IEA Bioenergy
Technology Collaboration Programme

Implementation of bioenergy in Norway - 2021 update

Country Reports

IEA Bioenergy: 10 2021

This report was prepared from the 2021 IEA World Energy Balances and Renewables Information, combined with data and information provided by the IEA Bioenergy Executive Committee and Task members[1]. Reference is also made to FAOstat and Eurostat data as well as data from national statistics. All individual country reports were reviewed by the national delegates to the IEA Bioenergy Executive Committee, who have approved the content. General background on the approach and definitions can be found in the central introductory report for all country reports.

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HIGHLIGHTS

- Renewables make up almost half of *total energy supply* in Norway. The renewable energy share in *final energy consumption* is 65%[2]. Almost all electricity comes from hydropower, while biomass for energy supply is mainly used for heat and liquid biofuels.
- Fossil fuels represent around 60% of fuel/heat provision (excluding electric heating or heat pumps). From 2021, oil and natural gas are forbidden for heat production in the households/service sectors.
- Direct use of biomass dropped to lower levels after 2012 due to closures in the pulp and paper sectors, but still represents around 30% of fuel/heat provision.
- Heat distribution (via district heating systems) increased steadily in the past decades and now represents almost one fifth of fuel/heat provided. Heat output is mainly produced from biomass, waste, and residual heat, solely as a reserve capacity.
- The transport system in Norway is dominated by diesel fuels. The average share of biodiesel (FAME and HVO) in diesel fuel is currently around 14% by energy, which is high compared to other countries. In the gasoline market there is also a general application of E10 (10% bioethanol by volume).

[1] While data for 2020 are starting to become available at national level, it was decided to consider trends up to 2019 for good comparability and benchmarking between the different IEA Bioenergy member countries. Care should also be taken when using 2020 data for analysing trends as these data are distorted by the COVID19 Pandemic.

[2] The difference between the share of renewables in supply and consumption relates to internal use of energy in energy industries (mainly in export-oriented oil and gas industries), which is counted in energy supply, but not in final consumption.

- Electric cars represented ca. 2.8% of transport energy in 2020; this share is likely to increase with growing shares of EV sales.
- Norway did not reach the 2020 target of 14.5 TWh increase in bioenergy set back in 2007. The government has announced that it will launch a new bioenergy strategy.

COUNTRY PROFILE

Population and land use

Norway comprises the western and northernmost part of Scandinavia in Northern Europe. It is member of the European Economic Area, but not of the European Union. Norway has a total land area of 365 thousand km² and a population of 5.4 million people, which represents a very low population density of 15 persons per km².

Much of the country is dominated by mountainous or high terrain. Around one third of the land area is forest land; only 3% is agricultural land. Much of the land use are alpine zones, which is covered in 'other land use'.

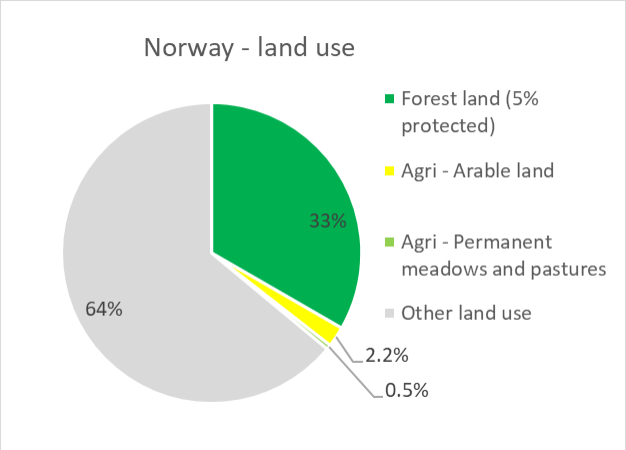

***Figure 1**: Land use in Norway (2018 figures - Source: FAOstat)*

Final energy consumption

Overall final energy consumption in Norway (*also including non-energy use of oil, natural gas and coal in industry*) comes down to around 3.8 tonnes of oil equivalent (toe) per capita, which is around 50% higher than the average of IEA Bioenergy member countries.

***Table 1**: Distribution of the final consumption of energy carriers by sector in Norway (2019 figures - Source: IEA (2021) World Energy Balances and Renewables Information)*

Final consumption energy carriers	Toe/capita (2019)	% of total	*Median* (toe/capita)*
Industry (energy use)	1.14	30%	*0.67*
Industry (non-energy use)	0.48	12%	*0.21*
Transport	0.82	21%	*0.69*
Residential	0.76	20%	*0.57*
Commercial & public services	0.56	15%	*0.34*
other	0.08	2%	
Total	3.84		*2.34*

** Median of the 25 member countries of IEA Bioenergy*[3]

Energy consumption in industry per capita is very high, mainly due to a large energy-intensive industry-sector (mainly Al, Fe, Si, Mn). Residential energy use is high, much because of a colder

[3] Comparative figures of the different IEA Bioenergy member countries are discussed in the central Countries' Report.

climate (higher domestic heating requirements). Transport energy use is also fairly high due to long distances between populated areas.

NATIONAL POLICY FRAMEWORK IN NORWAY

TARGETS AND STRATEGIES

Norway's nationally determined contribution under the Paris Agreement is to reduce greenhouse gas emissions by at least 50%, towards 55% by 2030 compared to 1990 levels.

Norway has been part of the EU Emission Trading System (EU-ETS) since 2008 through the EEA Agreement. About half of Norway's emissions are included in the EU ETS, making this a cornerstone in Norwegian climate policy.

Under the Effort Sharing Regulation Norway will have a commitment to reduce 40% of emissions in the non-ETS-sectors in 2030 compared to 2005. As a national policy the Government's intention is to reduce Norway's non-ETS emissions by at least 45% from 2005 to 2030, i.e., beyond our current commitment under the Effort Sharing Regulation.

As a member country of the European Economic Area, Norway implemented the EU Renewable Energy Directive 2009/28/EC. Norway reached the target of 67.5% share of renewable energy in gross final energy by 2020 in 2015.

Table 2: renewable energy targets in Norway.

Sector	Share of renewables in gross final consumption per sector
Overall target	67,5 % by 2020[4]
Heating and cooling	33%[5]
Electricity	115% (2020)[6]
Transport	21% (2020)

In January 2021 the Government presented a white paper describing its action plan for transformation of Norwegian society as a whole by 2030. The main policy instruments in the climate action plan are: taxation of greenhouse gas emissions, regulatory measures, climate-related requirements in public procurement processes, information on climate-friendly options, financial support for the development of new technology, and initiatives to promote research and innovation.

A description of renewable energy and climate policies and measures in Norway is available at the IEA's Policies and Measures Database: https://www.iea.org/policies?country=Norway

[4] Norway surpassed the target in 2015, reporting 74,62% in 2019.
[5] https://www.regjeringen.no/no/aktuelt/ny-rapport-om-energibruk-i-oppvarming-og-kjoling/id2696634/
[6] https://www.statnett.no/for-aktorer-i-kraftbransjen/tall-og-data-fra-kraftsystemet/#produksjon-og-forbruk (Production 153,3 TWh, Consumption 132,9 TWh). The hydropower production varies significantly (+/- 20%), depending on annual rainfall.

Specific policies related to renewable electricity, renewable heat and transport biofuels will be highlighted in the chapters about the role of bioenergy in different sectors.

THE CONTRIBUTION OF BIOENERGY IN NATIONAL ENERGY SUPPLY

TOTAL ENERGY SUPPLY

The total energy supply (TES) of Norway in 2019 amounted to 1143 PJ. Fossil fuels count for about 50%, particularly oil and gas, which represent 29% (329 PJ) and 19% (222 PJ) of total energy supply, respectively. Mind that most of the gas supply relates to internal gas consumption in gas industries (destined for exports). Coal represents around 3% of TES (34 PJ). Renewable energy sources have a share of 48% or 546 PJ, most of it being hydropower (452 PJ). About 14% of renewable energy supply in 2019 came from biomass (74 PJ), and another 4% from wind energy (20 PJ).

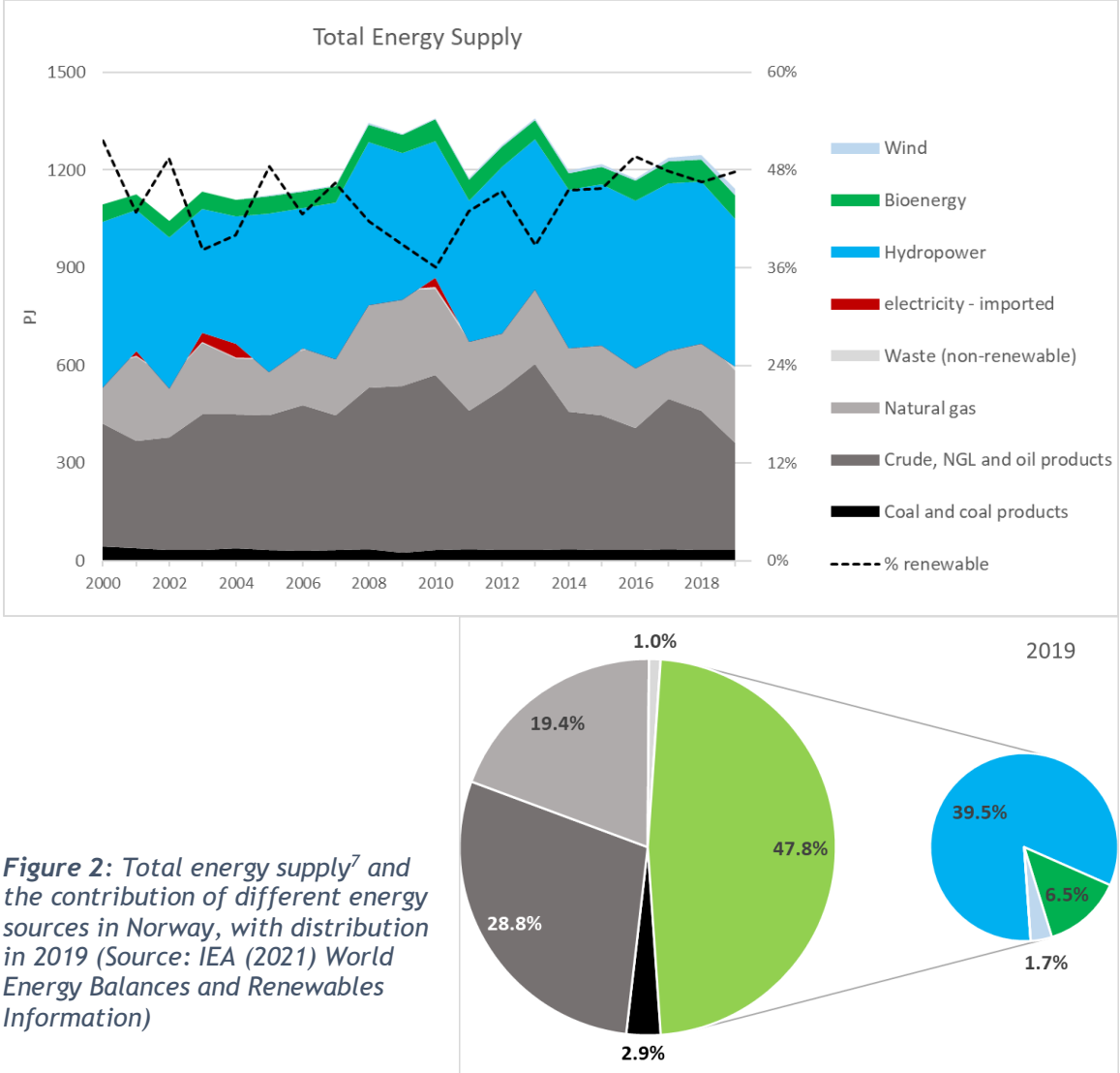

***Figure 2**: Total energy supply[7] and the contribution of different energy sources in Norway, with distribution in 2019 (Source: IEA (2021) World Energy Balances and Renewables Information)*

[7] Total energy supply refers to the use of resources. In terms of the role in the energy system this distribution overestimates the role of resources producing electricity with a high share of unused waste heat (like nuclear plants).

Overall TES has remained rather stable around 1200 PJ in the past decades, with some seasonal fluctuations. Oil products fluctuated between 400 and 500 PJ and natural gas between 170 and 260 PJ. Since 2013 there seems to be a declining trend, particularly in oil. Hydropower is very important, producing almost all electricity in Norway. Electricity is also widely used for direct heating. The production of hydropower fluctuated between 380 and 515 PJ in the past decades, depending on annual rainfall. Bioenergy was less important as a renewable energy vector, and mostly focused on non-electricity sectors, namely heat, and recently also transport fuels.

Figure 3 shows the evolution of the different types of bioenergy. The two biggest sources of bioenergy in Norway are solid biomass (41 PJ or 55% of bioenergy supply) and liquid biofuels (20 PJ or 27%). 12% of bioenergy comes from renewable MSW (9 PJ) and 5% from biogas (3.5 PJ).

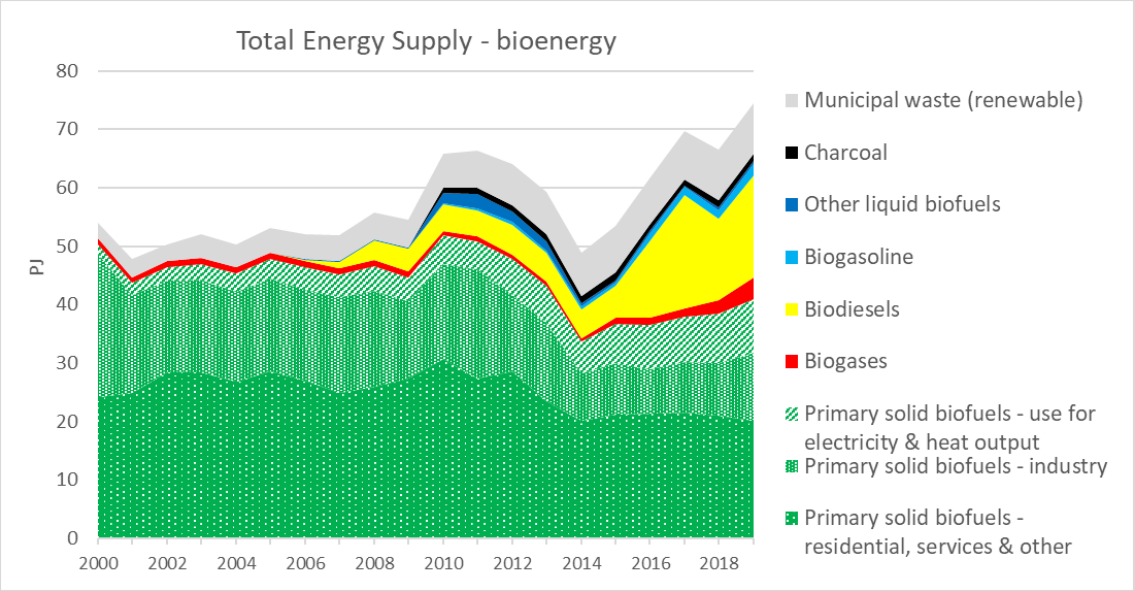

***Figure 3**: Development of total energy supply from bioenergy in Norway 2000 – 2019 (Source: IEA (2021) World Energy Balances and Renewables Information)*

Evolution of the bioenergy carriers:

- The use of solid biofuels has been fairly stable around 50 PJ until 2012, mostly dominated by residential use (28 PJ) and industry (16 PJ). After 2012 there was a substantial drop in residential use (down to 21 PJ) and even more in industry (down to 8 PJ) mainly related to closures in pulp and paper industries. Meanwhile there was a steady increase of biomass use for district heating, up to a level of 12 PJ recently.
- Liquid biofuels were introduced in 2006. After a growth in the first years, it stabilized around 6-7 PJ in the period 2010-2015. After 2015 there was a strong increase, particularly in biodiesel (FAME and HVO) up to a combined level of 20 PJ liquid biofuels.
- The use of MSW for energy production increased steadily from 3 PJ in 2002 up to 9 PJ recently.
- Biogas was fairly stable around 1 PJ until 2015. In recent years there is some growth, up to 3.5 PJ in 2019.

Table 3 displays the 2019 total bioenergy supply values on a per capita basis. Compared to the other 24 member countries of IEA Bioenergy (expressed per capita), Norway ranks at the higher end for liquid biofuels and renewable MSW and in the middle for solid biofuels and biogas.

Table 3: Total energy supply per capita in 2019 for different bioenergy carriers

	Supply per capita		Median IEA Bioenergy members
Bioenergy	13.8	GJ/cap	*10.6*
Solid biofuels	7.6	GJ/cap	*7.0*
Renewable MSW	1.6	GJ/cap	*0.8*
Biogas	0.7	GJ/cap	*0.7*
Liquid biofuels	3.7	GJ/cap	*1.5*

Source: IEA (2021) World Energy Balances and Renewables Information

Table 4 indicates the amounts of the different bioenergy carriers compared to some relevant reference points, namely the amount of forest in the country (for solid biomass), the amount of generated MSW (for renewable MSW used for energy), the amount of natural gas consumed in the country (for biogas) and the amount of fossil oil products consumed (for liquid biofuels).

Table 4: Comparison of the supply of different bioenergy carriers in 2019 to specific reference points

	Compared to reference points			Median*
Bioenergy	6.5	%	of total energy supply	*7.2 %*
Solid biofuels	3.5	GJ/ha_forest	compared to the domestic hectares of forest land (excl. protected)	*21.3 GJ/ha_forest*
Renewable MSW	3.97	GJ/ton_MSW	compared to the total generated MSW in the country	*1.4 GJ/ton_MSW*
Biogas	0.016	GJ/GJ_NG	compared to natural gas supply	*0.023 GJ/GJ_NG*
Liquid biofuels	0.061	GJ/GJ_oil	compared to oil products supply	*0.028 GJ/GJ_oil*

Source: energy data from IEA (2021) World Energy Balances and Renewables Information; forest figures from FAOStat; waste figures from World Bank
** median of the 25 member countries of IEA Bioenergy*[8]

Specific comments in relation to the reference points:

- The use of solid biomass for energy is very low compared to the amount of forest land in Norway (less than 0.2 $tons_{dry\ mass}$ of wood per hectare[9]). Mind that growth levels in Nordic boreal areas are lower than in more moderate climates.
- The use of renewable MSW for energy production is fairly high compared to other European countries with well-developed waste management systems.
- Transport biofuels are also well developed compared to other European countries and is predominantly focused on advanced biofuels (based on waste and residues). Most of the advanced biofuels are imported and use of palm oil is very restricted.

[8] Comparative figures of the different IEA Bioenergy member countries are discussed in the central Countries' Report.
[9] Counted with a typical calorific value of wood (dry mass) of 19 $GJ/ton_{dry\ mass}$

- The use of biogas is rather modest compared to the natural gas supply in Norway. There is almost no inland infrastructure of natural gas to households.

ROLE OF BIOENERGY IN DIFFERENT SECTORS

OVERVIEW

The overall 2019 share of renewables in **final energy consumption** among electricity, transportation and heat sectors is 65%, with bioenergy making up 8% of the energy share (Table 5). Note that these figures are higher than the shares in total energy supply where internal use of energy in energy industries (mainly in export-oriented oil and gas industries) is also included.

__Table 5__: Role of bioenergy and renewable energy in electricity, transport energy and fuel/heat consumption in 2019

Sector	Share of bioenergy	Share of renewable energy	Overall consumption
Electricity[10]	0.2%	97.7% *(93.6% hydro)*	134 TWh (483 PJ)
Transport energy (final consumption)	11.0%	13.7%	185 PJ
Overall fuel and heat consumption[11]	Direct biomass: 21.6% Biobased heat: 7.1%	28.6%	167 PJ
TOTAL FINAL ENERGY CONSUMPTION	**8.3%**	**65.2%**	**830 PJ**

Source: IEA (2021) World Energy Balances and Renewables Information

The table indicates the important role of electricity in Norway, which represents 58% of final energy consumption (the average share of electricity in other countries is typically around 20-40%).

The following paragraphs will consider the evolutions in the different sectors.

[10] Renewable electricity production compared to final consumption. Potential renewable shares of imported electricity are not included.

[11] This includes final consumption of fuels and heat in industry, the residential sector, commercial and public services and agriculture/forestry. Transport fuels are excluded. Energy used for transformation and for own use of energy producing industries is also excluded.
Electric heating (direct or through heat pumps) is not included in these figures as this is not separately reported.

ELECTRICITY

Norwegian electricity is almost exclusively generated by hydropower. In the past decade there was usually a surplus of up to 10% that could be exported. There is a very small share of fossil fuels, mainly natural gas and some very small fractions of oil and coal, together producing 2% of power (2.6 TWh).

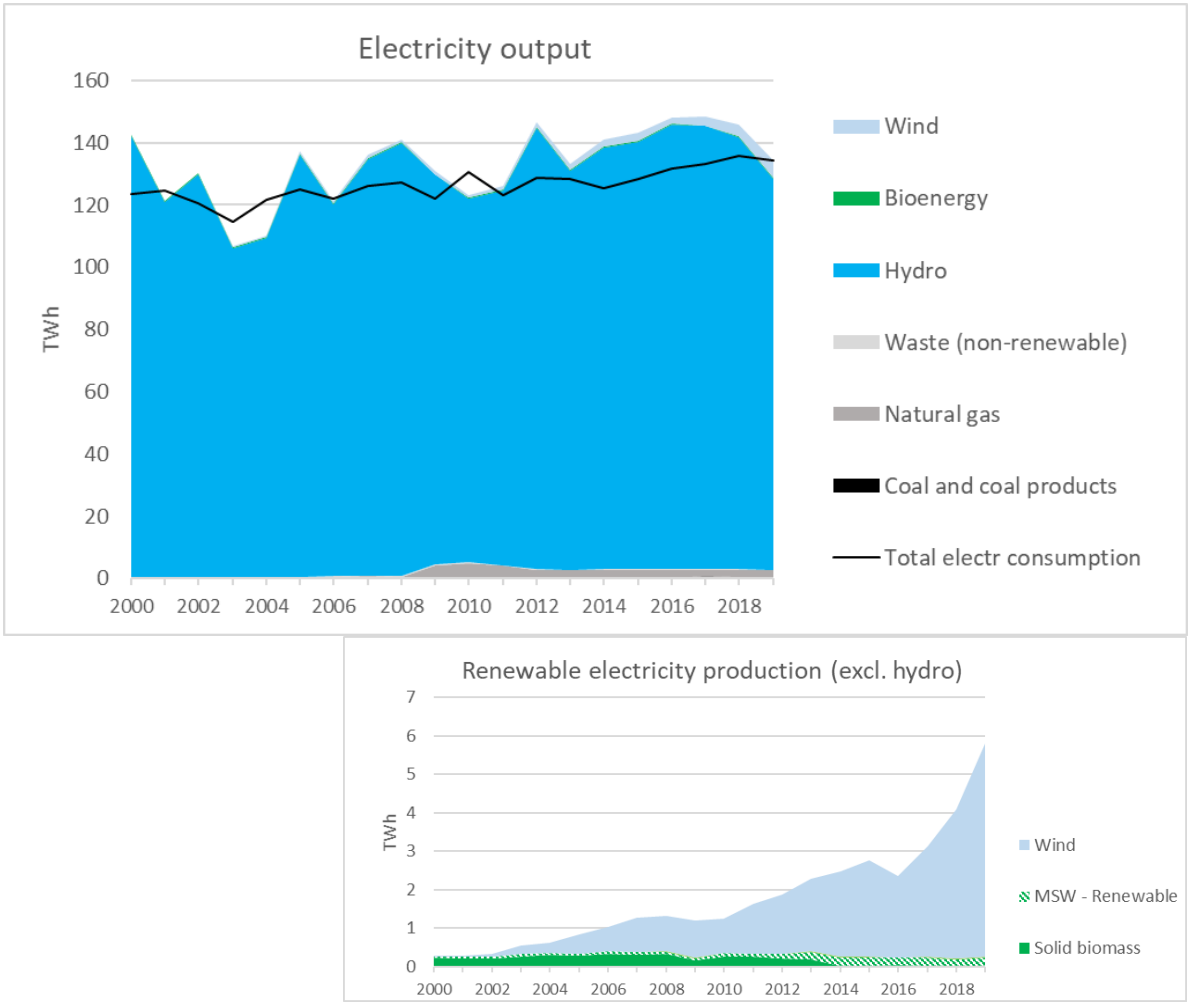

***Figure 3**: Evolution of the electricity mix in Norway 2000 - 2019 (Source: IEA (2021) World Energy Balances and Renewables Information)*

Wind has grown in the past decade from 1 to 5.5 TWh, representing 4% of power generation. The role of biobased electricity (mostly related to energy from MSW) is marginal at 0.3 TWh.

Policy framework

From 1 January 2012, Norway became part of a common electricity certificate market with Sweden. The countries have a common goal of 28.4 TWh of new renewable power production by the end of 2020. The electricity certificates system is a technology-neutral support scheme that makes it more profitable to invest in power production based on renewable energy sources, such as water, wind, solar and bioenergy. This technology neutrality has not resulted in much electricity production from bioenergy in Norway as of yet. See https://www.nve.no/energi/virkemidler/elsertifikater/

HEAT/FUEL

Figure 4 shows the role of different fuels/energy carriers for providing heat in different sectors (industry, residential sector, commercial and public services and other). It also includes heat sold to customers, e.g., through district heating. Fuel use by energy producing industries for transformation and for own use is excluded. Mind that electric heating (direct or through heat pumps) is not included in these figures as this is not separately reported in the IEA database.

For Norway, electric heating based on available hydropower-based electricity is highly relevant. Eurostat reported that in the residential sector alone a substantial level of 105 PJ of electricity was used for heating (and cooling).

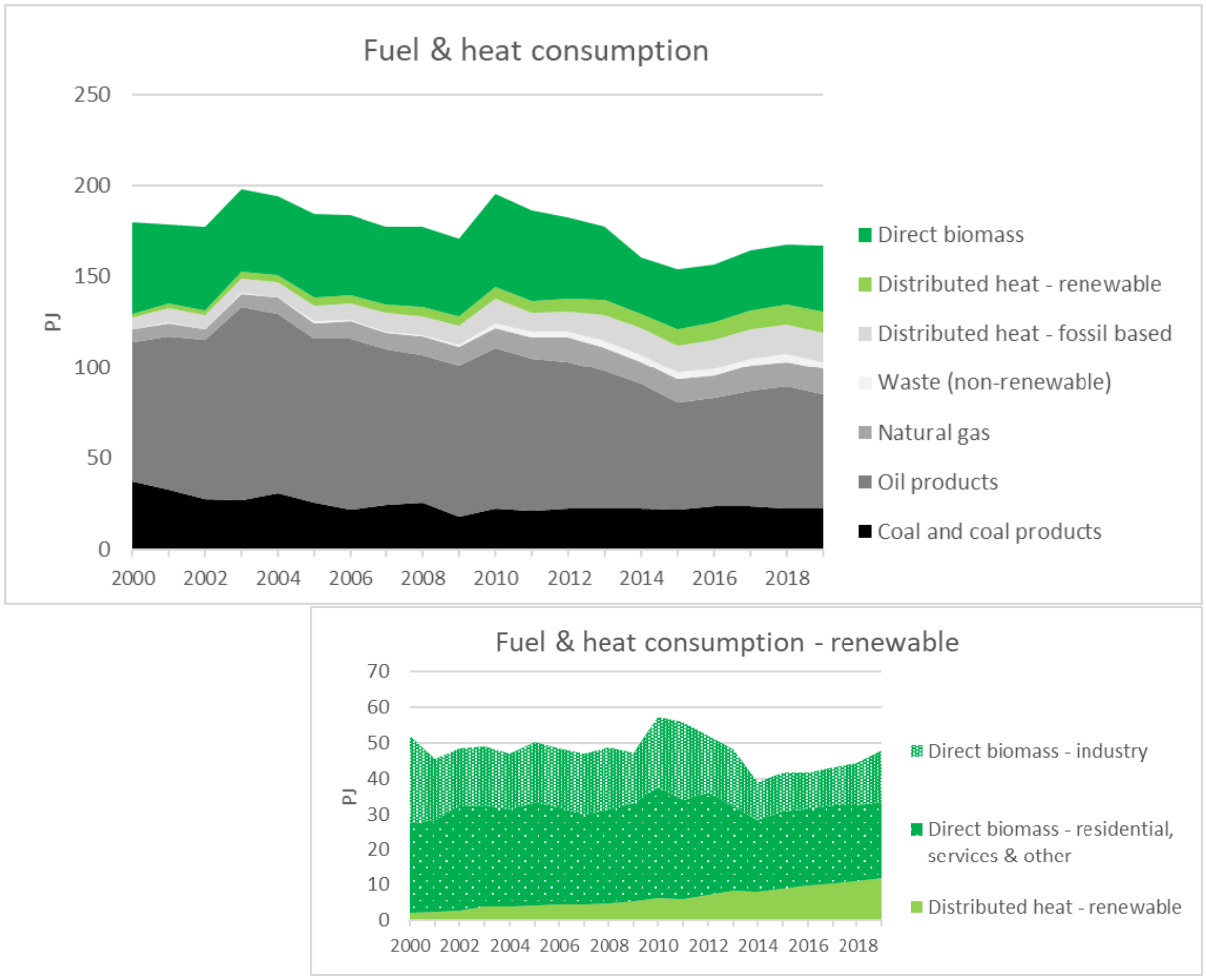

***Figure 4**: Evolution of fuel and heat consumption in Norway 2000 – 2019 (Source: IEA (2021) World Energy Balances and Renewables Information)*

Fuel and heat consumption (excl. electric heating) saw some decline in the past decades but seems to have stabilized around 160-170 PJ in recent years. The provision of heat can be divided in three parts: 60% on fossil fuels (mostly oil and some coal and gas), 22% direct biomass and 17% through heat sales (e.g., through district heating). Heat sales have steadily increased in the past decades (see further). Oil decreased from 100 PJ in 2004 to around 60 PJ in 2015 and has been stable since. Coal and gas were fairly stable in the past decade at around 23 PJ and 13 PJ, respectively. Direct use of

biomass fluctuated between 40 and 50 PJ until 2012, before dropping to 30-35 PJ since 2014 in relation to closures in the pulp and paper sectors.

Heat output generated and sold by heat plants (mainly through district heating) represents around 17% of fuel/heat provided; its share has steadily increased in the past decades. As shown in Figure 5, heat output is mainly produced from biomass (47%), waste (21%) and residual heat (27%). The share of fossil fuels is rather low at around 5% of heat output.

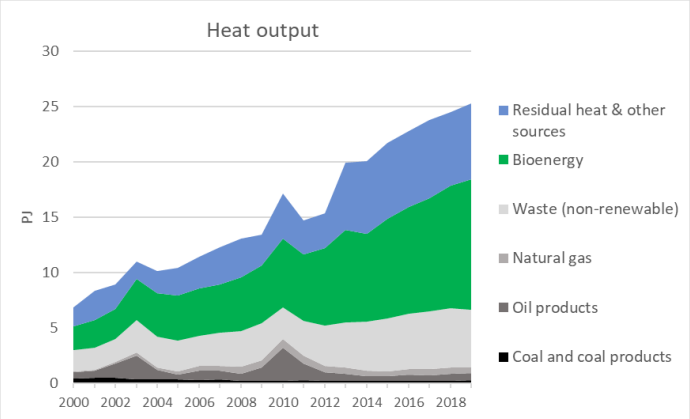

***Figure 5**: Evolution of fuels for heat output in Norway 2000 - 2019 (Source: IEA (2021) World Energy Balances and Renewables Information)*

Policy framework

The main relevant policy instruments behind these evolutions are:

- A Carbon tax was introduced in 1991. This is a tax on mineral products, and the purpose of the tax is to contribute to cost-effective reductions in CO_2 emissions. In 2019 the Carbon tax on mineral oils (general rate) was 1,35 NOK per litre, compared with 0,45 NOK per litre in 1999.[12]

- Norway joined the EU Emissions Trading System (EU ETS) in 2008. The sectors subject to the EU ETS have historically represented approx. 50% of CO_2 emissions".

- In 2001 the Norwegian Energy Fund was established. Through this fund investment support was given to renewable heat production, e.g., biobased and heat pumps, both in industry and buildings.

- Investment aid has also been granted to projects which target to utilize residual heat. Investment grants have been given to district heating, and major cities in Norway now have such infrastructure. Bioenergy, together with residual heat, have been preferred as energy carriers in these systems.

- In 2018, the Norwegian government announced a prohibition of fossil fuel as base load in heating buildings, both in households and commercial building. The prohibition was implemented in January 2020.

[12] https://www.skatteetaten.no/globalassets/rettskilder/avgiftshistorie/avgiftshistorie-2020.pdf

TRANSPORT

Figure 6 shows an overview of the energy used in transport in Norway, split up by different fuels/energy carriers.

Overall transport energy consumption in Norway was relatively stable around 200 PJ but seems to have declined in recent years. The role of diesel (fossil and biobased) increased steadily from 50% of transport fuels in 2004 up to a level of 69% in recent years, while the share of gasoline went down from 40% to 18%. Other oil-based fuels (particularly jet fuel) represented 8-9%; natural gas use in transport stabilized around 2.5% of transport energy consumption in the past 5 years.

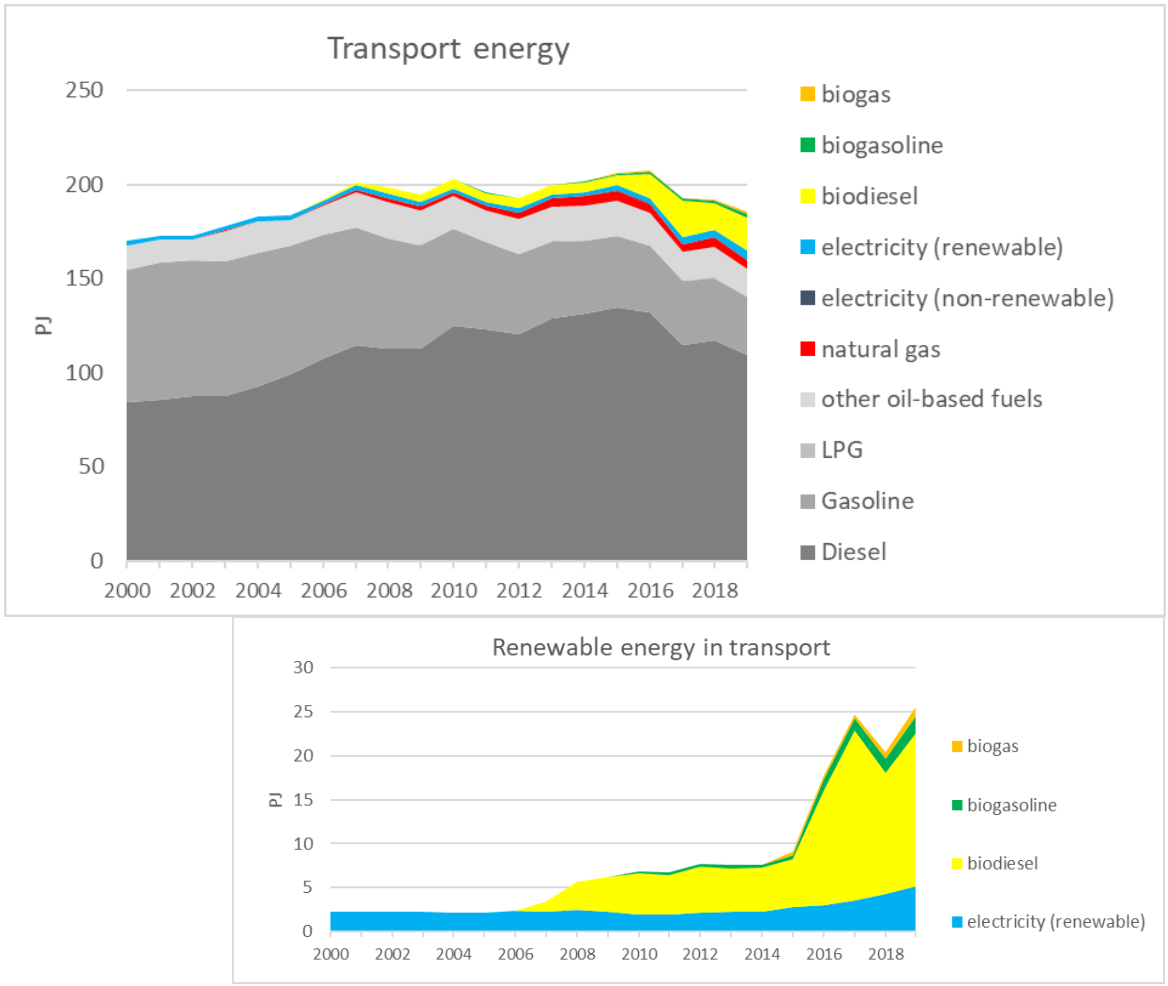

***Figure 6**: Evolution of transport fuels in Norway 2000 - 2019 (Source: IEA (2021) World Energy Balances and Renewables Information)*

Liquid biofuels were introduced in 2006; their use increased to 5 PJ in the first years and then stabilized at this level up to 2015. In recent years there was a strong increase again up to 20 PJ. Most is biodiesel, which is consistent with the dominant share of diesel fuels in the Norwegian transport system. In fact, the average share of biodiesel (FAME and HVO) in diesel fuel is currently around 14% by energy. Bioethanol also had a strong growth in the past 5 years and now represents 6% (by energy) of gasoline consumption (which is consistent with a general use of E10). Biogas is also used in the natural gas fleet and in recent years grew to almost 20% of gas use in transport.

About half of biofuels consumed in Norway are qualified as 'advanced biofuels', meaning that they are produced from residues and waste (particularly used oils for biodiesel, mainly imported).

Electricity represents a share of 2.8% of total transport energy use. In 2019 one third of transport electricity was in rail and already two thirds in road vehicles (1.7% of total transport energy use). This can be expected to grow in the coming years, considering the high sales of electric cars in Norway. In 2020, 54 % of new passenger cars in Norway were electric.

Policy framework

The main relevant policy instruments behind these evolutions:

- A blending obligation for biofuels in road transportation fuels was implemented in 2007. The share of biofuels has steadily increased, and in 2019 the obligation was 12 volume percentage biofuel (advanced biofuels are double counted). In 2020, the blending obligation further increased to 20 volume percentage. Biogas is not a part of this blending obligation.

- Electric cars are subject to subsidies in the form of exemption from VAT for private customers. There have also been other advantages for the use of electric cars, e.g., exemption of road tolls.

COMPARISON WITH RENEWABLE ENERGY TARGETS

According to Eurostat[13], the following renewable energy shares in *gross final energy consumption* were reached.

***Table 6**: Share of renewables in different sectors in Norway, according to Eurostat, and compared to the 2020 target*

	2005	2010	2015	2019	*2020 target*
Overall share	58.7%	60.4%	68.2%	74.6%	*67.5%*
In heating & cooling	28.9%	33.1%	34.5%	35.8%	*43%*
In electricity	96.9%	98.4%	106.7%	110.8%	*114%*
In transport	3.1%	5.4%	7.9%	27.3%	*10%*

Norway already exceeded its overall renewable energy target in 2015. Further growth was mainly in transport biofuels.

Mind that some of these figures can differ from the IEA derived data because of different accounting rules. Particularly in transport the Eurostat shares are higher due to the multiple counting of advanced biofuels and renewable electricity towards the transport target, both points highly relevant for the Norwegian mix. The heating & cooling figure in Eurostat also includes heat pumps.

[13] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_ind_335a&lang=en

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RESEARCH FOCUS RELATED TO BIOENERGY

Energi21 is an independent advisory body established by the Ministry of Petroleum and Energy and provides advice to the authorities on strategies for research and innovation within new climate friendly energy technologies.

The Energy-21 report from 2019 focuses on the following research areas for bioenergy:

- Integration of bioenergy in the energy systems of the future as part of a bioeconomy.
- Bioenergy as an integral part of the biorefineries of the future.
- Barriers to increased use of bioenergy in the Norwegian system, including utilization of GROT and low-value biomass.
- Sustainable biofuels for the transport sector with special focus on aviation and long and heavy transport on land and at sea.
- Better utilization of waste and side streams for heat, power, and fuel.
- Technologies and solutions for large-scale biogas production
- Methanation of CO_2
- New Norwegian sustainable biomass types – included marine biomass and algae (on land and at sea).

The Energy21 strategies will be revised in 2021/22.

Bio4Fuels:

Bio4Fuels is a cross-disciplinary research Centre involving graduate students, PhD students and research scientists at Norwegian University of Life Sciences (NMBU), Norwegian University of Science and Technology (NTNU) and University of South-Eastern Norway (USN). The Centre has an extensive network of partners from industry, research institutes and academia, both in Norway and abroad, and public bodies.

The ambition of the Bio4Fuels Centre is to reduce the impact of climate gas emissions from the transport sector through sustainable and economic production of Biofuels. Biomass, in particular low-grade fractions of wood from the forest and waste from agriculture, is a renewable resource that can potentially substitute the use of fossil resources in the transport sector, together with other renewable energy solutions.

There are four main biomass-to-products-routes identified for the Centre:

- Breaking down the biomass to separate the sugars in the biomass for use in fermentation to produce "Bio-alcohols". This can be blended up to certain levels into existing fuels.
- Fermentation of the biomass in the absence of oxygen to produce "Biogas". This Biogas can be upgraded to methane, liquified or converted to hydrogen for use as fuels in transport.
- Treatment of the biomass at higher temperatures in the absence of oxygen to produce a liquid "Biooil", which is then upgraded to a substitute Biofuel.
- Treatment of the biomass at higher temperatures to convert to gas, followed by upgrading of the gas to a substitute Biofuel.

For more information: Bio4Fuels | NMBU

RECENT MAJOR BIOENERGY DEVELOPMENTS

Silva Green Fuel is building a demonstration plant for biofuel at Tofte in Norway. The process solution chosen is hydrothermal conversion (HTL). The HTL technology has been developed by Danish-Canadian Steeper Energy and will be demonstrated for the first time on a larger scale in this project. The plan is for the demonstration facility to be ready in 2021.
https://www.silvagreenfuel.no/

Biogas production is quite modest in Norway, about 3,5 TJ. In later years there has been a development in larger industrial biogas plants, with production of upgraded and liquid biogas. Examples are

- Biokraft AS. The production started in 2018 and the capacity is about 12,5 million Nm3 (or 125 GWh) liquified biomethane per year. Biokraft have decided to increase this capacity towards 165 GWh per year. All this capacity is planned in output of liquid biomethane.
- Greve Biogass/municipality of Tønsberg, have established a production plant for production of biogas and upgrading in 2015-2019. Further development of this plant is decided and under construction. A liquification plant is part of this development. The total capacity of the plant will be about 180-200 GWh per year, and about 125 GWh per year for the liquification plant
- Renevo AS. Biogas plant under construction at Stord in the western part of Norway. The plant is planned for production for liquefied biomethane, about 50-55 GWh per year.
- VEAS own the largest wastewater treatment plant in Norway. The plant is situated in Asker, near Oslo. VEAS have produced biogas for a longer period and decided in 2016 to invest in a plant for upgrading and liquification. The capacity is about 70 GWh per year.

This means that these four plants, by the end of 2022, will operate a production capacity of liquified biomethane approaching 415 GWh per year.

LINKS TO SOURCES OF INFORMATION

Ministry of Petroleum and Energy: https://www.regjeringen.no/en/topics/energy/id212/

Energy facts Norway: https://energifaktanorge.no/en/

Production and consumption of energy, energy balance and energy accounts:
https://www.ssb.no/en/energi-og-industri/energi/statistikk/produksjon-og-forbruk-av-energi-energibalanse-og-energiregnskap

The Research Council of Norway - portfolio for Energy, transport and low emissions:
https://www.forskningsradet.no/en/about-the-research-council/Portfolios/Energy-transport-low-emissions/

Ministry of Climate and Environment: https://www.regjeringen.no/en/topics/climate-and-environment/id925/

Energi21 - National strategy for research and innovation within new climate friendly energy technology: https://www.energi21.no/en/