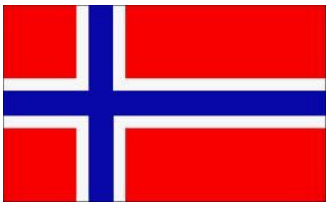
NORWAY



Country at a glance

- Population: 4.88 million (2010) [1]
- Total area: 323,802 sq. km [2]
- Carbon emissions per capita: 8.02 metric tons (2010) [3]
- Energy consumption per capita: 0.08 MWh (2010) [4]
- Percentage of global carbon emissions: 0.13% (2010) [3]

The Alta dam in Norway. *Permission Under CC BY-NC 3.0 License en.wikipedia.org/wiki/File:Alta-damm.jpg*

The Alta Dam in Norway

Located in the Alta-Kautokeino River in Finnmark county of Norway, the Alta hydroelectric power station is one of 1,166 hydroelectric facilities in Norway. Norway is considered by many to have supreme expertise in hydropower as it represents about 95% of the country's overall primary energy supply.

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	ktoe	GWh	%	GWh	%	GWh	%
Coal, including brown coal & peat	1,299	1	-355	838	9,750	3	106	0	74	2
Oil fuels	98,919	48	-85,449	12,825	149,158	40	31	0	827	21
Natural gas	93,535	46	-87,308	6,227	72,422	19	4,886	4	217	6
Nuclear	0	0	0	0	0	0	0	0	0	0
Hydroelectric	10,108	5	0	10,108	117,557	31	117,536	95	0	0
Biofuels and waste	1,514	1	150	1,663	19,346	5	490	0	2,702	69
Solar photovoltaics	0	0	0	0	0	0	0	0	0	0
Solar thermal	0	0	0	0	0	0	0	0	0	0
Tide, wave and ocean	0	0	0	0	0	0	0	0	0	0
Wind	77	0	0	77	895	0	895	1	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0
Electricity (imported)	0	0	649	649	7,550	2	0	0	78	2
Sub total Renewables	11,699	6	150	11,849	137,799	37	118,921	96	2,702	69
Totals	**205,451**	**100**	**-172,312**	**32,389**	**376,679**	**100**	**123,944**	**100**	**3,898**	**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 electicity generation plants.

Table 2 Breakdown of transport fuel use, 2010

(in ktoe)	Total transport mix	%	Domestic aviation	Road	%	Rail	Pipeline transport	Domestic navigation	Non-specified (transport)
Oil products	4,624	95	349	3,451	97	13	0	810	0
Natural gas	54	1	0	4	0	0	0	50	0
Biofuels and waste	117	2	0	117	3	0	0	0	0
Electricity	59	1	0	0	0	52	0	0	7
Sub total Renewables	117	2	0	117	3	0	0	0	0
Total	**4,854**	**100**	**349**	**3,572**	**100**	**65**	**0**	**860**	**7**

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

Stand on climate change

Norway signed the Kyoto Protocol on 29 April 1998. The government of Norway ratified the protocol on 30 May 2002 and it was later enforced on 16 February 2005. Norway is an Annex I member country of the Kyoto Protocol with emissions reduction targets of 0.3% from 1990 levels.

National climate change programmes

In 2007, the Norwegian government established an Inter-ministerial Working Group to facilitate the efforts related to climate change adaptation (CCA). The working group consists of ten ministries and is headed by the Ministry of the Environment. It is also supported by a Programme Secretariat, established at the Norwegian Directorate for Civil Protection and Emergency Planning (DSB) in 2007.

In 2008 the government launched an initial 5 year work programme (Norwegian only) which focused on enabling the activities for adaptation at sectoral and various administrative levels. Its three pillars are [5]:

- Identifying vulnerabilities, and integrating CCA into key policy areas
- Developing a knowledge base, including research and a national vulnerability and adaptation assessment, and
- Information and coordination, including a national clearing house and other capacity building efforts

Some notable policies and measures are:

White paper on climate policy/national emission targets

The latest white paper on Norwegian climate policy is Report No. 34 (2006-2007) to the Storting (parliament). This white paper and the subsequent Storting (parliament) debate and recommendations are the foundation for Norway's climate policy. In these documents, the general targets and the policy instruments to reach these targets are outlined. The main Norwegian climate targets are as follows [6]:

- Under the Kyoto Protocol, Norway has an international obligation to ensure that its average annual greenhouse gas emissions in the period 2008–2012 do not exceed the 1990 emission level by more than one per cent. The Kyoto Protocol provides for parties to use the Kyoto mechanisms as a supplement to national measures in fulfilling their emission commitments.
- Strengthen Norway's Kyoto commitment by 10 percentage points, corresponding to 9 per cent below the 1990 level.
- Reduction of global greenhouse gas emissions by the equivalent of 30 per cent of the 1990 emissions by 2020. The Government considers that a realistic target is to reduce Norwegian emissions by 15-17 million tonnes CO_2 equivalents relative to the reference scenario presented in the National Budget for 2007, when CO_2 uptake by forests was included. In this case, about two-thirds of the cuts in total emissions by 2020 will take place in Norway.
- Norway has made a political pledge to achieve carbon neutrality, undertaking to reduce global greenhouse gas emissions by the equivalent of 100 percent 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 attempt to achieve carbon neutrality by 2030 at the latest.
- It is also a long-term objective for Norway to become a low-emission society.

Project Klimakur 2020

The project "Klimakur 2020" was initiated by the Government in June 2008 with the mandate to evaluate whether existing policy measures are sufficient to reach the Norwegian climate objectives in 2020 and to explore additional mitigation options and policy measures. The project will also evaluate the need for mitigation options and measures in a longer perspective.

The Klimakur project has both a bottom up approach through in depth analysis of each sector (industry, oil manufacturing, energy production, energy use in buildings, transport, agriculture, and waste handling) as well as a top down approach through macroeconomic analysis of the total economy. Existing and additional mitigation options and policies in the various sectors are drawn up and analysed. The macroeconomic model can give an indication of the total cost, measured by the welfare loss, of the measures in the economy [8].

Other notable legislation:

On 1 January 2005 Norway adopted the Greenhouse Gas Emissions Trading Act, thereby establishing an emissions trading scheme (ETS) that was to operate from 2005-2007.The establishment of the scheme from 2005 was an important step towards fulfilling Norwegian climate goals and quantitative commitments under the Kyoto Protocol [9].

Furthermore, in the Fifth National Communication to the UNFCCC, the Government of Norway undertook the following policy measures and approaches for GHG emissions reduction [10]:

Green taxes

Green taxes imposed on activities that are harmful for the environment so that businesses and individuals must take into account the environmental cost of their activities on society. Some of these taxes are put directly on CO_2 emissions and have a climate motivation, others can be implemented for other reasons but will often have an indirect impact on the greenhouse gas emissions.

The Norwegian CO_2 tax scheme

CO_2 taxes were introduced in 1991 as a step towards a cost-effective policy to limit GHG emissions. Except for some adjustment of coverage in the first years of operation, some extensions of the coverage in 1999, and abolishment of the tax on the marginal usage on coal and coke for energy purposes in 2003, the main structure of the tax has remained relatively stable.

Regulation by the Pollution Control Act

The Pollution Control Act applies to greenhouse gas emissions. Greenhouse gas emissions are therefore included in the discharge permit for which industrial installations are obliged to obtain pursuant to the Pollution Control Act. As a general rule, the emitter is granted a discharge permit for CO_2 corresponding to the amount in the application. Greenhouse gas emissions are to a large extent covered by other specific policy instruments such as the CO_2 tax, the emission trading scheme and specific agreements with the industry to cap emissions. These instruments have been regarded as more efficient tools for reducing greenhouse gas emissions than quantitative limitations set in the installations' individual discharge permits [11].

Tax and reimbursement scheme for HFC

The growth trend in hydrofluorocarbons (HFC) and perfluorocarbons (PFC) emissions changed from exponential to linear after a tax on import and production of HFCs and PFCs was introduced in 2003. The tax is NOK 204.99 (approximately EUR 24) per tonne CO_2 equivalent of gas imported or produced. This approximately equals the CO_2 tax rate on mineral oil. In 2004, this tax was supplemented with a refund scheme, which prescribes a similar refund when gas is destroyed. Combined and over time, these two schemes amount to a proxy tax on emissions of HFC.

Energy use of new renewable energy sources and energy efficiency

Under the Ministry of Petroleum and Energy, there is an integrated strategy for increased production of renewable energy and energy efficiency. As a part of this strategy, the development of wind power and renewable heat production has been singled out with its own quantitative targets. The Government's targets are to develop 3 TWh/year wind power, 4TWh/year renewable heat production by 2010 and 14 TWh new bioenergy by 2020 [12].

The renewable energy production strategy also stretches out to the transportation and waste management sectors.

Transport measures

- Energy efficiency car parks: to influence car ownership decisions
  Instruments: Purchase tax, vehicle tax, CO_2 tax, promotion of electric vehicles
- Low and zero emissions vehicles and fuels: to influence car ownership decisions
  Turnover requirement, biofuels, promotion of EV's and hydrogen vehicles, R&D, subsidy scheme, tax incentives
- Reduce transport volume: to influence transport decisions
  Parking measures, road pricing scheme, land use planning
- Modal shift: transfer freight and private transport away from road and air
  Railways, seaports, bicycle lanes, domestic aviation, etc.

Waste management measures

The following regulations and requirements from the concerned ministries were also passed by the Norwegian government:

- Landfill gas collection requirements
- Prohibiting of landfilling of biodegradable waste
- Tax on landfilling to promote to reduce waste
- Tax on incineration
- Requirement to utilize energy from incineration
- Extended producer responsibility

Ministries involved in climate change/energy policy making:

Ministries involved	Web links
Ministry of Agriculture and Food	www.regjeringen.no/en/dep/lmd.html?id=627
Ministry of Environment	www.regjeringen.no/en/dep/md.html?id=668
Ministry of Education and Research	www.regjeringen.no/en/dep/kd.html?id=586
Ministry of Fisheries and Coastal Affairs	www.regjeringen.no/en/dep/fkd.html?id=257
Ministry of Foreign Affairs	www.regjeringen.no/en/dep/ud.html?id=833
Ministry of Petroleum and Energy	www.regjeringen.no/en/dep/oed.html?id=750
Ministry of Transport and Communications	www.regjeringen.no/en/dep/sd.html?id=791
Ministry of Trade and Industry	www.regjeringen.no/en/dep/nhd.html?id=709

Education institutes involved in climate change/energy policy making:

Ministries involved	Web links
Norwegian Institute for Agricultural and Environmental Research	sciencenordic.com/partner/norwegian-institute-agricultural-and-environmental-research
Center for International Climate and Environmental Research – Oslo (CICERO)	www.cicero.uio.no/home/index_e.aspx
Institute of Marine Research	www.imr.no/en
Geological Survey of Norway	www.ngu.no/no/
ENI Enrico Mattei Foundation (FEEM)	www.feem.it/getpage.aspx?id=62
Norwegian Institute of Nature Research (NINA)	www.nina.no/
Bjerknes Centre for Climate Research – BCCR	www.bjerknes.uib.no/?lang=2
Norwegian Water Resources and Energy Directorate	www.nve.no/en/

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[12] National Renewable Energy Action Plan – Ministry of Petroleum and Energy. Government of Norway. Available at: http://ec.europa.eu/energy/renewables/transparency_platform/doc/dir_2009_0028_action_plan_norway_nreap.pdf

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