to reduce of the carbon intensity of light passenger vehicles through the manufacture of new cars, with increasingly restrictive consumption (and CO_2 emissions) standards, as to reach the 120 g CO_2 eq./km target by 2010. In 2010, annual GHG savings were estimated to be 175 kt CO_2 eq./year.

Modal shift and raising awareness

The government of Portugal is promoting the modal shift towards public transport usage, aiming to transfer 5 % of conventional transportation to public transportation in Lisbon and Oporto. The Lisbon Metro and Porto Metro networks have been expanded, reducing annual GHG emissions in 2010 by 14.8 kt CO_2 eq./year. In addition, the construction of the South of the Tagus River Metro (MST) and Oporto Metro (MP) have expected annual GHG savings of 13 kt CO_2 eq./year and 30.4 kt CO_2 eq./year, respectively in 2010.

Industrial processes

Non-CO_2 gases

There are no policies reported for non-CO_2 gases in Portugal in the industrial sector.

Energy efficiency

The MAe3 - 'Improvement in energy efficiency from the electricity demand-side' policy aimed to reduce electricity consumption in Portugal by approximately 1 000 GWh by 2010.

Agriculture

The 'Evaluation and Promotion of Carbon Sequestration in Agricultural Soil' policy promotes the adoption of cropland management and grazing land management activities. Annual GHG emission reductions of 500 kt of CO_2 eq. per year were expected in 2010.

The 'Treatment and Energy Recovery of Livestock Waste' policy aims to reduce methane emissions resulting from manure management through the conversion of medium and large manure management systems (headcount over 1 000) to anaerobic bio-digesters with energy recovery. The expected annual GHG reduction for this policy is 507 kt of CO_2 eq. per year by 2020.

Waste

In the Waste management sector, EU policies have been particularly influential. The Decree-Law 366-A/97, of 20 December, transposed the Directive on packaging and packaging waste (2004/12/CE) imposing recovery and recycling objectives for packaging waste. The following targets, to be met by the 31st December 2012, were defined:

- recovery: of at least 60 % of waste;
- recycling: overall: 55–80 %, glass: 60 %, paper: 60 %, metals: 50 %, plastics: 22.5 %, wood: 15 %.

The Landfill Directive establishes the need to define a national strategy to reduce biodegradable municipal waste (BMW) destined to landfills. It was transposed by the Decree-Law 152/2002, of 23 May. The maximum percentage of BMW disposed in landfills, in relation to the BMW production in 1995 (targets), is 75 % for 2006, 50 % for 2009 and 35 % for 2016.

Land use, land-use change and forestry

The 'Programme for the Sustainable Development of Portuguese Forests' promotes a sustained increase in forested areas, through financial support and incentives, to new tree plantations. This is an important measure with expected GHG emission reductions of 4 300 kt of CO_2 eq. per year by 2020.

Portugal also aims to increase the carbon sink capacity of existing Portuguese forests, through improvement of forestry management.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
PT-LUC-002 MRf1. Programme for the Sustainable Development of Portuguese Forests (non-ETS)	4 300
PT-TRA-022 MA2007t1 - Biofuels Directive (non-ETS)	1 047
PT-ENS-002 MRe1. 'E4, E-RES' Programme	893
PT-AGR-002 MAg2. Treatment and energy recovery of livestock waste (non-ETS)	507
PT-ENU-001 MAe3. Improvement in energy efficiency from the electricity demand-side (both EU ETS and Non-ETS)	340
PT-RES-001 MRe3. Energy Efficiency in Buildings (both EU ETS and Non-ETS)	331
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
No reported information.	
Measures with large expected savings specifically in the non-ETS sectors	
PT-LUC-002 MRf1. Programme for the Sustainable Development of Portuguese Forests	4 300
PT-TRA-022 MA2007t1 - Biofuels Directive	1 047
PT-AGR-002 MAg2. Treatment and energy recovery of livestock waste	507
EU policies or measures related to measures expected to deliver the largest savings	
PT-LUC-002 MRf1. Programme for the Sustainable Development of Portuguese Forests: Common Agricultural Policy (CAP) - on support for rural development by the European Agricultural Fund for Rural Development (2603/1999, 1698/2005 and 1290/2005)	
PT-TRA-022 MA2007t1 - Biofuels Directive: Biofuels Directive (Directive 2003/30/EC)	
PT-ENS-002 MRe1. 'E4, E-RES' Programme: Electricity production from renewable energy sources (Directive 2001/77/EC)	
PT-AGR-002 MAg2. Treatment and energy recovery of livestock waste: Common Agricultural Policy (CAP) - on support for rural development by the European Agricultural Fund for Rural Development (2603/1999, 1698/2005 and 1290/2005)	
PT-ENU-001 MAe3. Improvement in energy efficiency from the electricity demand-side: End-use efficiency and energy services 2006/32/EC	
PT-RES-001 MRe3. Energy Efficiency in Buildings: Recast of the Energy performance of buildings (Directive 2010/31/EC) amending 2002/91/EC	
EU policies or measures expected to result in the largest emission savings	
Agriculture: Common Agricultural Policy (CAP) - on support for rural development by the European Agricultural Fund for Rural Development (2603/1999, 1698/2005 and 1290/2005)	
Transport: Biofuels Directive (Directive 2003/30/EC)	
Energy supply: Electricity production from renewable energy sources (Directive 2001/77/EC)	
Energy consumption: End-use efficiency and energy services 2006/32/EC	
Energy consumption: Recast of the Energy performance of buildings (Directive 2010/31/EC) amending 2002/91/EC	
Energy supply: Taxation of energy products 2003/96/EC	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Romania

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	244.4	133.5	116.6	123.3	120.6
GHG per capita (t CO_2 eq./cap.)	10.5	5.9	5.4	5.8	5.6
GHG per GDP (g CO_2 eq./EUR)	3 557.2	2 209.4	1 285.3	1 330.7	1 292.0
Share of GHG emissions in total EU-28 emissions (%)	4.4 %	2.6 %	2.5 %	2.7 %	2.7 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	47.3	51.2	47.9
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	41 %	42 %	40 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 36.9 %	– 31.5 %	– 36.9 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	17.8 %	8.7 %	28.3 %

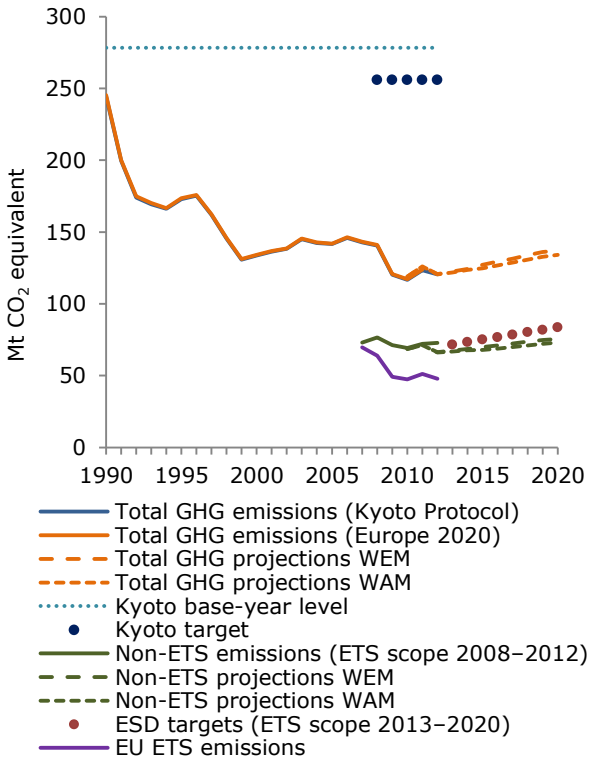
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	72.4
2008–2012 average non-ETS target	181.7
Gap to target (domestic emissions-target)	**– 109.3**
Expected effect of carbon sinks	– 3.0
Planned use of flexible mechanisms	– 2.6
Issued emission reduction units	– 0.8
Overall gap to target	**– 108.9**

Romania is on track towards its Kyoto target. Its government intends to sell to other countries, through the Kyoto flexible mechanisms, a number of Kyoto units equivalent to 1 % of base-year emissions per year.

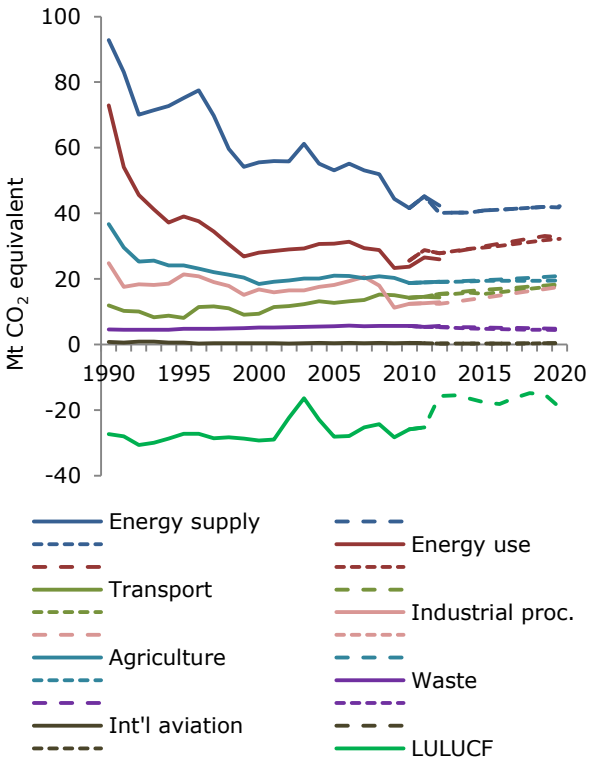
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	72.4
2013 ESD target	79.1
Gap to target (domestic emissions-target)	**– 6.7**
2020 ESD target (with art. 10 adjustment)	83.6
2020 non-ETS projections WEM	75.4
Gap to target WEM	**– 8.2**
2020 non-ETS projections WAM	73.1
Gap to target WAM	**– 10.5**

Romania is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

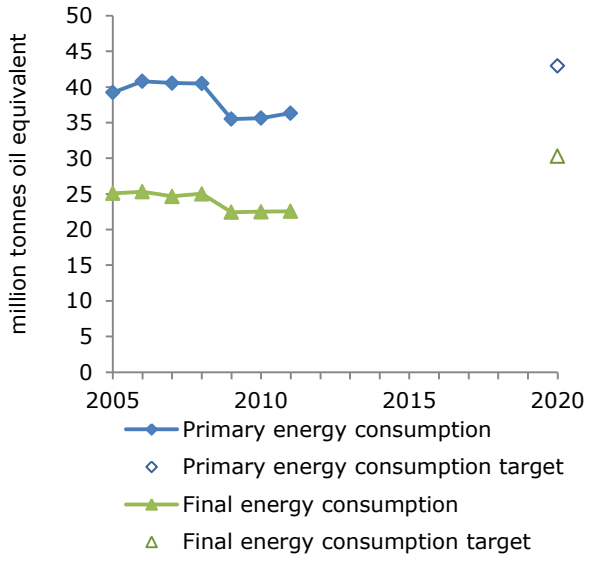


Sectoral GHG trends and projections

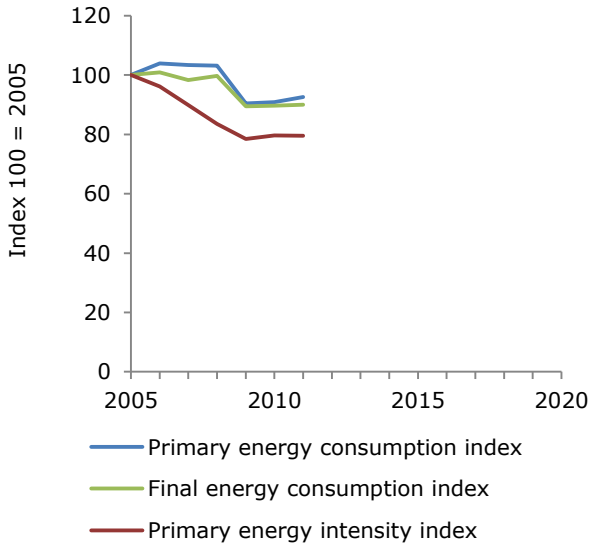


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	39.2	35.5	35.7	36.3	43.0
Final energy consumption (FEC) (Mtoe)	25.1	22.4	22.5	22.6	30.3
Romania has made limited progress in reducing energy consumption so far. Further improvements are necessary, in energy efficiency policy implementation as well as policy package development.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	17.6 % (17.6 %)	22.2 % (22.3 %)	22.9 % (23.4 %)	21.4 %	24.0 %
Share of renewable energy in gross FEC — electricity (%)	28.8 %	30.9 %	30.4 %	31.1 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	17.9 %	26.4 %	27.2 %	24.3 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	1.0 % (1.0 %)	0.7 % (1.5 %)	0.7 % (3.2 %)	2.1 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 21.4 % (5 176 ktoe), which is higher than the indicative target for the 2011-to-2012 period (19.0 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (67 %), hydropower (29 %) and onshore wind (2 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 2.0 %. In order to reach the 2020 target, an average annual growth rate of 3.8 % is needed for the period from 2011 to 2020. This corresponds to 0.5 times the cumulative effort up to 2011.					

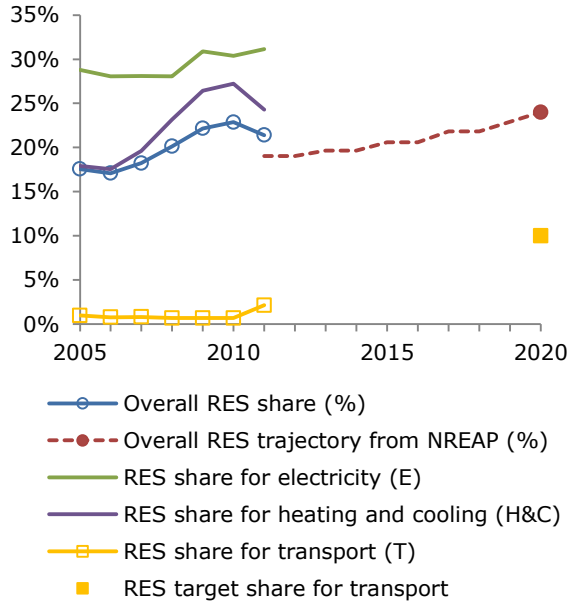
Primary and final energy consumption



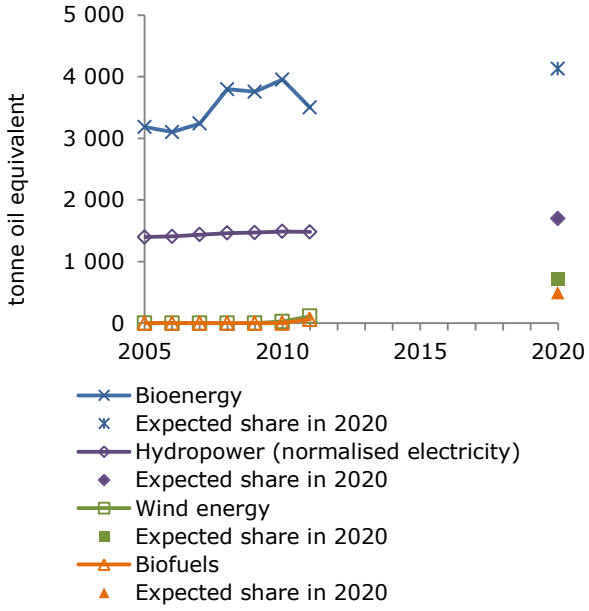
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

Romania witnessed a strong decrease of energy consumption and emissions over the transition to a market economy, and recently again due to the global economic downturn.

The Romanian government adopted in July 2005 the first National Strategy on Climate Change (NSCC) 2005–2007. The strategy indicates environmental and economic benefits through the implementation of flexible mechanisms and establishes Romania's approach towards implementation of activities in the field of climate change required for the accession to the EU and for its participation in the EU Emission Trading Scheme (EU ETS). A Romanian National Climate Change Strategy for the period from 2013 to 2020 is under way.

The Romanian Energy Strategy for 2007 through 2020 focuses on energy security, sustainable development and energy efficiency. It aims to reduce energy intensity by 41 % between 2007 and 2020. Potential primary energy savings are estimated at between 27 % and 35 % in 2020 (20 % to 25 % in industry, 40 % to 50 % in buildings and 35 % to 40 % in transport).

Main economic instruments for renewable energy and energy efficiency

Romania has a relatively low tax rate on energy. However, efforts for reforming energy taxation are under way, in the form of a tax on the exploitation of natural resources other than natural gas.

European Union Emissions Trading System (EU ETS)

Romania has 281 installations falling under the EU ETS. In 2011, they represented a share of 42 % of total GHG emissions in the country.

Energy supply

Energy efficiency

Although still relatively low, the average efficiency of the power sector increased noticeably between 1990 and 2011, from 23 % to 39 %. That improvement was partly achieved through the rising share of hydropower (higher efficiency) in the electricity mix (from 18 % to 34 %) but also through the growing efficiency rate of thermal power plants (from 19 % to 29 % over the 1990-to-2010 period), for example, by replacing old power plants by more efficient gas-fired facilities.

Romania aims to further improve the energy efficiency of its power sector to achieve total energy savings of 3.4 Mt in 2020, through fuel substitutions (renewable energies instead of fossil fuels), high-efficiency combined heat and power (CHP) generation, new coal-fired units, closing old thermal power plants and renovating existing ones. Following the second National Plan on Energy Efficiency for the 2011-to-2020 period, Romania proposes these primary energy-saving measures on the generation of electricity and heating: withdrawing from service the generating units whose lifespan has been exceeded and the replacement thereof with modern units with superior efficiencies; re-engineering 330 MW units operating in lignite-fired power plants; promoting high-efficiency cogeneration; promoting gas turbines with a heat recovery boiler (GT+HRB) and a combined cycle with gas turbines (CC+GT) of approximately 1 000 MW and 600 MW biomass-fired units; continuing the upgrade works of district heating supply systems, respectively the units generating heat fluid, the primary heat fluid (hot water) transmission grid, the heating stations and heating modules, the hot water and heat fluid distribution network; and generating electricity from renewable energy sources.

Renewables

The Romanian national renewable energy action plan (NREAP) divides the overall 24 % renewable energy target as follows: 42.1 % for electricity production, 22 % for heating and cooling, and 10 % for transport. Regarding electricity, Romania has adopted a green certificate system for encouraging renewable energy sources (RES) production. Regarding heating, relatively few efforts were made, with no specific legislative framework currently in place. The'Heating 2006–2015' programme aims to increase the efficiency of district heating systems, the rehabilitation of district heating system and the rehabilitation of buildings.

Energy use

Energy efficiency

Primary energy intensity decreased by 4 % per year between 1990 and 2010. This overall improvement of efficiency is mainly due to industrial consumers, with energy intensity of industry falling by 2.3 % per year.

Further improvements in energy efficiency are foreseen particularly in the building sector. The main potential lies in improving inefficient district heating systems and the insulation of buildings. To this end, subsidy programmes such as the 'Build-up skills Romania' were introduced. The subsidy programme 'District Heating, Heat and Comfort 2006–2015' was reformed and reintroduced in 2012 to encourage investments in more efficient district heating infrastructure.

Renewables

Under the Romanian Renewable Energy Law, it will become possible to support small-scale energy generation through price regulation.

Transport

Renewables

The use of biofuels and other renewable fuels for transport is promoted through a required minimum of 5.75 % biofuel content of all types of gasoline and diesel fuel sold on the market, as introduced on 31 December 2010.

Transport efficiency

In line with EU regulations, the market of clean and efficient energy vehicles is promoted.

Modal shift and raising awareness

As part of a programme to modernise transport, forms of alternative transport (such as cycling) and using public transportation are encouraged.

Industrial processes

Non-CO_2 gases

No specific strategies or measures have been reported in the industrial processes sector.

Energy efficiency

Romania's National Energy Efficiency Action Plan aims at improving industrial energy efficiency, and includes voluntary agreements, financial instruments and regulations.

Agriculture

Reported measures include the improvement of quality of nutrition for cattle, sheep and goats, the improvement of manure management to decrease methane emissions, and an action plan for the protection of waters against pollution caused by nitrates from agricultural sources.

Waste

Various measures are reported under the National Waste Management Strategy, including establishing the legal framework and technical regulations for waste disposal and storage, improving packaging and packaging waste, improving stored solid waste to recover CH_4 emissions, adopting fees for emissions of pollutants and a more efficient treatment of sewage and commercial water.

Land use, land-use change and forestry

To improve land use, Romanian policy aims at increasing the annual wood harvest as in the pre-1989 period. The afforestation of degraded lands and the implementation of 'no-tillage' practices for 30 % of the area of arable land per year from 2015 to 2030 are further promoted.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
RO-ENS-012 The development of the power sector for to cover electricity and heat demand produced in cogeneration (EU ETS)	25 055
RO-LUC-001 The improvement of land use (non-ETS)	19 155
RO-TRA-005 The modernization of transport (non-EU ETS)	18 110
RO-ENU-001 The modernization of industrial sector (both ETS and non-ETS)	15 723
RO-AGR-004 Order 1182 of Ministry of Environmental and Sustainable Development and Ministry of Agriculture and Rural Development for approval Agricultural good practice code for the protection of waters against pollution caused by nitrates from agricultural sources (non-ETS)'	11 984
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
RO-AGR-001 The improvement of quality of nutrition for cattle, sheep and goats (both)	8 147
RO-ENS-010 The improvement for the oil and gas sectors (both ETS and non-ETS)	7 295
RO-RES-004 The modernization of residential sector (both ETS and non-ETS)	6 953
RO-COM-002 The modernization of services sector (both ETS and non-ETS)	3 399
RO-WST-007 The improvement of the stored solid waste (both ETS and non-ETS)	2 390
RO-WST-008 The Improvement of the wastewater treatment (both ETS and non-ETS)	1 582
RO-ENS-009 The improvement of the handling coal (both ETS and non-ETS)	1 065
RO-COM-001 The modernization of agriculture (non-EU ETS)	1 018
Measures with large expected savings specifically in the non-ETS sectors	
RO-LUC-001 The improvement of land use (non-ETS)	19 155
RO-TRA-005 The modernization of transport (non-EU ETS)	18 110
RO-AGR-004 Order 1182 of Ministry of Environmental and Sustainable Development and Ministry of Agriculture and Rural Development for approval Agricultural good practice code for the protection of waters against pollution caused by nitrates from agricultural sources (non-ETS)'	11 984
EU policies or measures related to measures expected to deliver the largest savings	
RO-ENS-012 (25055 kt CO_2) Energy supply: Large combustion Directive 2001/80/EC & Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC Energy supply: Large combustion Directive 2001/80/EC Cross-cutting: EU ETS Directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	
EU policies or measures expected to result in the largest emission savings	
Energy supply: Large combustion Directive 2001/80/EC Cross-cutting: EU ETS Directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Slovakia

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	71.8	49.3	45.9	45.3	42.5
GHG per capita (t CO_2 eq./cap.)	13.6	9.1	8.5	8.4	7.9
GHG per GDP (g CO_2 eq./EUR)	n/a	1 627.4	949.2	907.5	834.7
Share of GHG emissions in total EU-28 emissions (%)	1.3 %	1.0 %	1.0 %	1.0 %	0.9 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	21.7	22.2	20.9
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	47 %	49 %	49 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 32.9 %	– 31.9 %	– 37.4 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	20.2 %	5.0 %	5.7 %

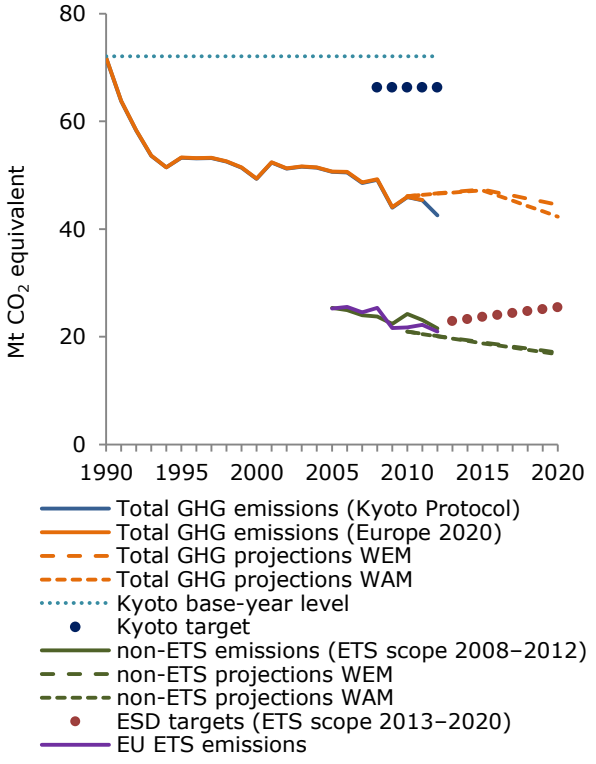
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	23.0
2008–2012 average non-ETS target	33.7
Gap to target (domestic emissions-target)	**– 10.7**
Expected effect of carbon sinks	– 0.4
Planned use of flexible mechanisms	– 8.4
Issued emission reduction units	0.0
Overall gap to target	**– 2.7**

Slovakia is on track towards its Kyoto target. Its government intends to sell to other countries, through the Kyoto flexible mechanisms, a number of Kyoto units equivalent to 12 % of base-year emissions per year.

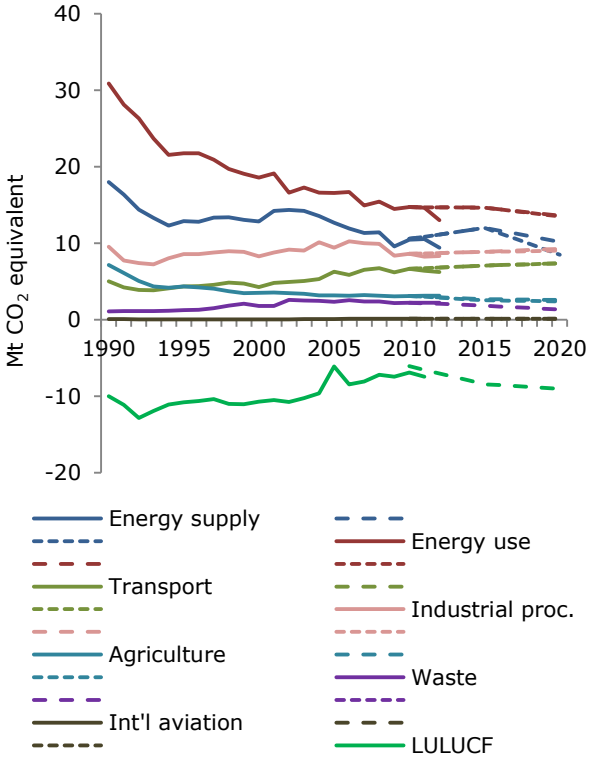
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	21.6
2013 ESD target	25.1
Gap to target (domestic emissions-target)	**– 3.5**
2020 ESD target (with art. 10 adjustment)	25.4
2020 non-ETS projections WEM	17.1
Gap to target WEM	**– 8.4**
2020 non-ETS projections WAM	16.7
Gap to target WAM	**– 8.7**

Slovakia is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

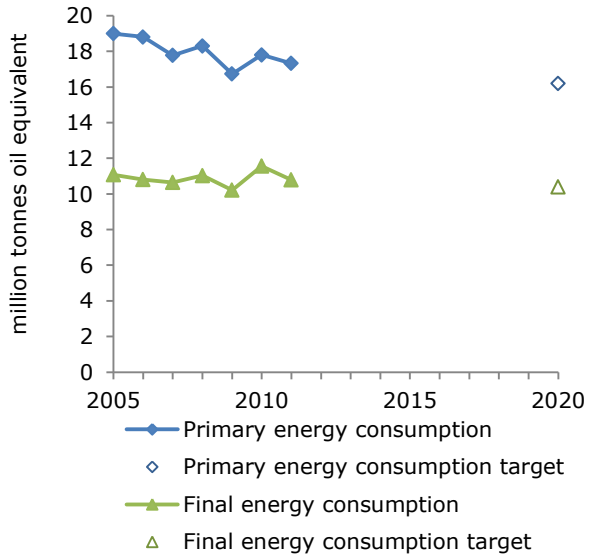


Sectoral GHG trends and projections

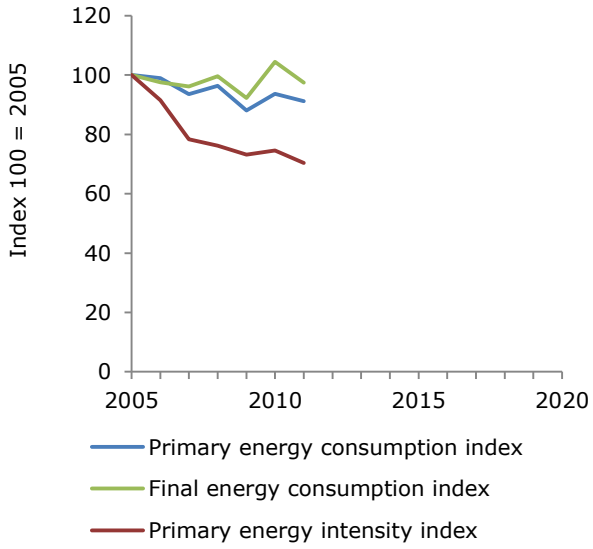


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	19.0	16.7	17.8	17.3	16.2
Final energy consumption (FEC) (Mtoe)	11.1	10.2	11.6	10.8	10.4
Slovakia has made limited progress in reducing energy consumption so far. Further improvements are necessary, in energy efficiency policy implementation as well as in policy package development.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	6.5 % (6.6 %)	8.9 % (9.7 %)	8.5 % (9.4 %)	9.7 %	14.0 %
Share of renewable energy in gross FEC — electricity (%)	16.1 %	18.5 %	18.4 %	19.8 %	24.0 %
Share of renewable energy in gross FEC — heating and cooling (%)	5.2 %	8.5 %	8.1 %	9.6 %	14.6 %
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.5 % (1.1 %)	0.4 % (4.8 %)	0.4 % (4.8 %)	0.4 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 9.7 % (1 054 ktoe), which is higher than the indicative target for the 2011-to-2012 period (8.2 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (50 %), hydropower (37 %) and solid biomass for electricity (6 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 5.7 %. In order to reach the 2020 target, an average annual growth rate of 4.5 % is needed for the period from 2011 to 2020. This corresponds to 0.9 times the cumulative effort up to 2011.					

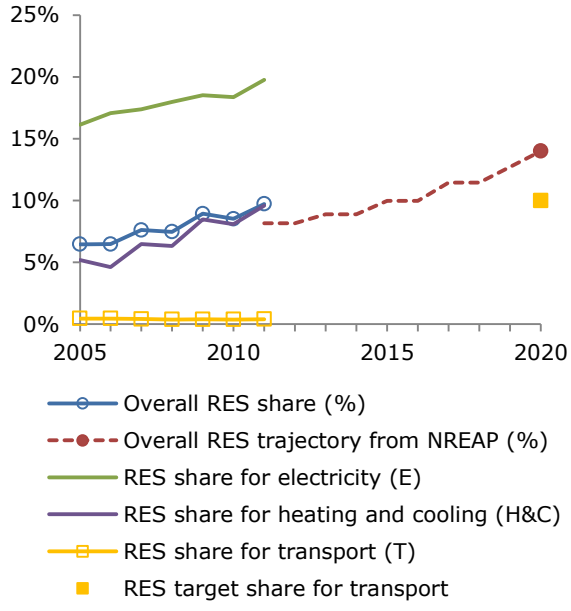
Primary and final energy consumption



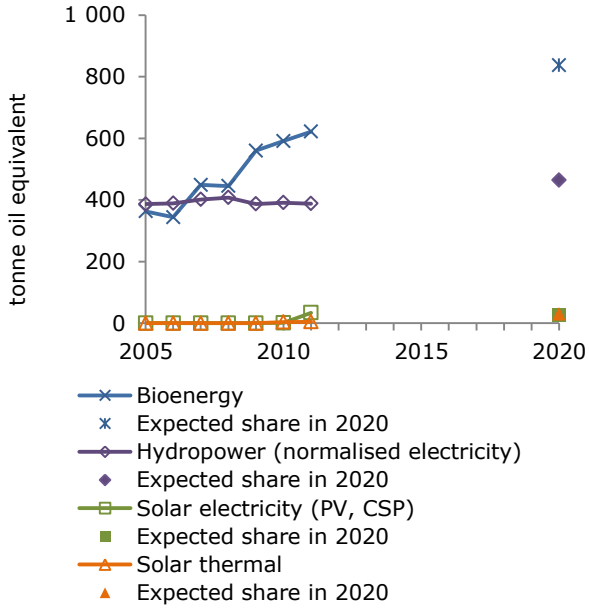
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Energy Security Strategy of the Slovak Republic (2008) is the main strategy for the energy sector. It aims to ensure energy supply with maximum efficiency, reduce energy demands and provide a sufficient amount of electricity. The strategy steers the development of electric power engineering, thermal power engineering, gas industry, mining, processing and transport of oil, coal mining and the utilisation of renewable energy sources. Renewable energy sources are mainly foreseen for heating and cooling, to reduce dependency from natural gas. In this context, the National Action Plan for Biomass was adopted to promote the use of biomass in Slovakia. The share of renewable sources in the gross final energy consumption shall amount to 14 % by 2020. Within the framework of the Energy Security Strategy, energy efficiency has fundamental priority. The national energy savings target for Slovakia is 11 % by 2020.

At present, no climate strategy has been adopted in Slovakia, but the government announced the preparation of a Low Carbon Development Strategy.

Main economic instruments for renewable energy and energy efficiency

Slovakia has implemented long-term feed-in tariffs to promote the use of renewable energy sources for power generation. Energy efficiency measures are often covered by the EU structural funds, but private investments also contribute.

European Union Emissions Trading System (EU ETS)

In 2011, 204 Slovakian installations participated in the EU ETS, counting 49 % of total national emissions.

Energy supply

Energy efficiency

The largest share of electricity in Slovakia is produced by nuclear power and hydropower. Two thermal coal power plants exist, whose operation will be maintained to ensure employment in the coal mining sector. Combined heat and power (CHP) is the main source of alternative non-fossil power generation. Furthermore, Slovakia supports the development of carbon capture and storage (CCS) technologies for the storage of industrial CO_2 emissions in geological formations. In 2012, the Concept of power generation development from small-scale renewable energy sources in the Slovak Republic was adopted to support the development of small household resources (mainly solar and wind energy).

Renewables

An increase of wind installations and photovoltaics as well as the use of geothermal heat for heat supply is supported. Feed-in tariffs for renewables were implemented in 2009; these are guaranteed for 15 years. Biomass is one of the priority resources, because the price of biomass is competitive compared to fossil fuels. Biomethane is promoted for electricity generation in CHP plants, including the installation of gas access to the gas network.

Energy use

Energy efficiency

The public and buildings sector is key to meeting defined targets. Several measures to increase energy efficiency in different types of buildings were put in place; these targeted the heat demand of apartment houses, family houses, public buildings, and non-residential buildings. For thermal insulation, cheap loans are provided by the government. A new legal framework for the labelling of energy important products was introduced.

Renewables

Oil consumption for heating has dropped following implementation of legislation to reduce air pollution. A comprehensive legal framework for fuels regulating fuel quality, fuel registration, obligations, reporting and controlling was implemented in order to decrease CO_2, sulphur dioxide (SO_2) and nitrogen oxides (NO_x) emissions. The installation of biomass boilers and solar panels is supported for promoting sustainable heating systems in households.

Transport

Renewables

Slovakia promotes the use of biofuels in the transport sector with reduced excise duties.

Transport efficiency

Technical requirements for the reduction of emissions from diesel and petrol engines driven by natural gas or liquefied petroleum gas were applied. New vehicles must meet the latest European emission standards (EURO V).

Modal shift and raising awareness

The updated Concept of combined transport development by 2010 (approved in 2001) defines measures targeting modal shift in the Slovak Republic. Subsidies for combined/ intermodal transport are regulated by the Decree No. 491/M-2006 of the Ministry of transport, posts and telecomunications of SR. No progress is observed in this field.

Industrial processes

Non-CO_2 gases

The implementation of control efficiency at aluminium production will lead to decreasing perfluorocarbon (PFC) emissions. Regarding N_2O emissions, the implementation of a secondary catalyst at nitric acid production is the only measure reported for the sector industrial processes.

Energy efficiency

No specific strategies or measures have been reported in the industrial processes sector.

Agriculture

The mitigation potential in the agriculture sector is mainly connected with manure management (its storage and application on soil) and animal feeding measures. At present, the Rural Development Programme for 2014–2020 is

being prepared; for the first time, it will incorporate climate change measures regarding plant production. Moreover, the strict implementation of Common Agricultural Policy (CAP) recommendations mostly regarding manure management and agricultural soils, as implemented in Governmental Decision No. 488/2010, will lead to decreasing emissions. Current legislation and recommended good agricultural practice mainly concerns the storage of waste from animal production and the integration of waste into agricultural land.

Waste

The Landfill Directive (1999/31/EC) is implemented through Slovak Act No 409/2006.

Land use, land-use change and forestry

The Rural Development Programme of the Slovak Republic 2007–2013 is based on the National Forest Programme, as well as the Indicative Action Plan (IAP) 2009–2013. Within the framework of the Rural Development Programme for the period of 2014 to 2020, the afforestation of 800 ha of low-productive land with fast-growing trees is planned. Another 600 ha of agricultural land will be afforested by 2015, and likewise a further 23 000 ha of agricultural land by 2020. In addition, the grassing of 50 000 ha of arable land will be undertaken by 2015.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
SK-ENS-002: National Action Plan for Biomass Use	1 900
SK-IND-001: Act No. 414/2012 Coll. on Emission Trading in amendments - nitric acid production	780
SK-RES-001-006: Concept of Energy Performance of Buildings by 2010 with outlook to 2020	750
SK-ENS-003: National Renewable Energy Action Plan, Government Resolution of SR No. 677/2010 - Wind and PV	540
SK-ENS-004: National Renewable Energy Action Plan, Government Resolution of SR No. 677/2010 - Geothermal energy	410
SK-WST-001: Act No. 409/2006 - complete text of the Act. 223/2001 on Solid Waste Disposal	400
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
SK-ENS-005: Act No. 258/2011 on carbon capture storage to the geological environment	1 600
SK-TRA-003: Act No. 158/2011 on Support for Energy- Air pollution from traffic	380
SK-TRA-002: Act No. 158/2011 on Support for Energy-Saving and Environmental Vehicles	160
SK-AGR-006: Government Decision No. 488/2010 Coll. on conditions for granting subsidies in agriculture through direct payments – Animal numbers	130
Measures with large expected savings specifically in the non-ETS sectors	
SK-WST-001: Act No. 409/2006 - complete text of the Act. 223/2001 on Solid Waste Disposal	400
SK-TRA-003: Act No. 158/2011 on Support for Energy- Air pollution from traffic (WAM)	380
SK-TRA-002: Act No. 158/2011 on Support for Energy-Saving and Environmental Vehicles (WAM)	160
SK-AGR-006: Ordinance No. 488/2010 Coll. on conditions for granting subsidies in agriculture through direct payments – Animal numbers (WAM)	130
EU policies or measures related to measures expected to deliver the largest savings	
SK-ENS-002: National Action Plan for Biomass Use: Biomass Action Plan COM(2005) 628 final	
SK-IND-001: Act No. 414/2012 Coll. on Emission Trading in amendments - nitric acid production: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	
SK-RES-001-006: Concept of Energy Performance of Buildings by 2010 with outlook to 2020: Energy Performance of Building Directive (EPBD) 2010/31/EU	
Act No. 476/2008 on Energy Efficiency: End-use efficiency and energy services (ESD) 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC) (Energy Efficiency Directive (EED) 2012/27/EU is not implemented yet in Slovakia.)	
SK-ENS-003: National Renewable Energy Action Plan, Government Resolution of SR No. 677/2010 - Wind and PV and SK-ENS-004: Geothermal energy: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
SK-WST-001: Act No. 409/2006 - complete text of the Act. 223/2001 on Solid Waste Disposal: Landfill Directive 1999/31/EC	
EU policies or measures expected to result in the largest emission savings	
See above.	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Slovenia

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	18.4	18.9	19.5	19.5	19.1
GHG per capita (t CO_2 eq./cap.)	9.2	9.5	9.5	9.5	9.3
GHG per GDP (g CO_2 eq./EUR)	921.0	786.7	620.9	618.1	620.0
Share of GHG emissions in total EU-28 emissions (%)	0.3 %	0.4 %	0.4 %	0.4 %	0.4 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	8.1	8.0	7.6
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	42 %	41 %	40 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 1.2 %	– 2.8 %	– 7.5 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	6.2 %	10.0 %	47.0 %

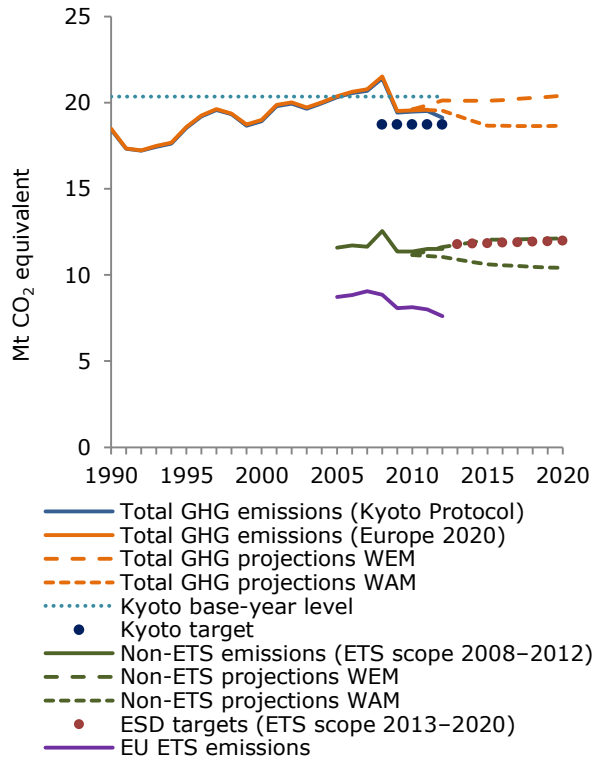
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	11.7
2008–2012 average non-ETS target	10.5
Gap to target (domestic emissions-target)	**1.2**
Expected effect of carbon sinks	– 1.3
Planned use of flexible mechanisms	1.0
Issued emission reduction units	0.0
Overall gap to target	**– 1.2**

Slovenia is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 5 % of base-year emissions per year.

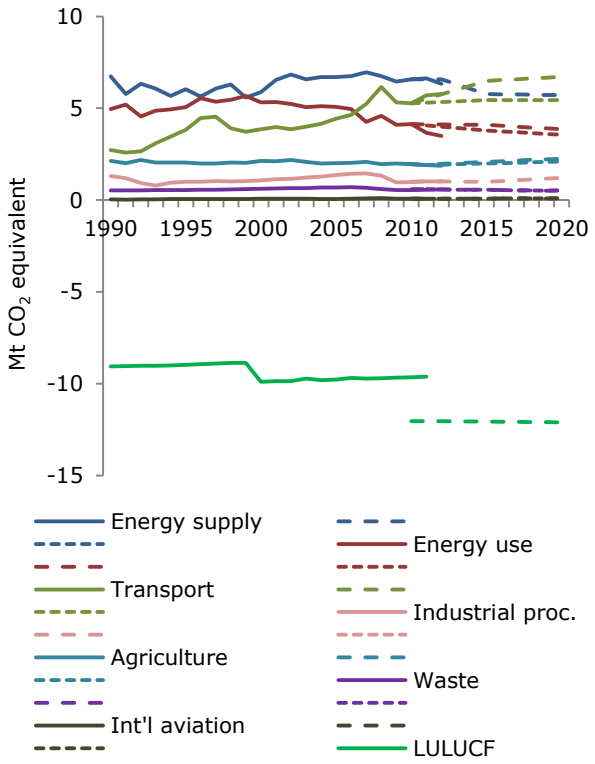
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	11.5
2013 ESD target	11.9
Gap to target (domestic emissions-target)	**– 0.4**
2020 ESD target (with art. 10 adjustment)	12.0
2020 non-ETS projections WEM	12.1
Gap to target WEM	**0.1**
2020 non-ETS projections WAM	10.4
Gap to target WAM	**– 1.6**

Slovenia is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

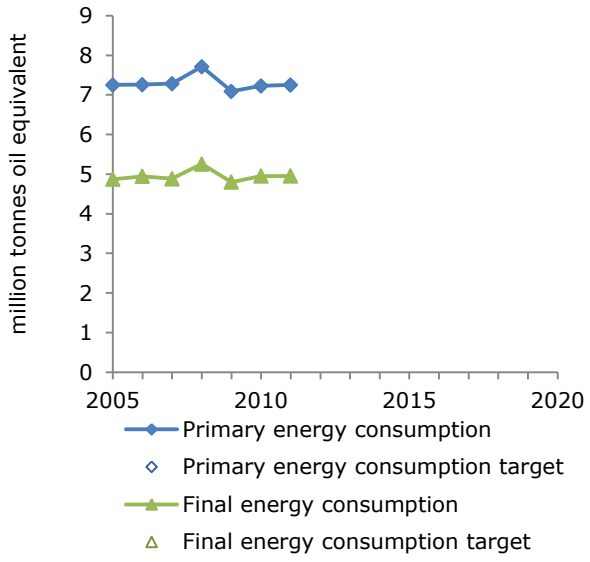


Sectoral GHG trends and projections

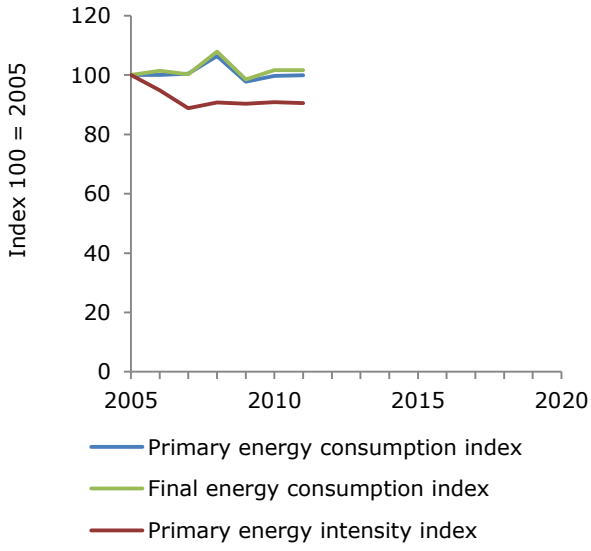


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	7.3	7.1	7.2	7.3	n/a
Final energy consumption (FEC) (Mtoe)	4.9	4.8	5.0	5.0	n/a
Slovenia is making some progress in reducing energy consumption but further improvements are necessary either in energy efficiency policy implementation, in the policy package development or both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	16.0 % (16.0 %)	18.4 % (19.0 %)	19.6 % (19.6 %)	18.8 %	25.0 %
Share of renewable energy in gross FEC — electricity (%)	28.4 %	33.8 %	32.1 %	30.8 %	
Share of renewable energy in gross FEC — heating and cooling (%)	19.0 %	25.2 %	26.4 %	27.3 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.3 % (0.3 %)	0.2 % (2.0 %)	2.8 % (2.8 %)	2.1 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 18.8 % (968 ktoe), which is higher than the indicative target for the 2011-to-2012 period (17.8 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (51 %), hydropower (37 %) and geo Thermal for heat (4 %). For the period 2005–2011 the observed average annual growth rate in renewable energy amounted to 3.0 %. In order to reach the 2020 target, an average annual growth rate of 3.7 % is needed for the period 2011–2020. This corresponds to 0.6 times the cumulative effort up to 2011.					

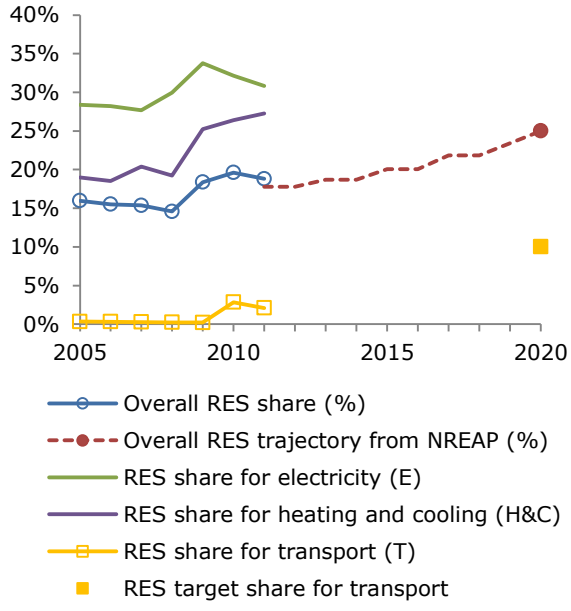
Primary and final energy consumption



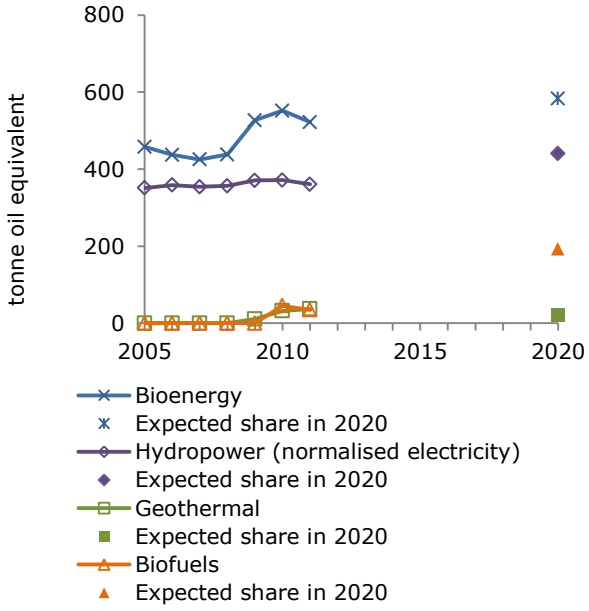
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Operational Programme for the Reduction of Greenhouse Gas Emissions by 2012 (OP GHG-1) only covers the period up to 2012. Slovenia still does not have a document setting out policy in the field of the reduction of greenhouse gas emissions. No clear targets or strategies are formulated in the report. For the period after 2012, Slovenia is preparing a Strategy for the Transition to a Low-Carbon Society. The purpose of the strategy is to ensure the reduction of GHG emissions in Slovenia to less than 2 t CO_2/inhabitant by 2050.

Main economic instruments for renewable energy and energy efficiency

Slovenia uses a number of economic instruments to promote renewable energy and energy efficiency. These include participation in the Kyoto Protocol's flexible mechanism and the EU ETS; taxes (including a CO_2 tax and an excise tax on energy in the transport sector); feed-in tariffs schemes to promote CHP, RES and electricity captured from gases emitted from landfills; and direct financial incentives to promote energy efficiency in public procurement, to promote hydropower RES, to decrease energy intensity in industry, and reduce energy use for residential heating.

European Union Emissions Trading System (EU ETS)

In 2011, in Slovenia 103 stationary installations were included in the ETS. The share of ETS emissions amounted to 41 % of the total emissions.

Energy supply

Energy efficiency

Based on the Directives 96/61/EC and 2001/80/EC, the electricity generation units need to be replaced by modern, environmentally acceptable units with significantly higher efficiency. Therefore, the technological modernisation of thermal power stations and the installation of new units is planned, including the replacement of coal-powered units in Ljubljana with a gas-fired CHP. This, along with a plan to increase cogeneration through a feed-in tariff scheme, will reduce emissions by an estimated 2 443 kT CO_2/eq. per year by 2020.

Renewables

The promotion of electricity from renewable sources of energy is planned in Slovenia. The main source of renewable energy has been the construction of hydroelectric power plants on the lower and middle Sava rivers. A feed-in tariff scheme is promoting distributed renewable electricity generation in all sectors. Switching to renewable sources will lead to a reduction of 890 kT CO_2/eq. per year by 2020.

Energy use

Energy efficiency

The range of instruments for improving energy efficiency in the public sector planned in the National Energy Efficiency Action Plan (NEEAP) includes financial incentives for investment in energy-efficient renovation and green public procurement. Slovenia is also promoting energy efficiency in the residential sector by decreasing the use of energy for heating through the updating of building codes (PURES), direct financial incentives for investment in households, and the measurement of actual heat consumption. These measures will lead to an estimated 257 kT CO_2/eq. per year by 2020.

Renewables

Slovenia is providing direct financial incentives for investments (subsidies and favourable loans) in environmentally-friendly heat generation from renewable energy sources. To supplement this policy it is updating regulations (building code), and providing energy counselling, awareness-raising, and information sessions to educate energy users and other target groups. The promotion of RES for head generation is expected to lead to a reduction of 304 kT CO_2/eq. per year by 2020.

Transport

Renewables

Slovenia is aiming to increase the use of biofuel in the transport sector, and has set a minimum quota of biofuel sold for motor fuel distributors. Slovenia has also introduced a zero tax rate to promote the use of biofuels. These measures are expected to reduce emissions by 507 kT CO_2/eq. per year by 2020.

Transport efficiency

Slovenia is promoting energy efficiency in the transport sector by reducing emissions in passenger cars, freight transport and buses. Policies include taxation of road vehicles, regulation of CO_2 from cars and buses, energy labelling for cars and tyres, green public procurement, and financial incentives for clean cars and clean buses. Energy efficiency in passenger vehicles is expected to reduce greenhouse gas emissions by 197 kT CO_2/eq. per year by 2020.

Modal shift and raising awareness

Slovenia has implemented two policies that promote a modal shift away from conventional transportation. First, it is aiming to decrease energy use in the transport sector by promoting an integrated public transport project that includes single combined tickets, increased accessibility, punctuality and frequency of trains, and subsidies for public transportation. Secondly, Slovenia is modernising its railway infrastructure in order to increase the share of freight on railways, rather than roads. Combined, these two policies will lead to a reduction of 211 kT CO_2/eq. per year by 2020.

Industrial processes

Non-CO_2 gases

Slovenia has outlined four policies that will reduce the emissions of F-gases - in the production of new cooling devices, reducing leakage in stationary equipment, reduction of gases in mobile A/C, and reduction of F-gases in current refrigerators and freezers. Combined, this will lead to a reduction of 135 kT CO_2/eq. per year by 2020.

Energy efficiency
Slovenia has outlined a plan to promote efficient energy use in industry through direct financial incentives, which will ultimately reduce emissions by an estimated 164 kT CO_2/eq. per year by 2020.

Agriculture

Slovenia's agricultural policies focus on the reduction of methane and nitrous oxide through animal husbandry and manure management policies. Technical tasks in cattle farming will be implemented as part of the Common Basic Breeding Programme. Additionally, numerous measures (such as preserving crop rotation, greening filed surfaces and organic farming) are being implemented within the context of the Rural Development Programme, which will directly contribute to reducing the use of mineral fertilisers. Finally, the Ministry of Agriculture, Forestry and Food contributes to increasing pasturing by financing the agricultural advisory service, financing special training as part of the Rural Development Programme (RDP), and promoting implementation of the 'Modernisation of agricultural holdings measure'. Slovenia's 6 reported policies will lead to an estimated reduction of 160 kT CO_2/eq. per year by 2020.

Waste

A further reduction of emissions from waste management will be achieved by reducing the quantity of biodegradable waste going to landfill. This will be achieved through stricter legislation regarding the management of separately collected fractions, which will encourage the more active separation of waste. In addition, all landfills have installed systems to collect landfill gas to use for electricity production. This electricity production from landfill gas is subsidised through feed-in tariff. Combined, these two policies will reduce emissions by an estimated 353 kT CO_2/eq. per year by 2020.

Land use, land-use change and forestry

The Resolution on the National Forestry Programme (ReNGP) was adopted in 2007. One fundamental objective of the programme is sustainable development of forests as an ecosystem in the sense of their biodiversity and all their ecological, economic and social functions. The main measure is the increase of carbon sinks. The maximum permitted harvest is determined in Slovenia by Forest Management Plans for Forest Management Areas, within a validity of 10 years. Increasing carbon sinks in Slovenia will lead to an estimated reduction of 12 105 kT CO_2/year by 2020.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
SI-LUC-001 Sustainable forest management (non-ETS)	12 105
SI-ENS-001 Technological modernisation of thermal power stations	2 210
SI-ENS-002 Emissions trading scheme (EU-ETS)	1 139
SI-ENS-003 Promoting electricity generation from RES (both EU ETS and non-ETS)	890
SI-TRA-005 Promoting use of biofuels (non-ETS)	507
SI-RES-004 Promoting use of RES for heat generation (non-ETS)	304
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
SI-TRA-004 Emissions from transit transport (non-ETS)	1 252
SI-AGR-001 Rational use of N fertilizers (non-ETS)	52
SI-AGR-002 Increase the proportion of grazed animals (non-ETS)	48
SI-AGR-003 Efficient animal production (non-ETS)	46
SI-AGR-004 Efficient animal production (non-ETS)	15
Measures with large expected savings specifically in the non-ETS sectors	
SI-LUC-001 Sustainable forest management	12 105
SI-TRA-004 Emissions from transit transport	1 252
SI-TRA-005 Promoting use of biofuels	507
EU policies or measures related to measures expected to deliver the largest savings	
SI-ENS-001 Technological modernisation of thermal power stations • Integrated pollution prevention and control 2008/1/EC (amending 96/61/EC) • Internal electricity market 2009/72/EC • National Emission Ceilings for certain pollutants (Directive 2001/81/EC) SI-ENS-002 Emissions trading scheme (EU-ETS): EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC SI-ENS-003 Promoting electricity generation from RES: RES Directive 2009/28/EC SI-TRA-005 Promoting use of biofuels: • RES Directive 2009/28/EC • Fuel Quality Directive 2009/30/EC amending 1998/70/EC • Biofuels Directive (Directive 2003/30/EC)	
EU policies or measures expected to result in the largest emission savings	
Cross-cutting: Integrated pollution prevention and control 2008/1/EC (amending 96/61/EC) Energy supply: Internal electricity market 2009/72/EC Cross-cutting: National Emission Ceilings for certain pollutants (Directive 2001/81/EC) Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC Energy supply: RES Directive 2009/28/EC Transport: Fuel Quality Directive 2009/30/EC amending 1998/70/EC Transport: Biofuels Directive (Directive 2003/30/EC)	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Spain

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	282.8	378.8	348.6	350.5	346.1
GHG per capita (t CO_2 eq./cap.)	7.3	9.5	7.6	7.6	7.5
GHG per GDP (g CO_2 eq./EUR)	481.2	489.1	367.8	368.2	368.8
Share of GHG emissions in total EU-28 emissions (%)	5.0 %	7.4 %	7.4 %	7.7 %	7.7 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	121.5	132.7	135.6
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	35 %	38 %	39 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 19.0 %	– 12.4 %	– 12.0 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	12.9 %	20.7 %	28.0 %

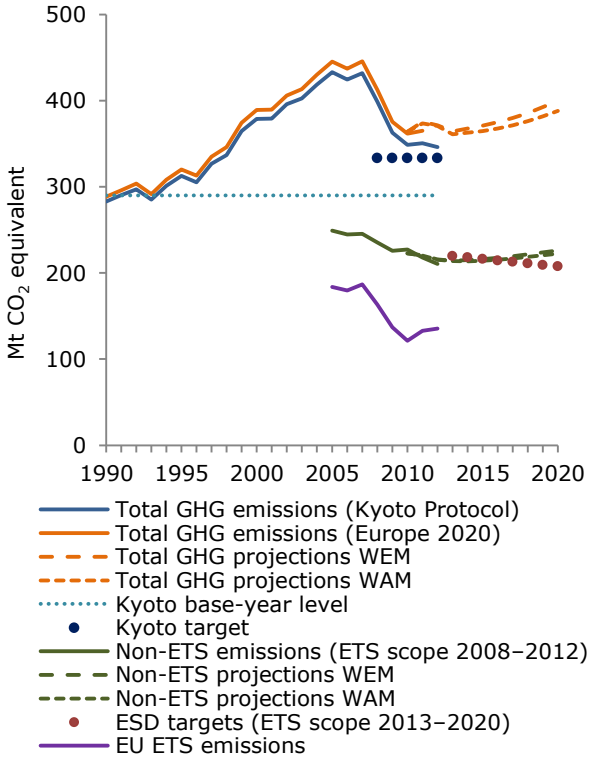
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	223.3
2008–2012 average non-ETS target	181.0
Gap to target (domestic emissions-target)	**42.3**
Expected effect of carbon sinks	– 11.3
Planned use of flexible mechanisms	38.8
Issued emission reduction units	– 0.1
Overall gap to target	**– 7.7**

Spain is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 13 % of base-year emissions per year.

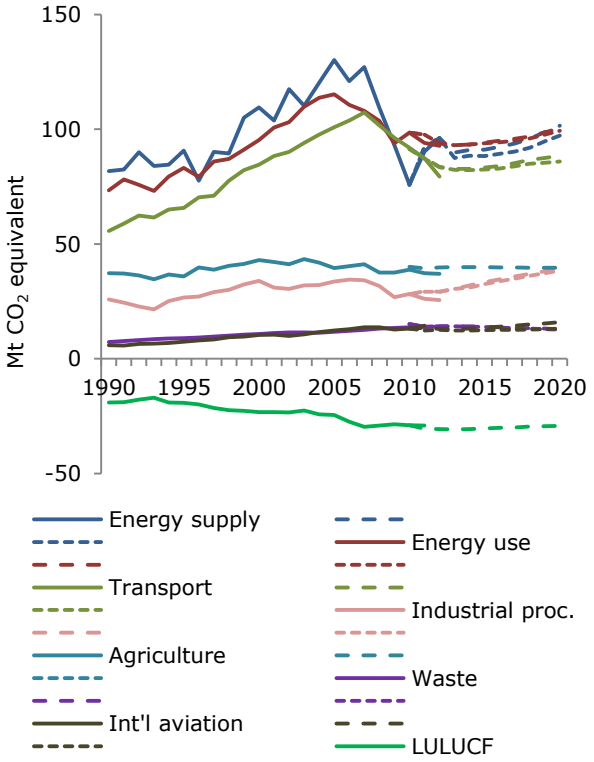
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	207.1
2013 ESD target	228.9
Gap to target (domestic emissions-target)	**– 21.8**
2020 ESD target (with art. 10 adjustment)	208.6
2020 non-ETS projections WEM	226.0
Gap to target WEM	**17.4**
2020 non-ETS projections WAM	222.2
Gap to target WAM	**13.7**

Spain is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be higher than the 2020 ESD target. Additional measures are needed to further reduce GHG emissions.

GHG trends and projections

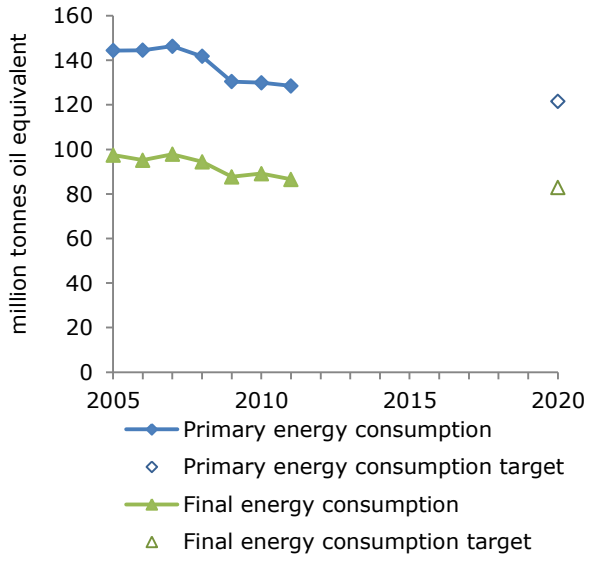


Sectoral GHG trends and projections

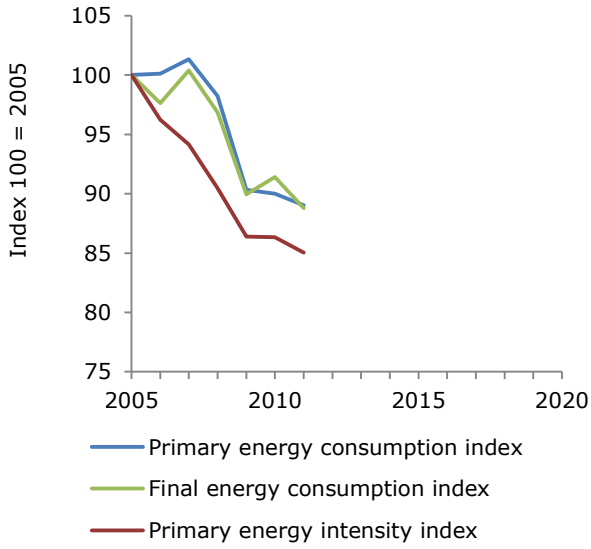


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	144.4	130.4	129.9	128.5	121.6
Final energy consumption (FEC) (Mtoe)	97.5	87.7	89.1	86.5	82.9
Spain has made limited progress in reducing energy consumption so far. Further improvements are necessary, in energy efficiency policy implementation as well as in policy package development.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	8.2 % (8.4 %)	11.8 % (13.0 %)	13.8 % (13.8 %)	15.1 %	20.0 %
Share of renewable energy in gross FEC — electricity (%)	18.9 %	27.8 %	29.8 %	31.5 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	9.4 %	13.3 %	12.6 %	13.5 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.3 % (1.0 %)	0.2 % (3.5 %)	4.7 % (4.7 %)	5.9 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 15.1 % (13 418 ktoe), which is higher than the indicative target for the 2011-to-2012 period (11.0 %). The three main technologies contributing to renewable energy use in 2011 were onshore wind (29 %), solid biomass for heat (28 %) and hydropower (20 %). For the period from 2005 to 2011, the observed average annual growth rate in renewable energy amounted to 8.5 %. In order to reach the 2020 target, an average annual growth rate of 4.8 % is needed for the period from 2011 to 2020. This corresponds to 0.9 times the cumulative effort up to 2011.					

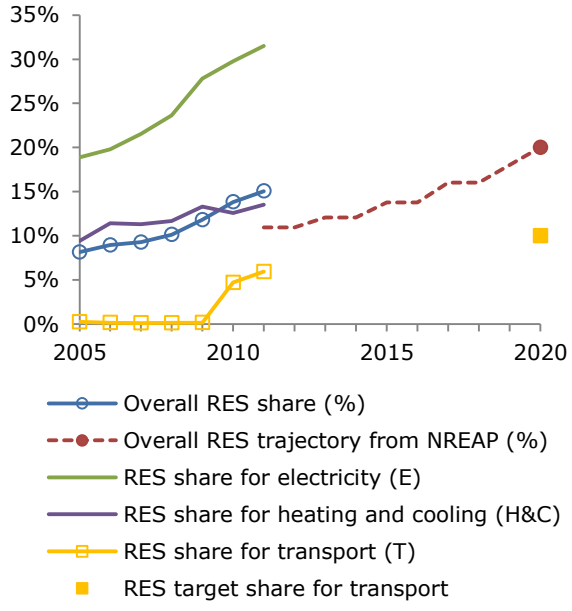
Primary and final energy consumption



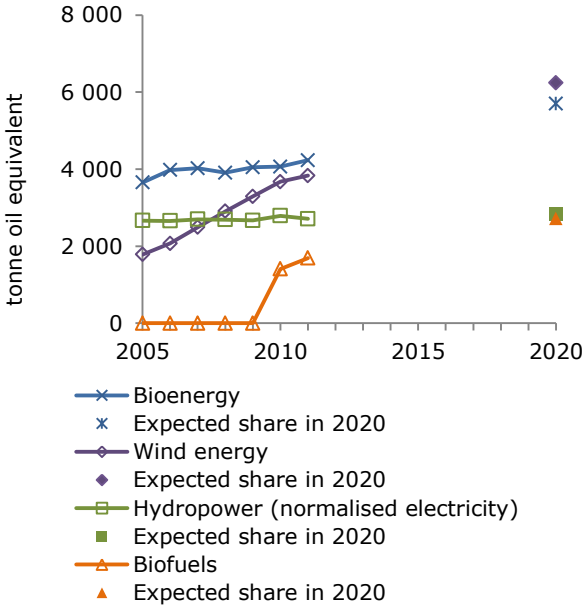
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Spanish Strategy on Climate Change and Clean Energy, Horizon 2007–2012–2020 (EECCEL) was approved in 2007 and later reinforced by six priority strategic lines setting out specific medium-term actions. The EECCEL is supported by the second Energy Saving and Efficiency Action Plan (PA 2011–2020) and the Renewable Energy Plan (PER), which aim to make significant improvements in energy efficiency and the promotion of renewable energy sources (RES) technology, and which will help Spain contribute to EU-wide reductions in greenhouse gas (GHG) emissions of 20 % by 2020, using 1990 as a reference year.

Main economic instruments for renewable energy and energy efficiency

Spain has instituted a number of tax policies to promote the generation and use of renewable energy. For instance, taxes and subsidies have been used to promote biomass, biogas and renewable municipal solid waste (MSW), photovoltaic, solar thermal and hydraulic energy generation, and have also been used to promote usage of these sources of energy in the industrial sector. A similar tax policy was introduced in 2013; it increases electrical taxes on businesses in an effort to reduce energy consumption. The Climate Fund for a Sustainable Economy was implemented in 2011 and is a new instrument to finance projects in sectors not included in the ETS. In 2012, most projects took place in the residential sector, focusing on energy efficiency and reduced energy use.

European Union Emissions Trading System (EU ETS)

In 2011 in Spain, 1 172 stationary installations were included in the ETS. The share of ETS emissions amounted to 38 % of the total emissions.

Energy supply

Energy efficiency

The PA 2011–2020 was approved by the Council of Ministers Agreement of 29 July 2011. This plan is a continuation of previously approved plans as part of the Strategy and Efficiency Savings 2004–2012, and is in line with Article 14 of the EU Directive on end-use efficiency and energy services (2006/32/EC). The plan presents a set of measures and activities which include financial support for combined heat and power (CHP), the limitation of energy losses in the distribution system and the reduction of fossil fuel consumption by increasing efficiency. This will lead to final energy savings of 17 842 ktoe and primary energy savings of 35 585 ktoe in 2020, calculated with reference to the year 2007.

Renewables

The Renewable Energy Plan (PER) 2011–2020 includes a package of more than 80 measures, nearly half of which are horizontal measures across other sectors, to achieve renewable energy consumption of 20.8 % of gross final energy consumption (FEC). The PER 2011–2020 plans to promote a total investment during the decade of more than EUR 62 million, of which more than EUR 55 million, corresponding to electric-generating facilities and more than EUR 6 million for facilities for thermal use. Mature technologies, such as wind power and hydroelectric, will receive the most support, but photovoltaics, thermal electric installations and the use of biomass are also supported.

Energy use

Energy efficiency

The main energy use measures in the residential, commercial and institutional sectors have been articulated around two pillars, as explained below.

Firstly, policy and regulatory development aimed at greater efficiency and savings in energy consumption in existing buildings (highlighted in the National Housing and Rehabilitation Plan 2009–2012, as well as the Royal Decree 1027/2007 approving the Regulation of Thermal Installations in Buildings (RITE)). This includes the establishment of emission limits for boilers in the residential sector, efficient electric appliances and lightning systems.

Secondly, active policies for highly efficient energy performance of new buildings (highlighted by the New Building Energy Certification plan adopted by Royal Decree 47/2007 and updated to support elements of EU Directive 2010/31). The introduction of energy requirements in the new Technical Building Code will bring an associated energy-saving of between 30 % and 40 %, and a 40 % to 55 % reduction in CO_2 emissions for every building, with respect to the amount it would 'consume' if built in line with earlier legislation.

Renewables

Spain promotes the use of solar heating systems and heating with biomass, but also geothermal energy in the domestic, commercial and public sectors, in order to increase self-sufficiency. In the industrial sector subsidies for the use of biomass as a fuel are available.

Transport

Renewables

One of the measures of the 2011–2020 PER is the introduction of biofuels in transport in order to meet the target of 10 % of FEC from renewable sources in the transport sector by 2020.

One specific policy is the Spanish Strategy to promote Electric Cars (2010–2014), which aims to facilitate the introduction of electric or plug-in vehicles, with a target of 250 000 such units in Spain by 2014.

In the aviation sector, two measures have been conceived to promote the use of renewable energies.

The first is the 'green airport' project, a platform for evaluation in a real operating environment at Lanzarote airport and the promotion of wider use of RES in Spanish airports and navigation areas (Aeropuertos Españoles y Navegación Aérea (AENA)).

The second measures to reduce CO_2 emissions in airport infrastructures address the utilisation of renewable energies through installation of wind generators, cogeneration plants and thermal and photovoltaic solar installations.

Transport efficiency

The aim of the transport component of the PA 2011–2020 in the transport sector is to achieve overall energy savings of 9 023 ktoe in 2020, as a result of the implementation of a total of 15 measures grouped in three categories: a

modal shift to reduce demand for conventional vehicles, fleet renewal to incorporate new technological advances in vehicle energy efficiency, and increasing rational use of transport methods.

Modal shift and raising awareness

The Strategic Infrastructure and Transport Plan (PEIT) defines the basic guidelines for action in infrastructure and transport for the years from 2005 through 2020.

Structural measures in the transport system under this plan, as well as the Savings, Energy Efficiency and Reducing Greenhouse Gases in Transport and Housing Plan, envision gross savings of EUR 8.890 million through the promotion of intermodal transport and public transport, looking to rebalance the current use towards more efficient modes. These include the shift to rail in all its aspects — high speed, commuter and freight — that, in addition to energising the transport network, will enable energy savings of EUR 8.600 million to 2020.

Industrial processes

Non-CO_2 gases

In order to set in motion the Kyoto Protocol commitment regarding fluorinated gases, European Union Regulation No 842/2006 was published in 2006, regulating the use of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) in certain applications, along with several other regulations implementing it. To implement these EU regulations, Royal Decree 795/2010 was approved on 16 June 2010, regulating the marketing and handling of fluorinated gases and equipment containing them, and likewise certification of professionals using them. These measures are expected to reduce emissions by nearly 2 800 kT CO_2/e per year by 2020.

Energy efficiency

The aim of the Action Plan 2011–2020 in the industrial sector is to achieve overall energy savings of 4 489 ktoe in 2020. To achieve these goals, the plan includes a set of three measures: energy audits, improved equipment and process technology and implementation of energy management systems.

Agriculture

Spanish agriculture is regulated by a set of rules derived from the Common Agricultural Policy (CAP).

Examples are the Slurry Biodigestion Plan (2009), laying down the regulatory bases of state subsidies to promote implementation of the technical processes and to improve agricultural use of slurry, valorising biogas from methanisation as a renewable energy source, and the Plan to Reduce the Use of Nitrogen Fertilisers, which aims to rationalise fertilisation in Spain, which will mean a reduction in emissions produced by these fertilisers, either in the soil or occurring during manufacture.

In addition, a policy not related to EU policies has been launched to reduce emissions of greenhouse gases through manure management of pigs.

Waste

The 2008–2015 National Integrated Waste Plan has encouraged the various administrations and economic operators involved to consolidate an integrated form of management, effectively combining the guiding principles governing EU waste policy and achieving a significant change in waste management in Spain. The cornerstone of this plan is to limit the amount of biodegradable municipal waste going to landfills. In 2009, Spain met the EU target (set out in Directive 1999/31/EC) to reduce its biodegradable waste destined for landfills by 50 %.

Land use, land-use change and forestry

The Spanish Forestry Plan is based on principles of sustainable development, multifunctionality of woodland, contribution to territorial and ecological cohesion and public participation. Key measures include hydrological/forestry restoration to increase CO_2 capture in Spanish forests, restoring plant cover and enlarging the wooded area, and a plan to plant 45 million trees under the Strategic Line for Forestry and Carbon Sink Policy.

By 2020, the Reforestation and Afforestation Plan will lead to a reduction in emissions of 2 335 kT CO_2/e per year.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
ES-ENS-001 Combined effects of horizontal (IPCC, GIC, GHG) trading and sectoral liberalisation policies in gas and electricity on the activity of power generation	20 497
ES-ENS-002 Saving measures electricity consumption	15 558
ES-ENS-003 Promotion of electricity generation from renewable sources. Wind Power	12 574
ES-TRA-001 Promoting the use of biofuels in road traffic (non-ETS)	10 178
ES-RES-001 Effects of horizontal policies on thermal energy consumption in RC & I sectors	7 315
ES-ENU-001 Combined effects of horizontal (IPCC, GIC, GHG) trading and sectoral liberalisation policies in gas and electricity on combustion in industry (both EU ETS and non-ETS)	6 148
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
ES-ENS-005 Taxation energy for electricity generation	2 561
ES-ENS-007 RES moratorium end	1 782
ES-TRA-003 Transfer of passengers from road to other modes of transport (non-ETS)	1 061
ES-IND-003 Prohibition of fluorinated gas emissions during the production of the same (non-ETS)	880
ES-RES-002 Intensifying actions regarding RES and energy efficiency improvement	671
ES-TRA-004 Penetration efficient aircraft models	623
Measures with large expected savings specifically in the non-ETS sectors	
ES-TRA-001 Promoting the use of biofuels in road traffic	10 178
ES-ENU-001 Combined effects of horizontal (IPCC, GIC, GHG) trading and sectoral liberalisation policies in gas and electricity on combustion in industry (both EU ETS and non-ETS)	6 148
ES-LUC-001 Expansion of forest surface	2 335
EU policies or measures related to measures expected to deliver the largest savings	
ES-ENS-001 Combined effects of horizontal (IPCC, GIC, GHG) trading and sectoral liberalisation policies in gas and electricity on the activity of power generation: 20 497 kt CO_2 eq.	
• Cross-cutting: Integrated pollution prevention and control 2008/1/EC (amending 96/61/EC)	
• Cross-cutting: EU ETS Directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	
• Cross-cutting: National Emission Ceilings for certain pollutants (Directive 2001/81/EC)	
ES-ENS-002 Saving measures electricity consumption: 15 558 kt CO_2	
• Energy consumption: Directives on energy labelling of household appliances	
• Energy consumption: Energy efficiency requirements for household electric refrigerators, freezers and combinations Directive (Directive 1996/57/EC)	
• Energy consumption: Energy labelling for office equipment 2422/2001 (Energy Star Program)	
ES-ENS-003 Promotion of electricity generation from renewable sources. Wind Power: 12 574 kt CO_2	
• Energy supply: Electricity production from renewable energy sources (Directive 2001/77/EC)	
• Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuels Directive 2003/30/EC)	
• Energy supply: European Energy programme for Recovery (Regulation 2009/663/EC)	
ES-TRA-001 Promoting the use of biofuels in road traffic: 10 178 kt CO_2	
• Transport: Biofuels Directive (Directive 2003/30/EC)	
ES-WST-001 Reduction of organic material destined to landfill: 8 038 kt CO_2	
• Waste: Landfill Directive 1999/31/EC	
• Waste: Packaging and packaging waste (94/62/EC, 2004/12/EC, 2005/20/EC)	
• Waste: Waste Framework Directive (2008/98/EC) amending Directive on waste 2006/12/EE	
ES-RES-001 Effects of horizontal policies on thermal energy consumption in RC & I sectors: 7 315 kt CO_2	
• Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	
• Energy consumption: Recast of the Energy performance of buildings (Directive 2010/31/EC) amending 2002/91/EC	
• Energy consumption: Boiler Efficiency Directive (Directive 92/42/EEC)	
EU policies or measures expected to result in the largest emission savings	
Cross-cutting: Integrated pollution prevention and control 2008/1/EC (amending 96/61/EC)	
Cross-cutting: EU ETS Directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC	
Cross-cutting: National Emission Ceilings for certain pollutants (Directive 2001/81/EC)	
Energy consumption: Directives on energy labelling of household appliances	
Energy consumption: Energy efficiency requirements for household electric refrigerators, freezers and combinations Directive (Directive 1996/57/EC)	
Energy consumption: Energy labelling for office equipment 2422/2001 (Energy Star Programme)	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Sweden

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	72.8	68.9	65.5	61.4	58.3
GHG per capita (t CO_2 eq./cap.)	8.5	7.8	7.0	6.5	6.1
GHG per GDP (g CO_2 eq./EUR)	342.5	263.7	202.5	183.2	172.3
Share of GHG emissions in total EU-28 emissions (%)	1.3 %	1.4 %	1.4 %	1.3 %	1.3 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	22.7	19.9	18.2
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	35 %	32 %	31 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 3.8 %	– 12.6 %	– 20.1 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	3.5 %	8.1 %	36.9 %

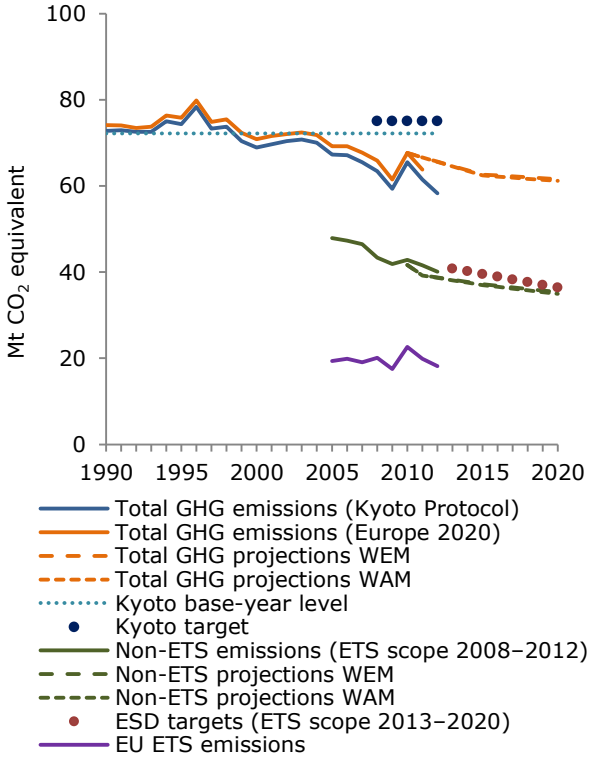
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	41.9
2008–2012 average non-ETS target	52.9
Gap to target (domestic emissions-target)	**– 10.9**
Expected effect of carbon sinks	– 2.1
Planned use of flexible mechanisms	0.0
Issued emission reduction units	0.0
Overall gap to target	**– 13.1**

Sweden is on track towards its Kyoto target. Its government does not plan on using the Kyoto flexible mechanisms to achieve its target.

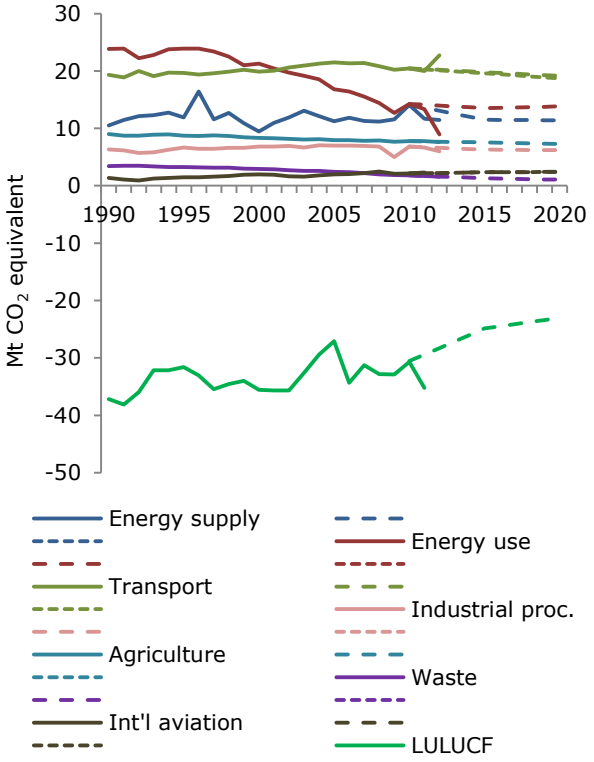
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	39.6
2013 ESD target	42.5
Gap to target (domestic emissions-target)	**– 3.0**
2020 ESD target (with art. 10 adjustment)	36.4
2020 non-ETS projections WEM	35.4
Gap to target WEM	**– 1.0**
2020 non-ETS projections WAM	35.0
Gap to target WAM	**– 1.4**

Sweden is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

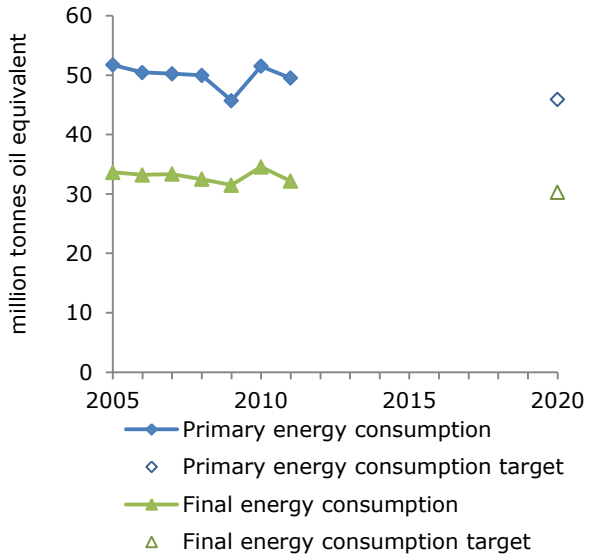


Sectoral GHG trends and projections

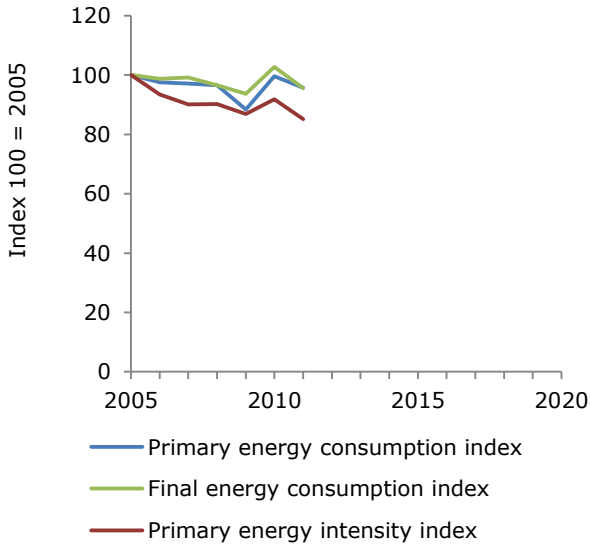


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	51.7	45.7	51.5	49.5	45.9
Final energy consumption (FEC) (Mtoe)	33.6	31.5	34.5	32.2	30.3
Sweden is making some progress in reducing energy consumption, but further improvements are necessary in either energy efficiency policy implementation, the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	39.9 % (40.4 %)	46.5 % (47.7 %)	47.9 % (47.9 %)	46.8 %	49.0 %
Share of renewable energy in gross FEC — electricity (%)	50.8 %	58.1 %	56.0 %	59.6 %	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	53.5 %	67.0 %	65.8 %	64.5 %	n/a
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	1.6 % (3.8 %)	1.5 % (6.8 %)	7.2 % (7.2 %)	8.8 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 46.8 % (16 002 ktoe), which is higher than the indicative target for the 2011-to-2012 period (41.6 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (45 %), hydropower (37 %) and renewable energy from heat pumps (8 %). For the period from 2005 to 2011 the observed average annual growth rate in renewable energy amounted to 2.0 %. In order to reach the 2020 target, an average annual growth rate of 2.3 % is needed for the period from 2011 to 2020. This corresponds to 0.3 times the cumulative effort up to 2011.					

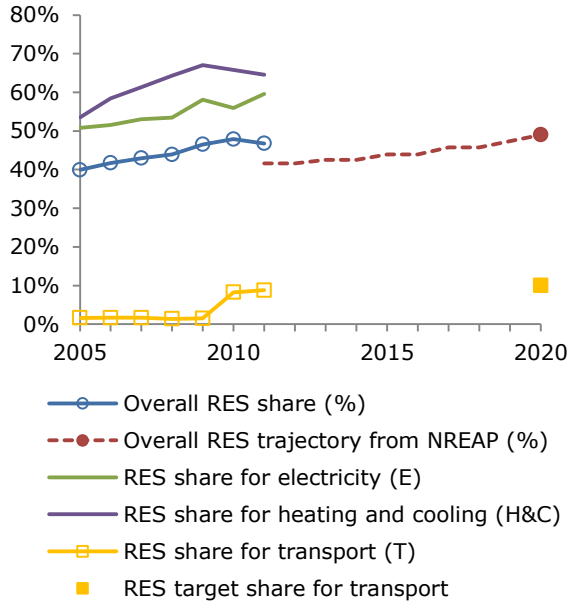
Primary and final energy consumption



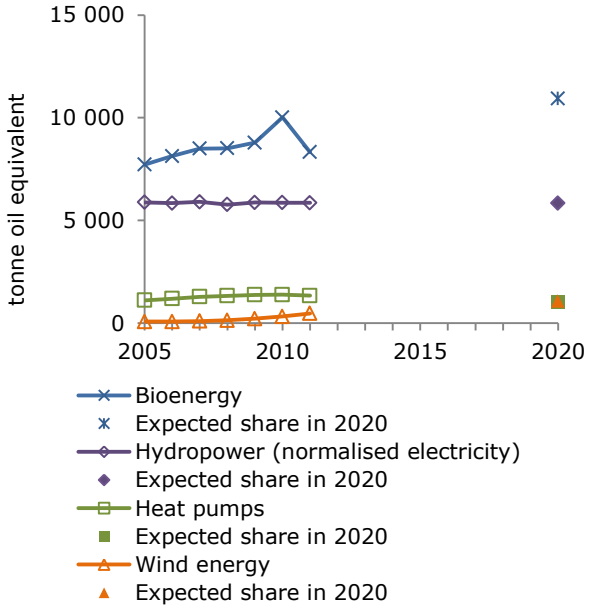
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

Sweden adopted a climate target to reduce emissions by 40 % from the 1990 level, which is approximately equal to a reduction of the emissions by 33 % between 2005 and 2020. This target applies to those activities not covered by the Emissions Trading System (EU ETS). Two thirds of the target will be reached by domestic measures, and one third through overseas investments, particularly through Clean Development Mechanism (CDM) projects.
In 2009, 'An integrated Climate and Energy Strategy' was decided in the Swedish parliament. The vision of the strategy is a long-term target for 2050, whereby Sweden will not have any net emissions of greenhouse gases (GHGs). The Swedish parliament has also decided that Sweden's use of renewable energy has to rise to 50 % of total energy use in 2020, and that energy efficiency will increase by 20 % compared to 2008, per unit of gross domestic product (GDP).

Main economic instruments for renewable energy and energy efficiency

Sweden uses a certificate system in order to stimulate the use of renewable energy and peat. The government also chooses to levy taxes (energy tax, carbon dioxide tax and vehicle fuel taxes) and offers many exemptions from them, in order to give the right incentives. Apart from the EU ETS system, Sweden has introduced a programme for energy efficiency in energy-intensive industry where companies can receive a full tax relief if they implement efficiency-improving measures. By funding research and development in natural and social sciences and technology, Sweden tries to develop, among others, environmentally friendly vehicles. A subsidy promotes the development of energy-efficient products and services. Policy instruments, such as the environmental code, the planning and building act and several climate information initiatives, should affect all sectors and reinforce public awareness.

European Union Emissions Trading System (EU ETS)

Sweden has 843 installations falling under the EU ETS. In 2011, they represented a share of 32 % of total GHG emissions in the country.

Energy supply

Energy efficiency

In June 2011, Sweden adopted its second National Energy Efficiency Action Plan (NEEAP) that set an energy savings target of 41 TWh (3.5 Mtoe) for the period from 2008 to 2016. It further stipulates a primary energy intensity reduction target of 20 % by 2020, compared with 2008 levels. The efficiency of the power sector is high at around 50 %, thanks to the large contribution of hydropower. The rate of transmission and distribution losses in the Swedish electricity grid is 7.1 %, which is in line with the EU average. There is a range of support measures from which combined heat and power (CHP) plants can benefit: tax exemptions for biomass, issuance of certificates from the renewable energy sources for electricity (RES-E) quota system and support for converting from direct-acting electricity.

Renewables

An electricity certificate system to support electricity based on renewable energy and peat was introduced in 2003. The current target is to increase renewable electricity production by 25 TWh by 2020. Under this system, electricity producers receive a certificate for every MWh of renewable electricity produced. The electricity certificates are then sold to electricity users who are obliged to purchase electricity certificates equivalent to a particular proportion of their use. In 2011, the green electricity certificates system has been expanded to allow cooperation with Norway on a mutual certification market. The purpose was to increase renewable electricity production in Sweden with 25 TWh between 2003 and 2020. There are also a number of voluntary training programmes and certification schemes for installers of RES plants, organised by particular associations for specific technologies. There is a specific programme supporting research, development and demonstration in the field of wind energy. The prospects for further production of wind power have been improved by simplifying the rules for permit appraisal of wind power installations.
Sweden wants to improve the technical conditions for wind power. By 2020 it is planned to incorporate 30 TWh, of which 10 TWh are offshore, in the electricity sector. Since 2009 there has also been support for photovoltaic installations.

Energy use

Energy efficiency

Building regulations have been implemented in Sweden since the 1960s, to set minimum requirements for energy use in new buildings. These have been tightened in 2006 and in 2009. The latest energy requirements for new buildings were put in force on 1 January 2012. The Energy Performance of Buildings Directive is implemented in Sweden. Owners of individual houses, multi-dwelling buildings and commercial premises are obliged to declare the energy use of the buildings and certain parameters in the indoor environment. Under the Programme for Energy Efficiency in Energy-intensive Industry, companies receive tax reliefs on electricity consumption they otherwise would have had to pay. In exchange, during the first two years, the company undertakes an energy management system to analyse the company's potential to improve the efficiency of energy use. The company has to implement efficiency-improving measures with a repayment period of fewer than three years.
The Eco Design Framework Directive 2005/32/EC and its implementing regulations, combined with the Energy Labelling Framework Directive 2003/66/EC, states which products have to be labelled and contains provisions on how the labelling of household products is to be established. The directives and implementing regulations are transposed to the Swedish legislation to reduce electricity use from household appliances. Expanded energy advice and contributions to energy surveys in small and medium-sized enterprises (SMEs) were introduced to stimulate increased energy efficiency in SMEs. An Energy Survey Cheque as well as a programme to deliver resources for energy advice to small companies with an energy consumption exceeding 0.5 GWh/year was established. Technology procurement is promoting the development of energy-efficient products and services, and primarily covers the area

of multi-dwelling buildings and commercial premises. The programme includes increased support for technology procurement and market introduction in the industrial, residential, service and transport sectors.
The taxation of fossil fuels used in industry but not covered by the EU ETS will be increased stepwise. The energy taxation will also be restructured so that an energy tax is charged on fossil fuels according to the energy content. Since 2011, fossil fuels used for heating in industry are covered by an energy tax in line with the EU's minimum tax level under the Energy Taxation Directive (2003/96/EC).

Renewables

Until the end of 2010, the switch from electric heating with radiators in residential buildings and the installation of solar heating was supported. The buildings code supports the use of heat pumps in new buildings. An investment subsidy for solar thermal installations is still valid. The continued use of a carbon dioxide tax which has proven to be very successful since its introduction in 1991 is also effective for promoting RES in the heating and cooling sector.

Transport

Renewables

A CO_2 tax on vehicle fuels was introduced in 1991 and has been raised in several steps over the last years. In 2007/2008, the total vehicle fuel tax was overshadowed due to increasing prices for petrol and diesel. The energy tax on diesel was raised in two stages, in 2011 and 2013, by a total of SEK 0.40 (EUR 0.05) per litre, to approximate the energy tax level for petrol. The strategy for introducing renewable energy into the road transport sector contains a temporary exemption for all biofuels from the energy and CO_2 tax until 2013. From 2014 onwards, the exemption will be replaced by new instruments promoting biofuels. A quota obligation has been decided to ensure the low blending of biofuels. Under the EC's Fuel Quality Directive (98/70/EC), the fuel specifications have been amended to allow blends of 10 % in diesel by 2011.
Directive 443/2009 contains a mandatory maximum emission rate for new car sales of 130 g CO_2/km on average by 2015. This EU instrument will further reduce the carbon intensity of new vehicles in the Swedish car fleet. To improve the availability of biofuels, all larger filling stations must sell at least one renewable fuel. Research and development (R&D) support is foreseen for the development of new biofuels technologies. Over the next few years, Sweden wants to focus on the development of electric and hybrid vehicle technologies.

Transport efficiency

To promote environmentally friendly cars, a Green Car Rebate has been granted on the new purchase of eco-classified cars over the period from 2007 to 2009. In 2009 it was replaced by an exemption from vehicle tax for the first five years for new efficient cars. Since 2013, the requirements for the green car definition have been made more rigorous and have become more harmonised with EU requirements. Since 2006, Sweden has also differentiated the annual vehicle tax with respect to the vehicle's CO_2 emissions per km. Cars that can be driven with alternative fuels such as ethanol fuel and gas fuel (except liquefied petroleum gas (LPG)) are taxed with a lower rate. Light trucks, light buses and campers are also included in the system of the CO_2 differentiated vehicle tax in 2011. The taxation of older cars and heavy trucks is mainly based on the weight. A new Super Green Car Rebate was introduced in 2012 with the purpose of increasing the sale of electric and hybrid cars. The rebate is available to 5 000 cars during the 2012-to-2014 period.

Modal shift and raising awareness

No measures concerning modal shift and raising awareness have been reported, but in general, transport networks for bicycles as well as the public transport system are considered to be well developed.

Industrial processes

Non-CO_2 gases

Emissions of fluorinated greenhouse gases (F-gases) are estimated to decrease significantly between now and 2020, as a result of the EU-wide regulation and directive for certain fluorinated greenhouse gases and measures taken in aluminium production following inclusion in the EU ETS.

Energy efficiency

A policy instrument for energy efficiency in industry is the Programme for Energy Efficiency in Energy-intensive Industry, which is described above in the section 'Energy use - Energy efficiency'.

Agriculture

After the review of the EU Common Agriculture Policy, direct aid is transferred to the budget of rural development in order to meet new challenges in the areas of climate change, renewable energy, water management, protection of biodiversity and competitiveness of the dairy sector. The national 'Rural Development Programme 2007–2013' covers support for the development of rural areas, environmental improvements and aid to boost competitiveness in agriculture, forestry, horticulture, reindeer herding and food processing. In 2008, the Swedish government introduced investment aid for agriculture biogas production and for the growing of energy crops.
In addition, the present day refunding of the CO_2 tax for fuels used in the land-based industries (agriculture and forestry) will be reduced in several steps.

Waste

The implementation of the Landfill Directive (1999/31/EC) sets requirements in order to reduce biodegradable waste on landfills and to collect methane from landfills, preferably for energy recovery. Sweden has, however, introduced more far-reaching national instruments which help to achieve emissions reductions earlier. A ban on landfilling of combustible materials was introduced in 2002 and a similar ban was imposed on organic material in 2005. The bans have been implemented gradually, and exemptions have been granted when treatment capacities for the recovery of materials and for waste incineration have not been expanded sufficiently quickly.

Land use, land-use change and forestry

Methods employed in forestry are chiefly governed in Swedish law by provisions in the Forestry Act and the Environmental Code. There are no special rules at present for promoting increased sequestration of carbon in Sweden. Swedish forests have a high carbon storage capacity and applications of current provisions directly affect the development of carbon storage in various ways.

Key policies and measures
reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
SE-CRS-008 Carbon dioxide taks, SE-CRS-007 Energy taks, SE-CRS-009 EU ETS and SE-ENS-002 Electricity certificate system (both ETS and non-ETS)	16 000
SE-TRA-001 Vehicle fuel taks (non-ETS)	2 400
SE-WST-001 Rules on municipal waste planning, rules on producer responsibility for certain goods, taks on landfilling of waste, prohibition of landfilling of combustible and organic waste (non-ETS)	1 900
SE-TRA-004 Taks relief on biomass fuels and SE-TRA-005 Law on supply of renewable fuels & SE-TRA-006 Support for renewable fuels supply (non-ETS)	1 800
SE-TRA-011 EU requirements on new vehicles CO_2 emissions, SE-TRA-007 Differentiated annual vehicle taks and SE-TRA-009 Annual vehicle taks exemption (non-ETS)	1 300
SE-IND-001 F-gas regulation (non-ETS)	700
SE-TRA-002 Taxation of fuel use (non-ETS)	200
SE-TRA-002 raised energy taks on diesel (non-ETS)	200
SE-ENU-003 Increased CO_2 taks for non-ETS industry and introduction of energy taks on fossil fuels for heating in industry (non-ETS)	200
SE-COM-001 Increased CO_2 taks for non-ETS agriculture sectors (non-ETS)	200
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
SE-TRA-006 Quota obligation for low-admixture of biofuels (N.E)	
Measures with large expected savings specifically in the non-ETS sectors	
SE-CRS-008 carbon dioxide taks (non-ETS)	16 000
SE-TRA-001 Vehicle fuel taks (non-ETS)	2 400
SE-WST-001 Rules on municipal waste planning, rules on producer responsibility for certain goods, taks on landfilling of waste, prohibition of landfilling of combustible and organic waste (non-ETS)	1 900
SE-TRA-004 Taks relief on biomass fuels, SE-TRA-005 Law on supply of renewable fuels and SE-TRA-006 Support for renewable fuels supply (non-ETS)	1 800
SE-TRA-011 EU requirements on new vehicles CO_2 emissions, SE-TRA-007 Differentiated annual vehicle taks and SE-TRA-009 Annual vehicle taks exemption (non-ETS)	1 300
EU policies or measures related to measures expected to deliver the largest savings	
SE-TRA-004 Taks relief on biomass fuels, SE-TRA-005 Law on supply of renewable fuels: RES directive (Directive 2009/28/EC)	
SE-TRA-001 Vehicle fuel taks: Taxation of energy products and electricity (Directive 2003/96/EC)	
SE-IND-001 F-gas regulation: Taxation of energy products and electricity (Directive 2003/96/EC)	
SE-TRA-011 EU requirements on new vehicles CO_2 emissions: Taxation of energy products and electricity (Directive 2003/96/EC)	
SE-WST-001 Rules on municipal waste planning, rules on producer responsibility for certain goods, taks on landfilling of waste, prohibition of landfilling of combustible and organic waste: Waste: Landfill Directive (Directive 1999/31/EC)	
EU policies or measures expected to result in the largest emission savings	
Energy supply: Taxation of energy products and electricity (Directive 2003/96/EC)	
Energy supply: RES directive (Directive 2009/28/EC)	
Transport: Strategy for cars CO_2 (Regulation 443/2009)	
Waste: Landfill Directive (Directive 1999/31/EC)	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Switzerland

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	53.0	51.7	54.1	50.0	50.2
GHG per capita (t CO_2 eq./cap.)	7.9	7.2	6.9	6.4	6.3
GHG per GDP (g CO_2 eq./EUR)	203.6	178.4	157.2	142.6	141.8
Share of GHG emissions in total EU-28 emissions (%)	0.9 %	1.0 %	1.1 %	1.1 %	1.1 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	2.8	2.7	2.6
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	5 %	5 %	5 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 17.6 %	– 20.6 %	– 23.5 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	0.0 %	0.0 %	5.2 %

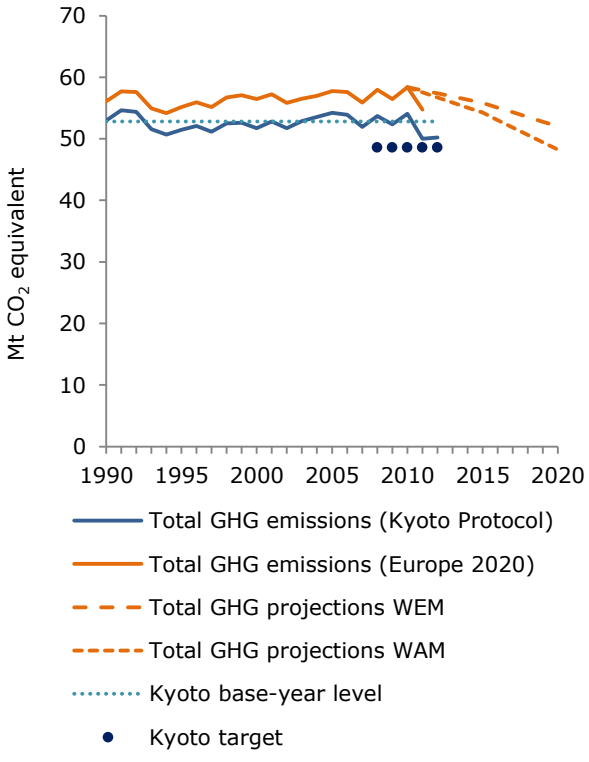
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	49.6
2008–2012 average non-ETS target	45.2
Gap to target (domestic emissions-target)	**4.3**
Expected effect of carbon sinks	– 1.7
Planned use of flexible mechanisms	3.0
Issued emission reduction units	0.0
Overall gap to target	**– 0.3**

Switzerland is on track towards its Kyoto target. Its government intends to close the gap between its 2008-to-2012 emissions and its target by acquiring a number of Kyoto units equivalent to 6 % of base-year emissions per year.

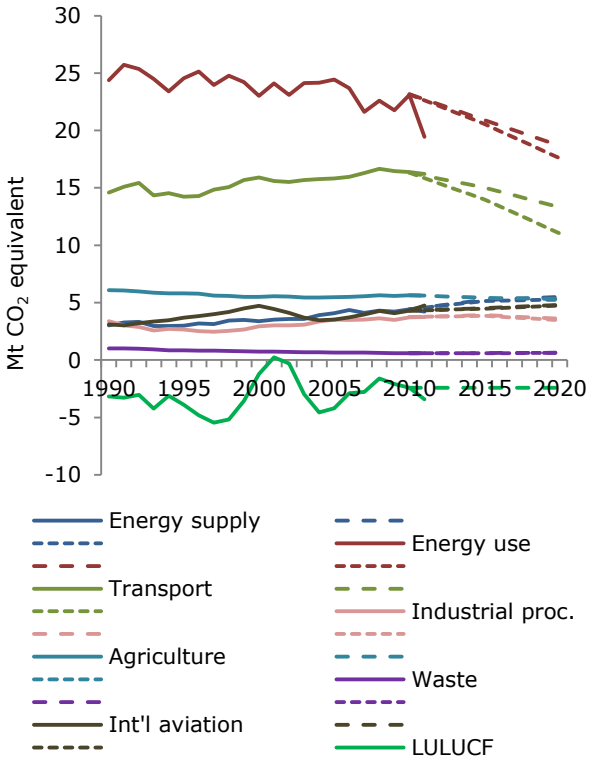
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	n/a
2013 ESD target	n/a
Gap to target (domestic emissions-target)	n/a
2020 ESD target (with art. 10 adjustment)	n/a
2020 non-ETS projections WEM	43.1
Gap to target WEM	**n/a**
2020 non-ETS projections WAM	40.5
Gap to target WAM	n/a

Switzerland is not a member of the European Union (EU) and does not have any targets under the ESD.

GHG trends and projections

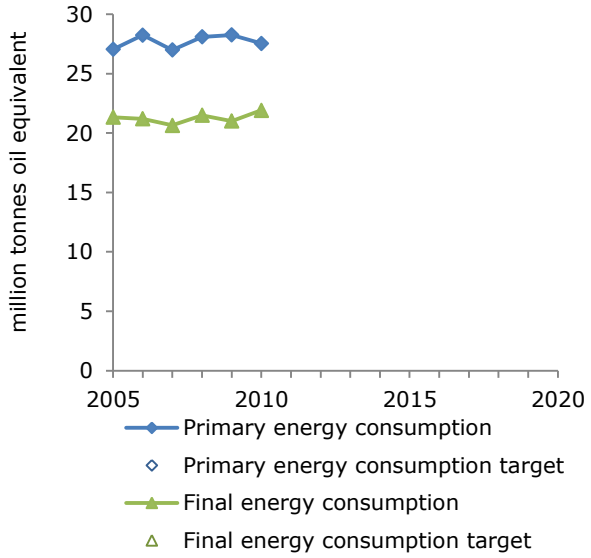


Sectoral GHG trends and projections

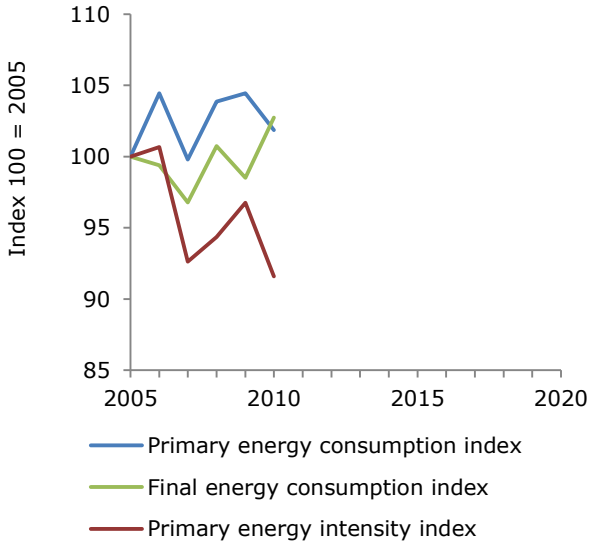


Key energy data ([9])	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	27.0	28.2	27.5	n/a	n/a
Final energy consumption (FEC) (Mtoe)	21.3	21.0	21.9	n/a	n/a
Switzerland has made some progress in reducing primary energy consumption but energy consumption in end-use sectors continues to increase, mainly dueto industrial sectors where electricity consumption has been increasing since 2005. In 2009, Switzerland extended its programme Swiss Energie until 2020. While there is no target on energy efficiency per se, Switzerland aims to reduce its fossil fuel use by 20 % by 2020 and the associated GHG emissions.					
Share of renewable energy in gross FEC (%)	n/a	n/a	n/a	23.4 %	n/a
Share of renewable energy in gross FEC — electricity (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — transport (%)	n/a	n/a	n/a	n/a	n/a
In 2011, the share of renewable energy in gross final energy consumption was 23.4 % (5 050 ktoe). Over the 2005-to-2011 period, the observed average annual growth rate in renewable energy amounted to 1.5 %.					

Primary and final energy consumption



Primary energy intensity



Progress towards renewables targets

n/a

Development of main renewable technologies

n/a

[9] Source: EEA estimation based on Eurostat's energy balances (Eurostat, 2013).

Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The Energy Strategy 2050 foresees a gradual reduction of the nuclear power capacity, further energy efficiency increases, an increase in hydropower and other renewable energy sources and, where needed, fossil fuel plants (e.g. combined heat and power (CHP)) and energy imports. The Swiss Energy 2011–2020 programme sets relevant targets for 2020 to reduce fossil fuel consumption by 20 % compared to 1990 and energy use through increased energy efficiency, and to increase the percentage of electricity from renewable sources to reach 50 % by 2020. Under the CO_2 Act of 2011, Swiss greenhouse gas (GHG) emissions must be reduced by at least 20 % by 2020 (equal to an absolute reduction of 10.5 million tonnes of CO_2 eq. compared to 1990). To this end, appropriate measures should be taken in the building and transport sectors amongst others, and participation in the ETS is foreseen.

Main economic instruments for renewable energy and energy efficiency

One key economic instrument is a feed-in tariff that guarantees producers of electricity generated from renewable energy sources a premium for a period of up to 25 years. The amount of funding differs depending on the used technology and installed plant capacity.

Swiss Emissions Trading System

Switzerland has a national ETS which covers large installations. In 2011, they represented a share of 5.4 % of total GHG emissions in the country.

Energy supply

Energy efficiency

The Swiss Energy programme aims to contribute to the reduction of energy use through increased energy efficiency, and an increase of the share of renewable energy up to 50 % by 2020. Nuclear power supply is to be gradually decreased. Energy efficiency in the power sector is high, partly due to the large share of hydropower. The share of cogeneration and combined cycle facilities has increased over the past decades. There is also a federal decree for compulsory compensation of all CO_2 emissions from gas power stations. Planned combined cycle power plants only obtain planning permission if their CO_2 emissions are fully compensated.

Renewables

To increase the use of renewable energy, the Swiss Energy programme identifies three key measures: a) stimulate heat production from renewable energy; b) stimulate electricity production from renewable energy (e.g. by better functioning of the current feed-in tariff); and c) support renewable energy systems.

According to current legislation, grid operators are obligated to connect producers of electricity to the grid (Art. 7, EnG), but electricity from renewable energy sources is not given priority.

Energy use

Energy efficiency

A CO_2 levy was introduced in 2008 on thermal and motor fuels. It will result in a reduction of 2 million tonnes of CO_2 by 2020. The CO_2 levy rate will depend on the price of oil. At current oil prices, a CO_2 levy rate of CHF 60 (EUR 48) per tonne CO_2 should be sufficient to achieve the target. It was increased in 2010 to act as an incentive for a more efficient use of fossil fuels, and to promote investment in energy-efficient technologies and the use of low-carbon or carbon-free energy sources.

The main instruments controlling industrial emissions of CO_2 is the CO_2 levy, a conditional exemption from the CO_2 levy, and emission trading amongst companies exempt from the CO_2 levy. Between 2013 and 2020, these measures should bring a reduction in GHG emissions of around 0.8 million tonnes. According to estimates, around 0.5 million tonnes of the reductions will be achieved by Swiss industrial companies. The companies will continue to be eligible to claim part of their emission reductions by purchasing emission allowances and certificates (around 0.3 million tonnes).

Renewables

No measures reported.

Transport

Renewables

Tax incentives are in place for low-emission vehicle and biofuels.

Transport efficiency

To increase energy efficiency in transport, the Swiss Energy programme promotes energy-efficient vehicles and a more energy-efficient driving style. Concrete measures include an Energy Label for passenger cars, as a voluntary agreement with Auto-Schweiz (the car importers association), and the adoption of CO_2 emission standards for new passenger cars.

Modal shift and raising awareness

A Heavy Vehicle Fee (HVF) and supporting modal shift policies have been adopted to reduce the transalpine traffic and increase transport rates on rail. The Agglomeration Programme aims to improve public transportation.

Industrial processes

Non-CO_2 gases

An ordinance on chemical risk reduction prohibiting the use of synthetic GHGs (hydrofluorocarbon (HFC), perfluorocarbon (PFC) and sulphur hexafluoride (SF_6)) is implemented to reduce the use of synthetic GHGs in all sectors. A deposit /advanced disposal fee for synthetic GHGs as an incentive for closed loop processes is planned.

Energy efficiency

To increase energy efficiency in industry and the service sector, the Swiss Energy programme promotes target agreements, process optimisation, energy efficiency in specific sectors and cross-cutting technologies, performing

efficiency programmes, the use of waste heat from industrial processes, eliminating barriers to investment and coverage of investment risks, integrative energy audits in companies (without target agreements), and the optimisation of cooling systems.

Agriculture

Agricultural policy aim to reduce methane and nitrous oxide through incentives for practices that reduce the use of fertilisers, for instance.

Waste

A technical ordinance on waste, a ban on landfilling combustible waste, aims at the reduction of methane emissions.

Land use, land-use change and forestry

The Swiss forestry policy 2020 foresees the sustainable forest management, with an increased use of wood as fuel.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
CH-RES-004 Building codes (MuKEn modules A-D) (non-ETS)	1 750
CH-RES-006 Building renovation programme (joint federal and cantonal) (additional effect 2013–2020) (non-ETS)	1 500
CH-TRA-007 CO_2 emission standards for new passenger cars (non-ETS)	1 500
CH-TRA-008 CO_2-compensation of fossil transport fuels (non-ETS)	1 500
CH-TRA-004 Energy label for passenger cars, voluntary agreement with Auto-Schweiz (car importers association) (non-ETS)	1 500
CH-RES-005 CO_2 levy on heating fuels (renewed CO_2 legislation) (non-ETS)	700
CH-CRS-004 Voluntary measures within EnergieSchweiz (renewed) (non-ETS)	600
CH-IND-001 Ordinance on chemical risk reduction prohibiting the use of synthetic greenhouse gases (HFC) (non-ETS)	500
CH-ENU-002 Emission Trading System (domestic effect) (non-ETS)	500
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
CH-TRA-003 Agglomeration programme (non-ETS)	325
CH-ENU-003 Emissions Trading System (CDM) (non-ETS)	300
CH-IND-003 Ordinance on chemical risk reduction prohibiting the use of synthetic greenhouse gases (SF6) (non-ETS)	200
CH-WST-001 Technical ordinance on waste, ban on landfilling combustible waste (non-ETS)	180
CH-TRA-002 Heavy vehicle fee (HVF) and supporting modal shift policies (non-ETS)	175
CH-CRS-005 Ordinance on Air Pollution Control and incentive tax on VOC (non-ETS)	120
CH-TRA-006 Tax incentives for low-emission vehicle and biofuels (non-ETS)	100
CH-IND-002 Ordinance on chemical risk reduction prohibiting the use of synthetic greenhouse gases (PFC) (non-ETS)	13
Measures with large expected savings specifically in the non-ETS sectors	
CH-IND-004 Deposit / advanced disposal fee for synthetic greenhouse gases (non-ETS)	100

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — Turkey

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	188.4	298.2	402.1	422.4	n/a
GHG per capita (t CO_2 eq./cap.)	3.4	4.5	5.5	5.7	n/a
GHG per GDP (g CO_2 eq./EUR)	872.2	962.9	888.2	857.8	n/a
Share of GHG emissions in total EU-28 emissions (%)	3.4 %	5.9 %	8.5 %	9.2 %	n/a
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	n/a	n/a	n/a
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	n/a	n/a	n/a
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	n/a	n/a	n/a
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	n/a	n/a	n/a

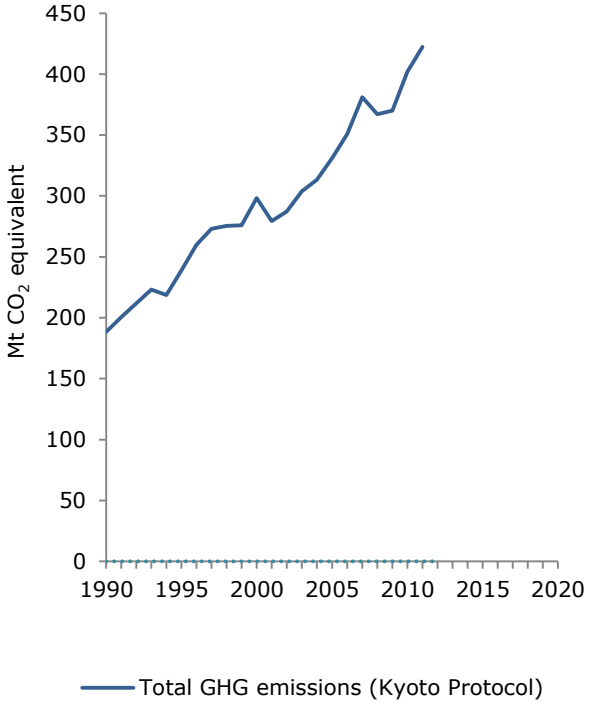
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	n/a
2008–2012 average non-ETS target	n/a
Gap to target (domestic emissions-target)	n/a
Expected effect of carbon sinks	n/a
Planned use of flexible mechanisms	n/a
Issued emission reduction units	n/a
Overall gap to target	n/a

Turkey does not have any targets under the Kyoto Protocol's first commitment period, from 2008 to 2012.

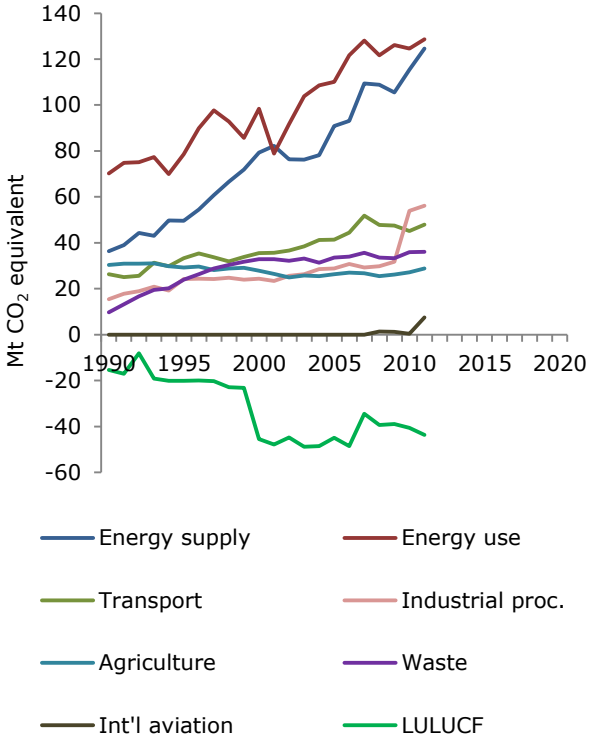
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	n/a
2013 ESD target	n/a
Gap to target (domestic emissions-target)	**n/a**
2020 ESD target (with art. 10 adjustment)	n/a
2020 non-ETS projections WEM	n/a
Gap to target WEM	**n/a**
2020 non-ETS projections WAM	**n/a**
Gap to target WAM	**n/a**

Turkey is not a member of the European Union (EU) and does not have any targets under the ESD.

GHG trends and projections



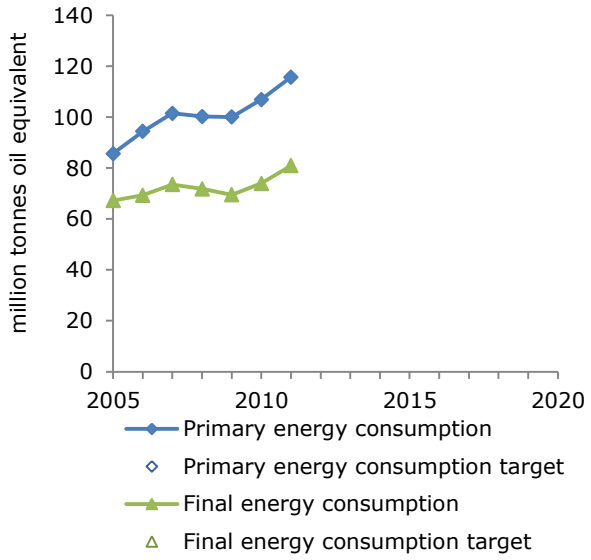
Sectoral GHG trends and projections



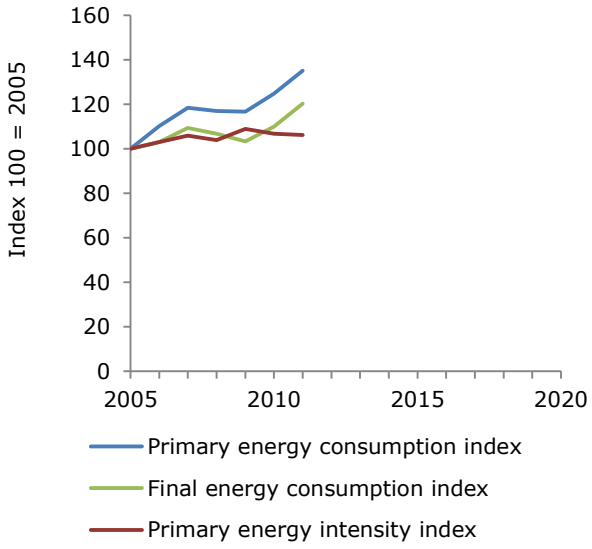
Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	85.7	100.0	106.9	115.7	n/a
Final energy consumption (FEC) (Mtoe)	67.3	69.5	74.0	80.9	n/a
Turkey does not have a 2020 target on energy efficiency.					
Share of renewable energy in gross FEC (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — electricity (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — heating and cooling (%)	n/a	n/a	n/a	n/a	n/a
Share of renewable energy in gross FEC — transport (%)	n/a	n/a	n/a	n/a	n/a

In 2011, the share of renewable energy in gross final energy consumption was 12.4 % (10 553 ktoe). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (52 %), hydropower (30 %) and renewable energy from heat pumps (6 %). Over the 2005-to-2011 period, the observed average annual growth rate in renewable energy amounted to 0.8 %.

Primary and final energy consumption



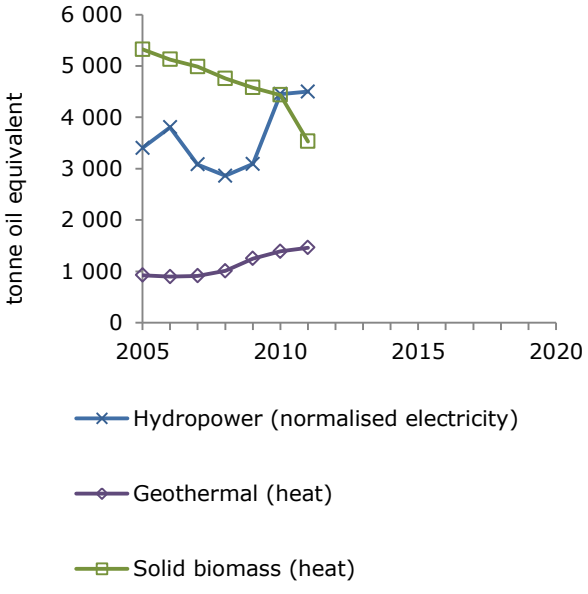
Primary energy intensity



Progress towards renewables targets

n/a

Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

In 2010, the Turkish government adopted a national Climate Change Strategy (2010–2020) that sets a national framework for climate policy. Climate change mitigation and adaptation aspects shall be integrated into the national action plans and policies. The share of renewables in power generation shall amount to 30 % by 2023. GHG emissions resulting from power generation shall be reduced by 7 % by 2020, and energy intensity shall decrease by 10 % by 2015. International cooperation is important for achieving these goals.

The National Climate Change Action Plan (2011–2023) complements the Climate Change Strategy and defines the measures to support the strategic targets. Emphasis has been placed on capacity-building, awareness-raising, data collection, and reviews and analysis of diverse technologies. Legislation is being assessed and amended; research and development (R&D) projects in particular are being supported at the moment.

In general, Turkey is making an effort to meet EU requirements.

Main economic instruments for renewable energy and energy efficiency

No information is provided on economic instruments. In the Climate Change Strategy, it is mentioned that funds will be derived from international funds from cooperation and bilateral projects.

European Union Emissions Trading System (EU ETS)

Turkey is not participating in the EU ETS.

Energy supply

Energy efficiency

The government supports the rehabilitation and modernisation of existing coal power plants, so as to increase their efficiency. As lignite remains an important domestic source, clean coal technologies are developed and promoted. Cogeneration and district heating are supported, in line with EU requirements.

Renewables

The most important renewable energy sources are hydropower and wind, which shall be exploited to the maximum. Geothermal electricity generation is another area of focus. Feed-in tariffs are provided for power generation based on renewable energy sources.

Energy use

Energy efficiency

According to the National Climate Change Action Plan, Turkey plans to introduce Energy Identity Certificates for new buildings. The renovation and insulation of existing buildings is promoted to reduce energy consumption. There are plans to adopt a limitation value of CO_2 emissions for buildings. The energy consumption of public buildings is intended to be reduced in the long term. Standards and energy labels for appliances were introduced. The industrial sector can benefit from financial incentives for energy savings. Moreover, Turkey plans to introduce smart grid applications for better control of electricity consumption.

Renewables

Renewable energy installations are promoted for new buildings: heat pumps, (micro-)cogeneration, district heating and cooling. Solar thermal installations will be installed in public buildings, hotels, and sport centers whose area is larger than 1 000 m².

Transport

Renewables

The use of alternative fuels such as liquefied natural gas (LNG), ethanol and biofuels is supported in Turkey. Regulations for biofuels are in line with the requirements of the EU Directive on Renewable Energy (Directive 2009/28/EC). Charging stations shall be installed to increase the use of electric vehicles.

Transport efficiency

Besides fulfilling EU requirements for reducing CO_2 emissions from light duty vehicles, Turkey has introduced high taxes on transport fuels, and levied a consumption tax that favours efficient cars. Trains and the marine fleet shall be successively modernised and exchanged.

Modal shift and raising awareness

Turkey plans further investments in the rail infrastructure, including electrification. The high-speed train network and the regular train network shall be extended to improve passenger and freight transportation within Turkey. The maritime infrastructure for passengers and freight transport will be improved and there are plans to build new ports. These measures aim at increasing the modal shift to decrease traffic on highways. In Turkish cities, public transport is promoted; there are plans to build additional roads and areas for cyclists and pedestrians.

Industrial processes

Non-CO_2 gases

No specific strategies or measures have been reported in the industrial processes sector.

Energy efficiency

Measures to be taken to increase energy efficiency in the industry sector require industrial establishments with annual energy consumption of 2 000 tonnes of oil equivalent or more, to set up an energy management system in their plants.

In the production industry, R&D shall be supported, particularly in the fields of information and communication, development of new products and technologies, environmental protection, development of small and medium-sized industries, and investment in the reduction of interregional differences in development.

Agriculture

Turkey´s legal basis in the agricultural sector is the Agricultural Strategy Paper (2006–2010), aiming at sustainable

development, product quality, sustainable use of natural resources, food security and competitiveness in agricultural holdings, agricultural markets, rural development and producers´ organisations. Rural development in Turkey covers basin management and small-scale agricultural development projects, including, for instance, the development of agriculture and livestock, and irrigation.
The policies and measures related to the Agricultural Strategy Paper are not climate specific, but some of them result in decreasing emissions. As stated in Turkey´s Climate Change Action Plan 2011–2023, the objectives for the agricultural sector are to increase carbon stock in soils, promote and improve the use of organic and green fertilisers and animal-sourced fertilisers, prevent stubble burning and burning of other wastes, introduce effective pasture management systems and limit GHG emissions from animal production.

Waste

Waste management is a relatively new policy in Turkey; it is based on sustainability principles such as waste avoidance, minimisation, reuse, recycling and pretreatment, including incineration and landfilling. Currently, preparatory work is being carried out for emission control by controlled waste disposal in compliance with Council Directive 1999/31/EC on the landfilling of waste and for organic wastes (third draft of the Biowaste Directive). Regarding organic waste recovery, mechanical and biological treatment is being considered for composting.
Regarding Turkey´s Climate Change Action Plan 2011–2023, further objectives for the waste sector are to prepare Integrated Waste Management Plans (IWMPs), achieve the target of reducing the quantity of biodegradable waste disposed on landfills (by 75 % in weight by 2015, by 50 % till 2018 and by 35 % by 2025), and disseminate information and carry out awareness-raising for separate waste collection. Additionally, the installation of biomethanisation facilities is planned across Turkey for organic wastes and the rehabilitation of uncontrolled waste sites.

Land use, land-use change and forestry

Turkey has a Forestry Master Plan for the period 1990–2009, which focuses mainly on sustainable forest management, forest conservation, multiple uses of forests, and stakeholder participation in the design and monitoring of sectoral policies.
The main policies developed under the Turkish 'National Forest Programme' (NFP) deal with the protection of forests, the conservation of their biodiversity, the protection against the negative impacts of biotic and non-biotic agents, the improvement of existing forests and the expansion of the forest land area, as well as the optimisation of wood and non-wood products and services. Action plans for the application of these policies are prepared by the General Directorate of Forests. A key climate change mitigation measure implemented under the NFP is the Afforestation and Erosion Control Mobilisation Action Plan 2008–2012, with a target of afforesting 2.3 million hectares of land in a 5-year period (2008–2013). Some 181.4 million tonnes of CO_2 are expected to be sequestered as a result of this campaign.
In Turkey´s Climate Change Action Plan 2011–2023, the following additional objectives are planned: enhancing carbon sequestration in forests, the development of forest monitoring systems, the promotion of short rotation plantations for energy wood production on less favourable land, the protection and improvement of wetlands, the protection of peat lands and the restriction of turf production.

Key policies and measures

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
n/a	n/a
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
n/a	n/a

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

Key climate- and energy-related data — The United Kingdom

Key GHG data	1990	2000	2010	2011	2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2 eq.)	767.3	673.8	593.9	552.6	567.7
GHG per capita (t CO_2 eq./cap.)	13.4	11.5	9.6	8.8	9.0
GHG per GDP (g CO_2 eq./EUR)	617.1	422.2	312.5	287.9	294.9
Share of GHG emissions in total EU-28 emissions (%)	13.7 %	13.2 %	12.5 %	12.1 %	12.6 %
EU ETS verified emissions (Mt CO_2 eq.)	n/a	n/a	237.3	220.9	231.2
Share of EU ETS verified emissions in total emissions (%)	n/a	n/a	40 %	40 %	41 %
ETS emissions vs. allowances (free, sold, auctioned) (%)	n/a	n/a	– 7.4 %	– 13.1 %	– 9.7 %
Share of CERs & ERUs in total surrendered allowances (%)	n/a	n/a	3.3 %	7.2 %	19.0 %

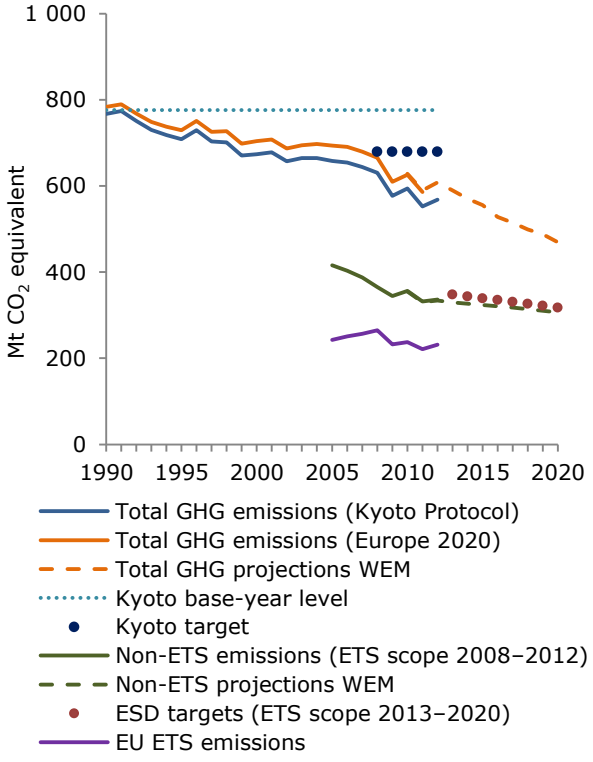
Progress towards 2008–2012 Kyoto target (Mt CO2 equivalent)	
2008–2012 average non-ETS emissions	346.9
2008–2012 average non-ETS target	433.9
Gap to target (domestic emissions-target)	**– 87.0**
Expected effect of carbon sinks	– 3.6
Planned use of flexible mechanisms	0.0
Issued emission reduction units	0.0
Overall gap to target	**– 90.7**

The United Kingdom is on track towards its Kyoto target. Its government does not plan on using the Kyoto flexible mechanisms to achieve its target.

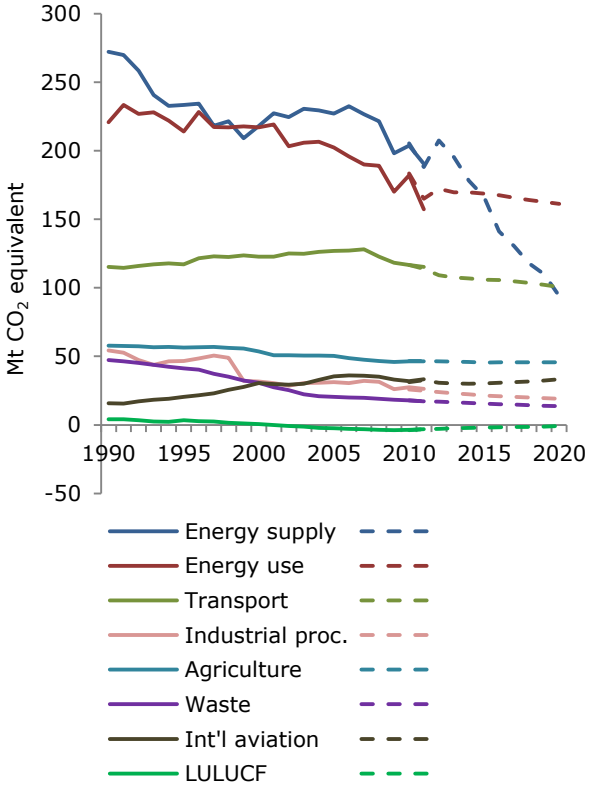
Progress towards annual ESD targets (Mt CO2 equivalent)	
2012 non-ETS emissions	335.0
2013 ESD target	350.4
Gap to target (domestic emissions-target)	**– 15.4**
2020 ESD target (with art. 10 adjustment)	319.5
2020 non-ETS projections WEM	306.6
Gap to target WEM	**– 12.9**
2020 non-ETS projections WAM	n/a
Gap to target WAM	**n/a**

The United Kingdom is on track towards its 2013 ESD target. Projections show that with the existing measures, 2020 emissions will be lower than the 2020 ESD target.

GHG trends and projections

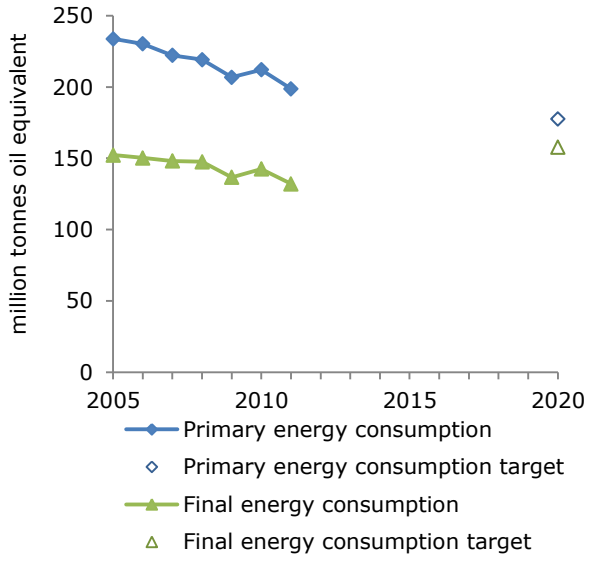


Sectoral GHG trends and projections

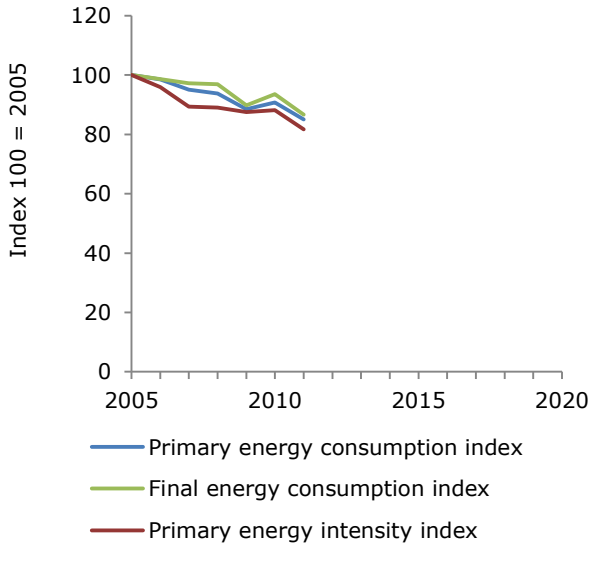


Key energy data	2005	2009	2010	2011	2020 target
Primary energy consumption (Mtoe)	233.8	206.9	212.1	198.7	177.6
Final energy consumption (FEC) (Mtoe)	152.3	136.7	142.5	132.0	157.8
The United Kingdom is making some progress in reducing energy consumption, but further improvements are necessary, in either energy efficiency policy implementation, the policy package development, or in both.					
Share of renewable energy in gross FEC (%) (including all biofuels consumed in transport)	1.3 % (1.4 %)	2.3 % (3.0 %)	3.3 % (3.3 %)	3.8 %	15.0 %
Share of renewable energy in gross FEC — electricity (%)	4.1 %	6.6 %	7.4 %	8.7 %	
Share of renewable energy in gross FEC — heating and cooling (%)	0.9 %	1.7 %	1.7 %	2.2 %	
Share of renewable energy in gross FEC — transport (%) (including all biofuels consumed in transport)	0.1 % (0.3 %)	0.1 % (2.7 %)	3.1 % (3.1 %)	2.9 %	10.0 %
In 2011, the share of renewable sources in gross final energy consumption was 3.8 % (5 004 ktoe), which is lower than the indicative target for the 2011-to-2012 period (4.0 %). The three main technologies contributing to renewable energy use in 2011 were solid biomass for heat (19 %), onshore wind (18 %) and biodiesels (15 %). For the 2005-to-2011 period, the observed average annual growth rate in renewable energy amounted to 16.6 %. In order to reach the 2020 target, an average annual growth rate of 17.0 % is needed for the period from 2011 to 2020. This corresponds to 3.7 times the cumulative effort up to 2011.					

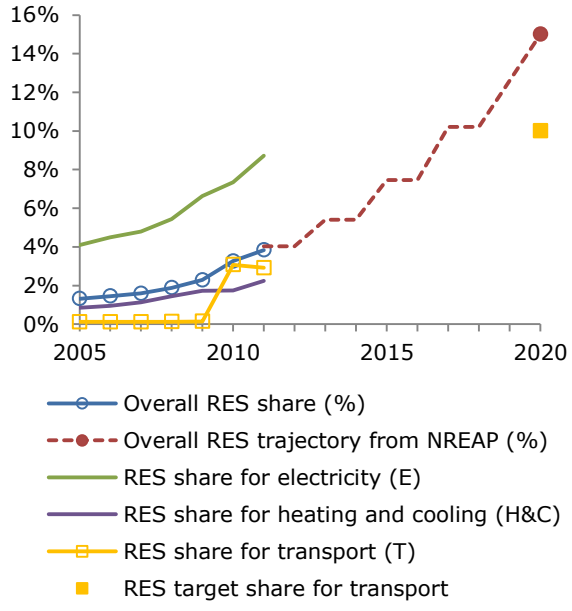
Primary and final energy consumption



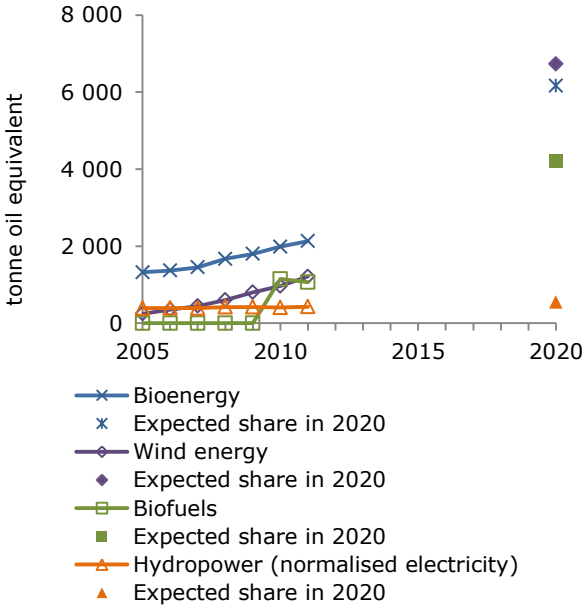
Primary energy intensity



Progress towards renewables targets



Development of main renewable technologies



Climate and energy policy framework

based on 2013 submission under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy framework and cross-sectoral measures

Climate and energy strategies

The United Kingdom has implemented the international Kyoto and EU targets in the Climate Change Act 2008. This framework legislation focuses on the transition to a low-carbon economy and sets national legally binding greenhouse gas (GHG) emission reduction targets. GHG emissions have to be reduced by 34 % (below the 1990 baseline) by 2020, and by at least 80 % by 2050. The government has to fix carbon budgets that cap the United Kingdom's GHG emissions for five-year periods.

Main economic instruments for renewable energy and energy efficiency

The UK Green Investment Bank (UKGIB) was established for providing funding in green infrastructure projects and attracting private sector investment. Priority is given to offshore wind and energy efficiency. A total of 80 % of the funds are planned for these types of projects. Other projects may involve marine energy, renewable heat, biomass power, biofuels for transport and carbon capture and storage (CCS). The government provided GBP 3 billion (EUR 3.4 billion) for green investments to 2015.

European Union Emissions Trading System (EU ETS)

In the United Kingdom, 1 166 installations participate in the EU ETS. They cover around 40 % of the total national emissions in 2011.

Energy supply

Energy efficiency

The Electricity Market Reform (EMR) programme aims to implement reforms to the electricity market to attract the investment needed to meet carbon emission reductions targets and ensure a secure, affordable supply of electricity. Contracts for Difference (CfD) ensure that low-carbon generators receive a guaranteed price for the electricity and shall stimulate investments in renewables, nuclear and CCS. A carbon price floor was introduced 2013 to stimulate investments in low-carbon technology. The Emissions Performance Standard (EPS) puts a backstop on the amount of emissions through fossil fuel power stations and shall prevent new coal-fired power stations.

Renewables

The Renewables Obligation (RO) is the main financial incentive for large-scale renewable electricity. It obliges licensed electricity suppliers to source an annually increasing proportion of their annual sales from renewable sources, or to pay a penalty.

The feed-in tariffs scheme was launched in April 2010. It is intended to incentivise small-scale low-carbon electricity generation (below 5 MW) and encourage participation of individuals, householders, organisations, businesses and communities. The scheme supports new Anaerobic Digestion, hydro, solar, photovoltaic, wind projects and micro combined heat and power (CHP).

Energy use

Energy efficiency

The United Kingdom has a number of policies aimed at improving energy efficiency. The Green Deal will increase take-up of energy efficiency improvements such as insulations. This market-based initiative rewards efficiency improvements by paying them through expected savings on the fuel bill of the owner or tenant. The Energy Companies Obligation (ECO) focuses on poor and vulnerable households and those hard-to-treat properties that cannot achieve financial savings within the Green Deal. The government plans to provide every home with smart electricity and gas meters. The initiative is expected to start in 2014.

Since October 2010, the government has introduced more stringent standards for new buildings and building renovations.

Energy performance and labelling standards have been agreed for 11 product categories, following agreements on the Framework Directives. Aiming to reduce end-use consumption from electricity-using products, these measures are expected to deliver 7 Mt CO_2 eq. per year by 2020. There are plans to extend this to a further 12 products, including boilers, water heaters, air conditioners and information and communication technologies (ICT).

Renewables

The Renewable Heat Incentive (RHI) is a financial support scheme for promoting renewable heat in the non-domestic sector. In addition, the Renewable Heat Premium Payment (RHPP) provides upfront grants for renewable heating installations in the domestic sector.

At local level, the introduction of the Community Infrastructure Levy in 2010 gave local authorities a tool with which to raise funds for local renewable energy infrastructure.

Transport

Renewables

The Renewable Transport Fuel Obligation sets annual targets for biofuels in the United Kingdom, and the uptake of biofuels has increased in line with regulatory targets. At present, biofuels make up 3 % of the total supply. In 2011, the government introduced minimum sustainability criteria.

Transport efficiency

The government is promoting ultra-low emission vehicle (ULEV) technologies by providing GBP 400 million (EUR 460 million) between 2010 and 2015 for research and development (R&D) activities on e-mobility and hydrogen fuel. The Local Sustainable Transport Fund is a supporting scheme which provides local authorities with around GBP 600 million (EUR 690 million) to implement transport measures on the local level. Measures promoting low-carbon heavy goods vehicles were implemented and a task force is developing a strategy for moving heavy goods vehicles (HGVs) to bio-methane. A Green Bus Fund allocates the GBP 95 million (EUR 110 million) to purchase efficient new buses. The rail network is undergoing further electrification.

Modal shift and raising awareness

No specific strategies or measures have been reported.

Industrial processes

Non-CO_2 gases

The United Kingdom has fully implemented the regulatory framework of EU Regulation 842/2006 on certain fluorinated greenhouse gases and its 10 supplemental European Commission regulations. As a result of this framework and further industry action, it is expected that British emissions of hydrofluorocarbons (HFCs), which are the most common types of F gas, will drop significantly over the next 20 years.

Energy efficiency

The United Kingdom has introduced policies to encourage industrial energy efficiency and carbon reduction. The Carbon Reduction Commitment (CRC) Energy Efficiency Scheme is a mandatory scheme aimed at improving energy efficiency and cutting emissions in large public and private sector organisations. The CRC incentivises large private and public sector energy users to prioritise investment in energy efficiency. Further instruments are the Climate Change Agreements to incentivise energy efficiency while protecting competitiveness. The Energy Intensive Industry package ensures that manufacturing is able to remain competitive during the shift to a low-carbon economy while minimising carbon leakage.

Agriculture

Several EU policy instruments act in support of measures that reduce emissions from the agriculture sector, including the Rural Development Regulation, the Direct Payments Directive, the Nitrates Directive (91/676/EEC) and the Water Framework Directive (2000/60/EC). In England, a Greenhouse Gas Action Plan was published by a group of industry representatives with the focus on using resources more efficiently, reducing the use of nitrogen in animal and crop nutrition, using better management systems for livestock and making better use of energy and fuel. The plan is expected to deliver annual savings of 3 Mt CO_2 eq. per year by 2020.

Waste

Actions related to sector waste will contribute to reducing the volume of waste going to landfills by encouraging the right infrastructure, markets and behaviour. The most important instrument is the landfill tax. The EU Landfill Directive (1999/31/EC) sets targets to reduce the amount of biodegradable municipal waste to landfill.
The Anaerobic Digestion (AD) Strategy, published in June 2011, sets out the reasons why the government wished to see an increase in the energy from waste produced by Anaerobic Digestion inclusive of avoiding, by more efficient capture and treatment, the GHG emissions associated with sending food waste to landfill. A progress report on the AD Action Plan was published in July 2012. Energy from waste plays an important role in diverting waste from landfills. The Waste Prevention Programme for England, due in 2013, will provide a strategic direction for waste prevention: it aims to increase the amount of items that are reused and to reduce the quantity of produced waste.

Land use, land-use change and forestry

The Forestry Act, felling license requirements and environmental impact regulations provide a strong overarching regulatory framework for forest management, controlling deforestation and unsustainable management practices. Key measures include the Forestry Commission's Woodfuel Strategy, the English Woodland Grant Scheme, the Woodland Carbon Task Force, the Glastir scheme (Wales), the Woodland Grant Scheme (Northern Ireland) and the Scottish forestry programme. The UK Forestry Standard (UKFS) is the reference standard for sustainable forest management.

Key policies and measures

reported under the GHG Monitoring Mechanism Decision 280/2004/EC

Policy or measure	Expected savings (kt CO_2 eq. per year 2020)
Existing measures expected to deliver the largest GHG reductions by 2020	
UK-ENS-001-004: Industrial Emissions Directive (as it applies to Large Combustion Plant), RO, CCS, Carbon Price Floor	67 800
UK-RES-001/UK-COM-001/UK-ENU-001): Building Regulations 2002, 2006, including 2005 condensing boiler update	10 500
UK-RES-005/UK-COM-005/UK-ENU-005: RHI	9 800
UK-RES-009: Energy Efficiency Commitment 1 and 2, Original Carbon Emission Reduction Target (WOM)	7 300
UK-RES-004/UK-COM-004/UK-ENU-004: National Products Policy — Tranche 2 (minimum energy efficiency standards for products)	7 100
UK-RES-003/UK-COM-003/UK-ENU-003: National Products Policy — Tranche 1 (minimum energy efficiency standards for products)	7 100
Additional measures expected to reduce further GHG emissions by 2020, once adopted and fully implemented	
No additional measure reported.	
Measures with large expected savings specifically in the non-ETS sectors	
UK-TRA-004: EU new car CO_2 emissions targets and complementary measures	5 700
UK-TRA-003: Biofuels Policies	3 800
UK-AGR-001: English Agriculture Sector Greenhouse Gas Action Plan (GHGAP)	3 200
EU policies or measures related to measures expected to deliver the largest savings	
UK-ENS-001-004: Industrial Emissions Directive (as it applies to Large Combustion Plant), RO, CCS, Carbon Price Floor: • Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) • Electricity production from renewable energy sources (Directive 2001/77/EC) UK-RES-005/UK-COM-005/UK-ENU-005: RHI: • RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and 2003/30/EC) • Biofuels Directive (2003/30/EC) UK-RES-004/UK-COM-004/UK-ENU-004: National Products Policy – Tranche 1 and 2 (minimum energy efficiency standards for products): End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	
EU policies or measures expected to result in the largest emission savings	
See above.	

More details on each policy or measure are provided on the EEA database on climate change mitigation policies and measures in Europe (www.eea.europa.eu/data-and-maps/pam).

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European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark

Tel.: + 45 33 36 71 00
Fax: + 45 33 36 71 99

Web: eea.europa.eu
Enquiries: eea.europa.eu/enquiries

European Environment Agency