

## Country profile – Luxembourg

The section 'Key climate- and energy-related data' was prepared by the EEA. It includes the latest data available as of 31 July 2014

The section 'Climate and energy policy framework' was prepared by eclareon and Ecologic Institute, Germany. It includes the latest information on national policies and measures available as of 31 May 2014.

For methodological details and other country profiles, see [www.eea.europa.eu/themes/climate/country-profiles](http://www.eea.europa.eu/themes/climate/country-profiles).

## Key climate- and energy-related data — Luxembourg

Key data on GHG emissions	2005	2011	2012	2013	EU 2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO <sub>2</sub> -eq.)	13.1	12.1	11.8	11.4	4 544.2
GHG per capita (t CO <sub>2</sub> -eq./cap.)	28.4	23.7	22.6	21.3	9.0
GHG per GDP (g CO <sub>2</sub> -eq./PPS in EUR)	493	350	332	311	350
Share of GHG emissions in total EU-28 emissions (%)	0.3 %	0.3 %	0.3 %	0.3 %	100.0 %
EU ETS verified emissions (Mt CO <sub>2</sub> -eq.)	2.6	2.1	2.0	1.8	1 848.6
Share of EU ETS emissions in total emissions (%)	19.9 %	16.9 %	16.8 %	16.2 %	40.7 %
ETS emissions vs allowances (free, auctioned, sold) (%)	- 19.4 %	- 17.5 %	- 20.0 %	- 29.5 %	- 14.1 %
Share of CERs & ERUs in surrendered allowances (%)	0.0 %	11.8 %	12.9 %	n.a.	26.4 %
Non-ETS (ESD) emissions, adjusted to 2013–2020 scope (Mt CO <sub>2</sub> -eq.)	10.2	9.8	9.6	9.6	2 566.6
Key data on renewable energy	2005	2010	2011	2012	EU 2012
Share of renewable energy in gross FEC (%)			2.9 %	3.1 %	14.1 %
( ) = including all biofuels consumed in transport	(1.4 %)	(2.9 %)			
Share of renewable energy for electricity (%)	3.2 %	3.8 %	4.1 %	4.6 %	23.5 %
Share of renewable energy for heating and cooling (%)	3.6 %	4.8 %	4.8 %	5.0 %	15.6 %
Share of renewable energy for transport (%)			2.1 %	2.2 %	5.1 %
( ) = including all biofuels consumed (%)	(0.1 %)	(2.0 %)			
Key data on energy consumption	2005	2010	2011	2012	EU 2012
Primary energy consumption (Mtoe)	4.8	4.6	4.5	4.4	1 584.8
Primary energy consumption per capita (Mtoe/cap.)	10.3	9.2	8.9	8.4	3.1
Final energy consumption (Mtoe)	4.5	4.3	4.3	4.2	1 104.5
Final energy consumption per capita (Mtoe/cap.)	9.7	8.6	8.4	8.0	2.2
Efficiency of conventional thermal electricity and heat production (%)	n.a.	n.a.	n.a.	n.a.	50.0 %
Energy consumption per dwelling by end use	2005	2009	2010	2011	EU 2011
Total energy consumption per dwelling (toe/dwelling)	2.99	2.81	2.46	n.a.	1.42
Space heating and cooling (toe/dwelling)	n.a.	n.a.	n.a.	n.a.	0.96
Water heating (toe/dwelling)	n.a.	n.a.	n.a.	n.a.	0.18
Cooking (toe/dwelling)	n.a.	n.a.	n.a.	n.a.	0.08
Electricity (lighting, appliances) (toe/dwelling)	n.a.	n.a.	n.a.	n.a.	0.20

**Progress towards GHG targets (under the Effort Sharing Decision, i.e. non-ETS emissions)**

2013 ESD target (% vs base year)	- 6.3 %	2020 ESD target (% vs base year)	- 20.0 %
2013 ESD emissions (% vs base year)	- 5.2 %	2020 ESD projections WEM (% vs base year)	+ 3.0 %
		2020 ESD projections WAM (% vs base year)	- 4.1 %

Based on approximated emission estimates for 2013 by EEA, emissions covered by the Effort Sharing Decision (ESD) (i.e. in the sectors which are not covered by the EU ETS) are expected to be above the annual ESD target in 2013. However, according to recent national proxy estimates, the 2013 ESD target could actually be met. Projections indicate that 2020 ESD emissions are expected to be well above the 2020 ESD target, despite the implementation of measures planned until 2013.

**Progress towards renewable energy targets**

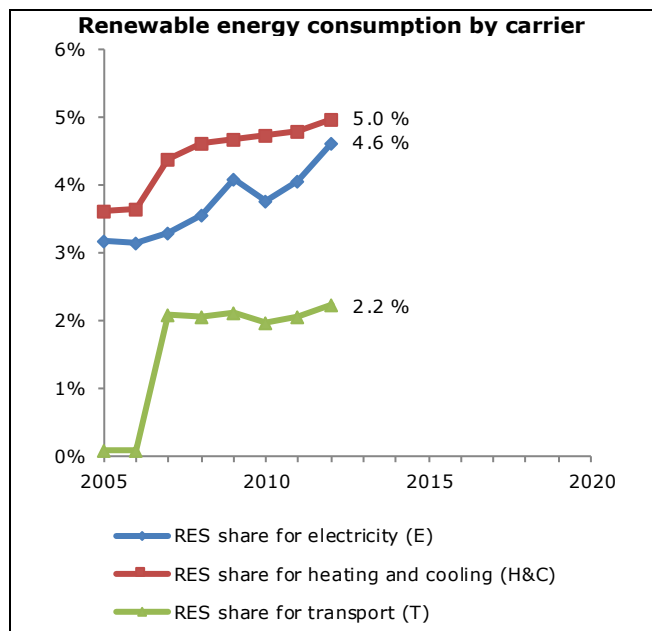
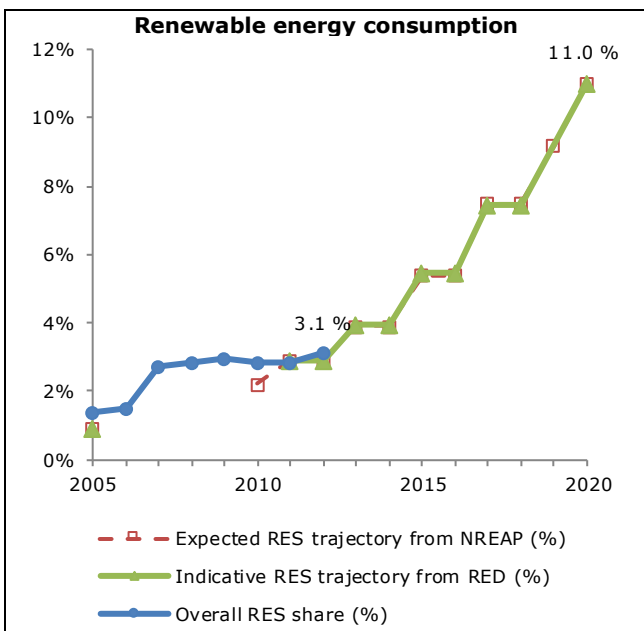
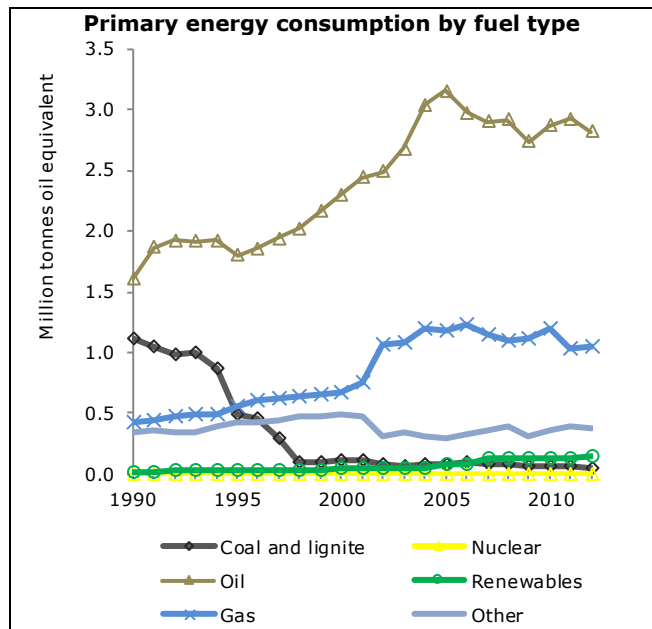
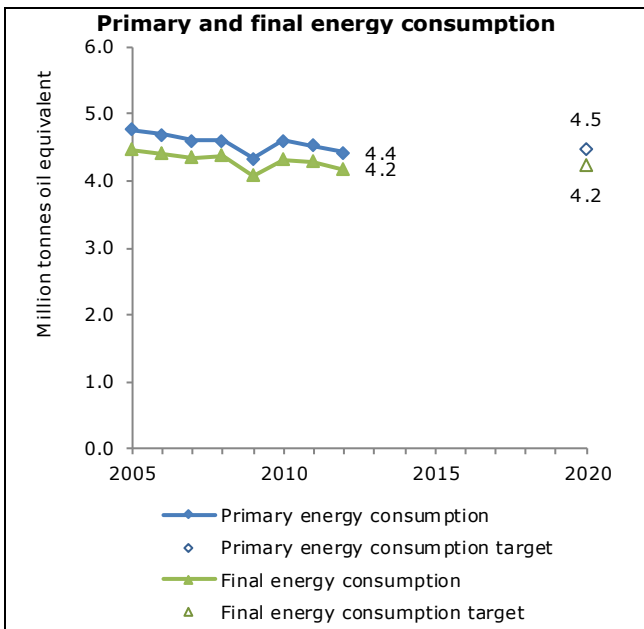
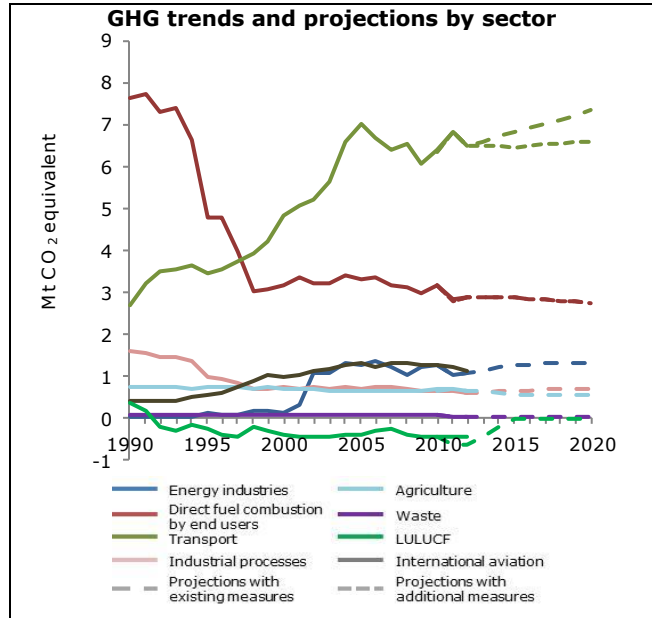
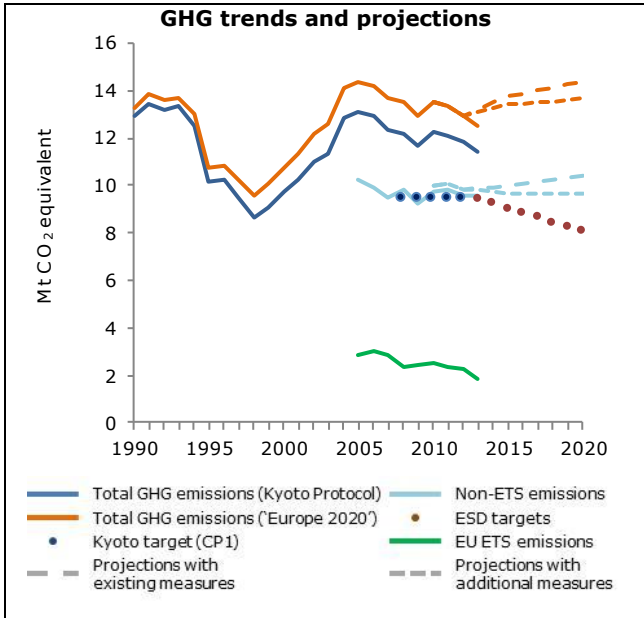
2012 RES share in gross final energy consumption (%)	3.1 %	2011–2012 indicative share from RES Directive (%)	2.9 %
2020 RES target	11.0 %	2012 expected share from NREAP (%)	2.9 %

The average share of renewable sources in gross final energy consumption for 2011–2012 was 3.0% (124 ktoe), which is higher than the indicative RED target for 2011–2012 (2.9%). At the same time, the share of renewables in 2012 (3.1 %) is higher than the expected 2012 NREAP target (2.9 %). Over the period 2005–2012 the observed average annual growth rate in renewable energy consumption amounted to 11.3%. In order to reach its 2020 NREAP target, Luxembourg needs an average annual growth rate of 15.0% in the run-up to 2020. In absolute terms, this is equivalent to 3.9 times its cumulative effort so far.

**Progress towards energy efficiency targets**

Primary energy consumption:		Final energy consumption:	
2005–2012 average annual change	- 1.1 %	2005–2012 average annual change	- 1.0 %
2012–2020 average annual change to target	+ 0.2 %	2012–2020 average annual change to target	+ 0.2 %

Between 2005 and 2012, primary and final energy consumption decreased at a faster pace than is necessary to meet the 2020 targets. This was due to energy efficiency improvements (for example, the replacement of coal by electricity in the steel industry, coupled with an increased share of natural gas in electricity production), as well as a reduction in activity, to some extent. Therefore Luxembourg could focus on stabilising its energy consumption.



## Climate and energy policy framework

### Challenges and opportunities

Luxembourg is projected to miss its 2020 target for non-Emissions Trading System (ETS) greenhouse gas (GHG) emissions by a significant margin if no additional measures are taken. Emissions dropped until 1998 but have risen back to 1990 levels, which can mainly be ascribed to an increase in fuel use in the transport sector. However, a 2008 study indicated that Luxembourg could reduce its energy consumption by up to 72 % by 2050 compared to a business-as-usual scenario, if the country eliminated fuel tourism and implemented energy efficiency measures in all sectors (Ecofys, 2008). More than half of Luxembourg's emissions stem from transport, 70 % of which are connected to fuel export. The main reason for this phenomenon is Luxembourg's geographical position as a transit country and, more importantly, fuel taxes that are well below those of neighbouring Member States, especially as regards diesel. The recognition in the new Climate Action Plan of fuel export as a key challenge is a step forward, but the Plan only establishes a no-growth objective and no reduction of fuel export. However, emissions from domestic transport have also grown, and average emissions from newly registered cars are high. Addressing these emission sources both from domestic fuel consumption as well as fuel export could help Luxembourg to even overachieve its 2020 GHG target. Promoting alternative means of transportation would also help to solve the increasing congestion problem on Luxembourg's roads. Luxembourg's Strategy for Sustainable Mobility and the new Climate Action Plan already outline a number of possible measures, but they largely remain vague and clear timelines for their implementation are missing. Particularly, better spatial planning plays a key role in this respect, given that there is a growing spatial separation between workplace and housing in Luxembourg.

Energy efficiency in the residential sector presents another challenge given that Luxembourg's households have the highest energy consumption per dwelling in the EU, partly due to large living space per capita. Projections show that Luxembourg's population will continue to grow, and so will demand for housing. Refurbishing existing buildings to make them more energy efficient, and constructing highly efficient buildings, could reduce household spending on heating. In particular, investments in refurbishment can also spur local job creation.

### Climate and energy strategies

In 2013, Luxembourg published its second National Climate Action Plan, which contains 51 measures aiming to reduce GHG emissions in Luxembourg by 20 % until 2020. The government announced a focus on energy efficiency measures and the 'strategic potential' of the use of flexible mechanisms and changes in fuel export, recognising that reducing fuel exports by 60 % could close the emissions gap. However, no specific measures on fuel exports are provided, partly because Luxembourg fears tax revenue losses. Rather, the proposed measures target 'domestic' emission reduction potentials in six priority areas, namely renewable energy, energy efficiency, electric mobility, restructuring of the tax system, financial instruments that from a social point of view are more efficient and fair, and improvements on information and communication. In the framework of the Climate Pact, the state government provides financial and technical support to exemplary municipalities.

### Renewable energy

Luxembourg has the second lowest share of renewables in overall energy consumption in the EU, and is still far from meeting its 11 % target for 2020. The main instrument for the promotion of renewable electricity is a feed-in tariff (FIT) system, with tariffs guaranteed for a period of 15 years. The FIT rates depend on the technology and the size of the plant. Except for geothermal energy, all renewable electricity-generation technologies are eligible (Règlement Grand Ducal du 8 février 2008). Following an amendment, FITs for hydropower, wind energy, biogas and biomass were increased by 11 to 31 % while FITs for new photovoltaic (PV) installations decreased by 9 % from 2014 onwards. The new tariffs were presented to the European Commission by the government in July 2013 but are still not approved as of May 2014 (europaforum.lu, 2014). Additionally, a number of subsidies are available for investments in renewable electricity generation, for example for PV installations with a maximum capacity of up to 30 kWp, for companies or for municipalities (RES Legal). Also, sales of electricity generated by PV with a capacity up to 4 kW are exempt from the income tax, as the sale of PV electricity from these installations is not deemed a commercial activity.

For renewable heating, which accounts for only 5 % of heat generation, there are a number of subsidy schemes available, for example for aerothermal and geothermal heat pumps as well as renewable energy plants generating heat from solar thermal energy or various types of biomass (RES Legal). The Climate Action Plan of May 2013 envisages for 2014 information campaigns on renewable energies targeting small and medium-size companies as well as companies of the industrial sector, and a more targeted support scheme for the use of biomass in the form of wood, green waste, agricultural waste and sewage sludge, for example through the introduction of a FIT for renewable heat from these sources.

### Energy efficiency

The second National Action Plan for the reduction of CO<sub>2</sub> emissions contains a number of proposed measures, mainly targeting energy efficiency in residential buildings.

**Taxes** on energy products are below EU average, a fact that is even aggravated by the generally low VAT rate. Luxembourg also grants a number of tax and VAT exemptions and reductions, for example for electricity used in metallurgical processes.

**Cogeneration of electricity and heat** is supported under the FIT system for renewable electricity.

As regards **industry**, structural changes in the iron and steel industry, which are Luxembourg's most important industrial branches, have decreased energy consumption, but the industry remains one of the most energy intensive in the EU. Voluntary agreements with industry are in place in order to improve the energy efficiency of single industrial companies by 1 % per year. The government committed in the Climate Action Plan to monitor these agreements more closely but apart from that the industrial sector does not seem to be in the focus of the plan.

For residential **buildings**, the government recently adopted a regulation setting the target of 'nearly zero energy' requirements from 2019 onwards. As a follow-up measure to the Climate Action Plan, Luxembourg presented a Sectoral Master Plan for Housing offering a new aid scheme for energy savings and the use of renewable energy of residential buildings from 2013 to 2015 (MDDI, 2014b). The Action Plan also lays out that all new buildings should meet the requirements of the low-energy building standards 'as soon as possible'. A Grand-Ducal regulation setting

deadlines for the compliance of new buildings to 'nearly zero energy' standards is currently in preparation. For public buildings, monitoring of energy consumption will be improved by means of a database compiling information on the energy consumption of public buildings and connected to a smart-metering system.

### Transport

Transport is the most challenging sector with regard to GHG emissions. The second Climate Action Plan, which gives priority to the improvement of public transport networks, improved spatial planning, the promotion of soft mobility and the promotion of electric mobility, addresses these challenges only partly.

Transport taxation is limited in Luxembourg. There is no registration tax. The ownership tax is based on CO<sub>2</sub> emissions only, or engine capacity for older cars (ACEA, 2012). Taxes on transport fuels are among the lowest in the EU, and fuel export to neighbouring countries is a significant revenue source for Luxembourg. The Action Plan envisages restructuring the transportation tax system, possibly including a revision of the vehicle tax, a reform of the company cars taxation and the gradual adjustment of tax rates on transport fuels (GovLux, 2013a). However, the National Action Plan does not formulate concrete implementing measures but only commits to examine possible actions in the medium term.

Biofuels make up 2 % of transport fuels but are exclusively imported. They are promoted via a quota system. For electric mobility, the National Action Plan sets the target of approximately 10 % of the Luxembourg fleet to be constituted of electric cars by 2020 (corresponding to about 40 000 cars). Additionally, about 850 charging stations for electric cars should be installed by 2020. However, the Car-e bonus for electric cars is discontinued from 1 January 2015 as the government wants to focus on the e-mobility in public transport rather than for private vehicles.

The 2013 Global Strategy for Sustainable Mobility (MoDu) of the Grand Duchy of Luxembourg (MDDI, 2014a) envisages increasing the modal share of the country's daily commuting for soft mobility from 13 % to 25 %, and the share of public transport from 14.5 % to 25 % by 2020 (GovLux, 2013b; Luxemburger Wort, 2013). For this purpose, the MoDu Strategy foresees the development of the rail network so as to become the main public transport at national level, and the promotion of cross-border mobility schemes. As part of the strategy, Luxembourg also presented in July 2013 a draft law aiming at developing an 'effective and consistent cycling network for soft mobility'. As of May 2014, however, no information was available as to the further legislative process of this law. The projects of the MoDu Strategy should be implemented in three steps, namely by 2020, by 2030 and after 2030.

### Agriculture

Agriculture only accounts for a very small share of emissions in Luxembourg. The second Climate Action Plan includes measures on agrofuels but notes that further work is required to identify and realise additional emission-saving potentials in agriculture and forestry. Moreover, it foresees the development and implementation of a legislative framework for the promotion of agroforestry in 2014.

### Waste

The 2010 national waste management plan established the principle of full-cost pricing of every stage of waste management. In March 2012, a new framework law regulating waste management in Luxembourg was published. According to the law, the Administration of Environment of the Ministry of Sustainable Development should develop a new national waste management plan replacing the one from 2010. The law also provides for the introduction of municipal taxes on waste to help cover the costs incurred by the municipalities for waste management. A tax on household waste should also be introduced depending on the weight and volume of waste produced. However, so far, implementing acts have only been published for electronic waste.

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