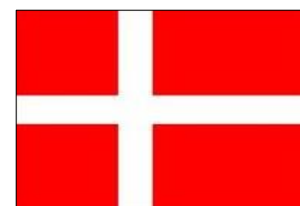


DENMARK



Country at a glance

- Population: 5.55 million (2010) [1]
- Total area: 43,094 sq. km [2]
- Carbon emissions per capita: 8.47 metric tons (2010) [3]
- Energy consumption per capita: 40 MWh (2010) [4]
- Percentage of global carbon emissions: 0.16% (2010) [3]



Oil storage tanks shares the coast with a wind farm in Denmark

Wind provides around 20% of Denmark's electricity. Denmark is a leader in wind energy technology as well as a major exporter of crude oil from its North Sea oil and gas fields.

An oil storage facility at the north tip of the island Amager, Denmark by Bioertvedt. Permission under CC BY-SA 3.0 License. commons.wikimedia.org/wiki/File:Oiltanking_Copenhagen_IMG_5588_Amager_north.jpg

Table 1 Breakdown of energy use, electricity and heat generation, 2010

	Primary energy sourced within country		Energy imports minus exports	Primary energy used within the country ^(a)			Electricity Generation ^(b)		Heat Generation ^(c)		
	unit	ktoe		%	ktoe	GWh	%	GWh	%	GWh	%
Coal, including brown coal & peat		0	0	2,643	3,809	44,297	20	16,976	44	10,014	24
Oil fuels		12,486	54	-3,966	6,832	79,459	35	750	2	1,250	3
Natural gas		7,342	31	-3,021	4,422	51,431	23	7,908	20	12,397	30
Nuclear		0	0	0	0	0	0	0	0	0	0
Hydroelectric		2	0	0	2	21	0	21	0	0	0
Biofuels and waste		2,798	12	785	3,583	41,672	19	5,315	14	17,191	42
Solar photovoltaics		1	0	0	1	6	0	6	0	0	0
Solar thermal		16	0	0	16	181	0	0	0	39	0
Tide, wave and ocean		0	0	0	0	0	0	0	0	0	0
Wind		672	3	0	672	7,810	3	7,809	20	0	0
Geothermal		10	0	0	10	118	0	0	0	59	0
Electricity (imported)		0	0	-98	-98	-1,135	-1	0	0	1	0
Sub total Renewables		3,498	15	785	4,283	49,809	22	13,151	34	17,288	42
Totals		23,326	100	-3,657	19,248	223,860	100	38,785	100	40,950	100

Source: Based on World Energy Statistics and Balances Database 2012, "World Energy Balances." © OECD/IEA, 2012.

Notes:

Standard conversion used is 1 ktoe = 11.63 GWh

- (a) Sum of energy sourced within country, energy imports minus exports, international marine and aviation bunkers and stock change flows.
- (b) Includes all electricity generation, including any exported.
- (c) Does not include electrical heating. Includes waste heat recovery from electricity generation plants.

Table 2 Breakdown of transport fuel use, 2010

	Total transport mix	%	Domestic aviation	Road	%	Rail	Pipeline transport	Domestic navigation	Non-specified (transport)
(in ktoe)									
Oil products	4,276	99	39	3,969	99	78	0	155	35
Biofuels and waste	27	1	0	27	1	0	0	0	0
Electricity	35	1	0	0	0	35	0	0	0
Sub total									
Renewables	27	1	0	27	1	0	0	0	0
Total	4,338	100	39	3,995	100	113	0	155	35

Source: Based on World Energy Statistics and Balances Database 2012, "World Energy Balances." © OECD/IEA, 2012.

Stand on climate change

Denmark signed the Kyoto Protocol on 29 April 1998, ratified it on 31 May 2002 and brought it into force on 16 February 2005.

National climate change programmes

Denmark has implemented the EU Emission Trading System (ETS). Companies covered by the scheme are allowed to plan their own emission reduction targets. They can also buy carbon credits via project-based emission reductions.

From 2008 to 2011, an "Energy Agreement" was in place which was later revised with new policies and targets for the Energy Agreement for 2013 to 2020.

For the government's "Energy Policy Statement" of 2010 [5], the policies are summarized as follows:

Oil and gas production:

- Carry out CO₂ storage projects using funding granted by the European Union under the 2009 Economic Recovery Plan [6].

Gas:

- The state-owned electricity grid company, Energinet.dk, expanded its gas storage in 2008 to increase storage volume to 1.5 billion m³.
- Pipelines from Germany to Denmark are being expanded to increase import of natural gas. The European Commission has pledged DKK 750 million in funding for the project.
- The 2009 "Agreement on Green Growth" stipulates that up to 50% of livestock manure in Denmark should be utilized through composting and other means for green energy by 2020 [7].

Heat:

- A new "Heat Supply Act" lays guidelines for funding support to natural gas companies when they convert to district heating using renewable sources [8].
- Expand district heating network to regions without this facility.

Electricity:

- Conversion to more renewable sources for example via offshore wind farms.
- Develop "The Great Belt" cable to link eastern and western Denmark's electricity grids. This will allow for more efficient load-sharing which is important for the development of wind power.

Renewable energy:

- Support the planting of energy crops.
- Building a low temperature gasification plant for more efficient use of straw and other biofuels.

Energy efficiency:

- A 2008 agreement between companies and the government sets energy saving targets aimed at doubling savings.

Buildings:

- Targets were set for energy reductions in building use at 20% in 2010 and 25% in 2015.
- Retrofits of state buildings for energy efficiency improvements and scrapping of old oil burners are being funded with subsidy allocations of EUR 50 million. Subsidies are also given for conversions to district heating or heat pumps and also for the solar components of new combined oil and solar heating plants.
- A Government order was issued stipulating that all Ministries must reduce their energy consumption by 10% in 2011 as compared to 2006.

Transport:

- Green Transportation Agreement in 2009 promotes use of biofuels, use of electric cars and increase in number of charging stations for electric cars.

In 2011 the government released two documents on strategies for climate change:

- Energy Strategy 2050 [9].
- Our Future Energy [10].

There are four critical policy focus areas for these strategies: energy efficiency, electrification, expansion of renewable energy, research, development and demonstration. These policies are to be implemented from 2012 to 2050, and aim to achieve 100% renewable energy production by 2050. They are outlined as follows:

Energy efficiency improvements:

- Implementation of the EU Directive on “Energy Performance of Buildings”.
- Agreements with building owners on efficient energy consumption.
- Minimum efficiency standards for building components.
- No new oil burners in new buildings from 2012 and none in existing buildings from 2017.
- A 2012 “Financial Agreement” established a subsidy scheme for energy efficiency improvements for housing, DKK 500 million is being allocated for this for 2013 and 2014.

Heating and electricity production:

- Building a new wind farm at Krieger Flak.
- Greater freedom of agreement between producers and buyers to encourage a shift from coal to biomass as provisioned in the “Heat Supply Act”.
- Funding is being increased for projects using biogas for combined heat and power (CHP).
- Subsidies for biogas capital projects will be increased.
- Conversion from coal to biomass at large scale power plants will be made more attractive by amending the “Heating Supply Act” [11].

Transport:

- A target to achieve 10% of biofuels in the transport sector by 2020.
- To encourage use of electric cars, funds are being allocated to establish recharging stations.
- Extension of tax exemptions for electric cars to the end of 2015.
- Promotion of energy efficient vehicles such as hybrid, plug-in and electric cars.

An intelligent and international energy system:

- Intelligent electricity meters.
- Promotion of smart grids.

On 22 March 2012, an “Energy Agreement” was established [12]. This was a political commitment for a transition to “green technology” for all of Denmark and focuses on the promotion of renewable energy. The financing of the expansion of renewables in electricity production will be financed through the “Public Service Obligation” schemes. The Energy Agreement is only binding up to 2020. Further initiatives will be discussed before the end of 2018.

Ministries involved in climate change/energy policy making:

Ministries involved	Web links
Ministry of Transport and the Danish Coastal Authority	eng.kyst.dk/
Ministry of Food, Agriculture and Fisheries	www.fvm.dk/english.aspx?id=14541
Ministry of Climate and Energy	www.kemin.dk/da-dk/sider/forside.aspx
Ministry of Science, Technology and Innovation	en.fivu.dk/
Ministry of Foreign Affairs	um.dk/en
Ministry of Taxation	www.skm.dk/foreign/
Ministry of Economic and Business Affairs	www.evm.dk/english/engelsk-tema

Education institutes involved in climate change/energy policy making:

Ministries involved	Web links
Aalborg University- Danish Building Research Institute	www.en.aau.dk/
Aarhus University- National Environmental Research Institute and Climate Secretariat	www.au.dk/en/
University of Copenhagen- Institute of Food and Resource Economics and Forest & Landscape	www.ku.dk/english/
Roskilde University- Department of Environmental, Social and Spatial Change	www.ruc.dk/en/departments/department_of_environmental-social-and-spatial-change/
Risø DTU	www.risoe.dtu.dk/?sc_lang=en
Danish Environmental Protection Agency	www.mst.dk/English/
Danish Forest and Nature Agency	www.naturstyrelsen.dk/International/English/
Danish Institute of Agricultural Sciences	agrsci.au.dk/en/
Danish energy agency	www.ens.dk/en-US/Sider/forside.aspx

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