Luxembourg climate change

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Climate change in Luxembourg discusses the climate change issues in Luxembourg. Luxembourg is a territory of 998.4 miles (2 586 km2). Of the total area of Luxembourg, 85.5% was agricultural land and land under forest - with around 51% for agriculture and 35% for forests. Changes in temperature and rainfall will have an impact on Luxembourg especially due to their high percentage of forestry. [1][2]

Emissions of carbon dioxide in total, per capita in 2007 were 22.4 tons CO2 compared to the European Union"s 27 countries average of 7.9 tons per capita.[1] 1990 emissions were 13 Mt CO2eq

The European primary energy use per capita was highest in 2008 in (TWh/per million): 1) Iceland 191 2) Luxembourg 98 3) Finland 77 4) Norway 72 5) Belgium 64 6) Sweden 62 7) Netherlands 56 8) Russia 56 9) Kazakhstan 53 10) Czech Republic 50 11) France 48, 12) Germany 47 13) Estonia 47 and 14) Austria 46.[3]

From 1981-2010, Luxembourg"s average annual temperature rose by 1 ?C, in comparison to 1961-1990. This rise in temperature is expected to increase further, possibly by 3.1 ?C by the end of the 21st century. Luxembourg is on par with the world average temperature increase of 0.03 ?C per year. There is a trend of a lower number of frost days and a higher number of extremely warm days.[7]

Average annual temperatures in 1981-2010 were around 1?C higher than in 1961-1990. Although temperatures have risen across all seasons, they have increased more in the summer and spring. The number of frost days (daily minimum temperature lower than 0?C) has decreased in recent decades, while the numbers of summer days (daily maximum temperature over 25?C) and tropical nights (night-time temperature over 20?C) have increased.

The temperature is expected to continue rising during all seasons, with averages increasing by around 1.1?C1 by mid-century and 3.1?C2 by the end of the century. The trend towards a lower number of frost days and more hot days is expected to continue.

As a result of warming over the past two decades, there are now fewer heating degree days (HDDs) and more cooling degree days (CDDs). The national adaptation strategy anticipates that this shift in HDDs and CDDs will reduce energy demand for heating in the winter but raise consumption for summer cooling.

Luxembourg"s average annual precipitation was slightly higher in 1981-2010 (897 mm) than during the 1961-1990 reference period (875 mm), with little seasonal variation. Western Luxembourg, represented by the Asselborn and Clemency stations, has been historically wetter than the eastern regions (Grevenmacher and Remich stations). Clemency had the highest increase in precipitation between the two periods (+47mm). The number of heavy precipitation events3 also rose between 1961-1990 (7.8 days) and 1981-2010 (8.3 days).

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Luxembourg is sometimes affected by storms and tornadoes.5 High wind speeds can damage electricity transmission and distribution systems, as witnessed during the August 2019 tornado that damaged a 65-kV line and partially destroyed the 220-kV Esch-Aubange transmission line that imports electricity from Belgium. Due to the damage, this line was unavailable for almost a year. In future winters, storm tracks are expected to extend further into central Europe and could create more frequent and intense extreme wind events in this region.

Luxembourg bases its efforts in climate change adaptation and resilience on research and assessments. The government report Adaptation to Climate Change - Strategies for Spatial Planning (2012) explores the relationship between adaptation and spatial planning, and the Luxembourg Institute of Science and Technology (LIST) has assembled detailed projections of the country"s future climatic conditions, including temperature, precipitation, extreme climate events, and the evolution of event days.

Compared with its climate change adaptation strategy, Luxembourg"s energy policies, such as the National Energy and Climate Plan (NECP) and its white paper on an energy strategy, prioritise mitigation measures and focus less on climate resilience and adaptation.