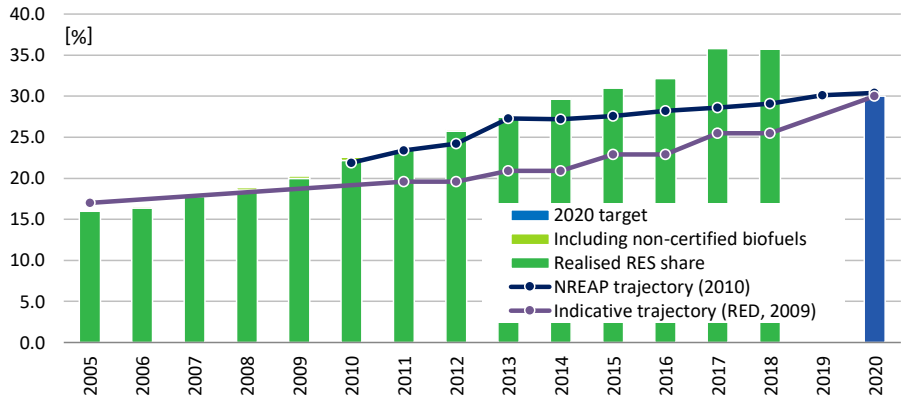
Denmark

Renewable Energy Policy Factsheet

October 2020

Summary

Electricity from renewable sources is mainly promoted through a feed-in premium and net-metering. The premium for wind and solar PV installations is awarded through tenders. Furthermore, Denmark supports the construction of pilot windmills through a separate state fund. This support is also granted through tenders. Renewable energy sources for heating purposes are exempt from the tax obligations on the production, supply and use of energy sources. The use of biogas for heating purposes is supported through a direct tariff. The main incentive for renewable energy use in transport is a biofuels quota system. Selling of biogas for transport purposes is supported through a direct tariff.



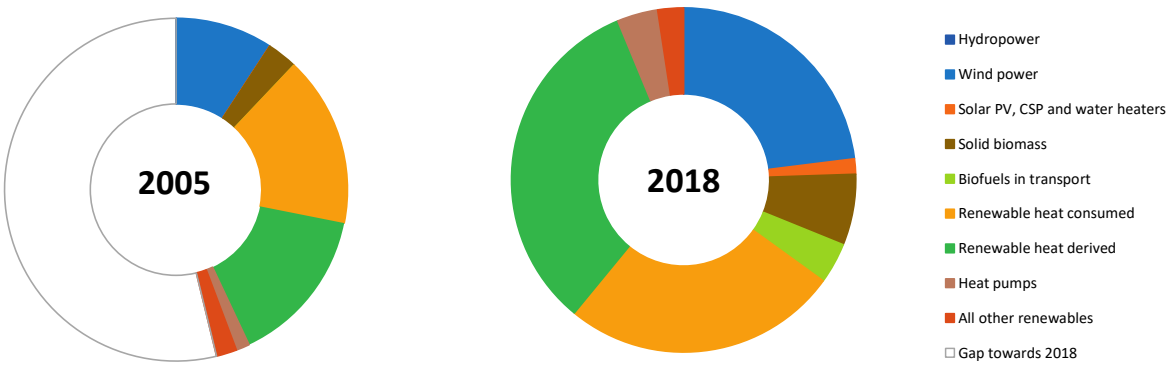
Source: EEA, Eurostat

Abbreviations used:

RES: renewable energy sources
RES-E: renewable electricity
RES-H/C: renewable heating/cooling
RES-T: renewable transport fuels

Data for 2018

Overall RES share:	35.7%	Avoided fossil fuels:	10.7 [Mtoe]
Overall RES 2020 target:	30.0%	Avoided fuel expenses:	7.4 [billion euro]
Share RES-E in electricity:	62.4%	RES Turnover:	8650 [MEUR]
Share RES-T in transport:	6.6%	RES Employment:	47600 [jobs]
Share RES-H/C in heating:	46.7%		



Source: Eurostat, 2020.

	2005	2018		
	Energy	Energy	Employment	Turnover
Hydropower	2.5 ktoe	1.7 ktoe	<100 Jobs	<10 MEUR
Wind power	521.7 ktoe	1309.9 ktoe	35400 Jobs	6420 MEUR
Solar PV, CSP and water heaters	0.2 ktoe	81.9 ktoe	2100 Jobs	370 MEUR
Solid biomass	162.9 ktoe	379.9 ktoe	5300 Jobs	1020 MEUR
Biofuels in transport	0.0 ktoe	218.1 ktoe	700 Jobs	120 MEUR
Renewable heat consumed	914.9 ktoe	1480.1 ktoe		
Renewable heat derived	846.9 ktoe	1868.7 ktoe		
Heat pumps	72.5 ktoe	217.9 ktoe	2700 Jobs	470 MEUR
All other renewables	110.0 ktoe	137.7 ktoe	1300 Jobs	240 MEUR
Gap towards 2018	3064.4 ktoe			

Source: Eurostat, EurObserv'ER, 2020.

Hydropower jobs & turnover only covers 'small hydropower'. PV=Photovoltaics, CSP=Concentrated Solar Power. Biofuels in transport only covers compliant fuels (employment and turnover additionally cover the non-compliant biofuels). Derived heat includes heat produced in main activity producer plants and heat sold produced in autoproducer plants. Its counterpart is the final heat consumption in the final consumption sectors (such as households).

CURRENT RENEWABLE ENERGY POLICY

In March 2012 an Energy Agreement was reached in Denmark, which was renewed in June 2018 (Ministry of Foreign Affairs of Denmark, 2018). These Agreements contains a wide range of ambitious initiatives, which aims at bringing Denmark closer to the targeted renewables share in total energy consumption of 50% by 2030 and 100% renewable energy in the energy and transport sectors by 2050. They ensures substantial expansion of wind power in particular. Denmark entered into a cooperation agreement with Germany in 2016 concerning the mutual opening of tenders for support for solar cells to plants located in the other country. Solar photovoltaic plants in Germany will therefore be able to receive support from Denmark, and solar photovoltaic plants in Denmark will be able to receive support from Germany. Instruments to promote deployment of renewable electricity, renewable heating and cooling, and renewable transport fuels respectively are highlighted in the next paragraphs.

Electricity from renewable sources is mainly promoted through a floating premium tariff. The sum of the market price and the bonus shall not exceed a statutory maximum per kWh, which depends on the source of energy used and the date of connection of a given plant. The applicable premium tariffs for onshore and offshore wind parks as well as solar PV are awarded through tenders on a pay-as-bid basis. Moreover, tenders are organised to stimulate innovative wind turbine development projects. In certain cases, plant operators are granted a guaranteed bonus on top of the market price. In such cases the maximum is not defined by law. The latest tender for which the call procedure has started in September 2019 is the Thor tender (DTU, 2020). The Thor offshore wind farm should have a total capacity of 800-1000 MW. The pay-as-bid contract-for-differences with a symmetric two-sided payment is to cover a 20-years period. The reference price is determined annually as the simple average of the benchmark hourly electricity spot price in the previous calendar year with ex post monthly settlement, where production in hours with negative negative market prices is excluded. In years where the concession owner has to pay the state, hours are excluded during which the spot price is lower than the negative premium. The state's cap for payments to the concession owner is capped at 6.5 billion DKK (ca. 845 million euro) and the concession owner's cap for payments to the state is set at 2.8 billion DKK (ca. 364 million euro) in total. The price mechanism should incentivise the concession owner to consider design solutions for their wind farms that maximise the market value of the delivered electricity (DTU,2020). Prosumers are eligible for net-metering. They are totally or partly exempt from paying Public Service Obligation on this electricity. The Public Service Obligation is a charge levied to support renewable energy. Associations of wind and solar energy plant owners and other local initiatives may apply for guarantees for loans for feasibility studies that are conducted in the run-up to the construction of a wind or PV energy plant.

Renewable energy sources for heating purposes are exempt from tax obligations on the production, supply and use of energy sources, thereby receiving a tax benefit in comparison to other fuels for heating purposes. Moreover, the use of biogas for heating purposes is supported through a direct premium per gigajoule of biogas used.

The main incentive for *renewable energy use in transport* is a biofuels quota scheme. Moreover biofuels are eligible to reduced tax obligations on the production, supply and use of energy sources as compared to fossil transport fuels proportionate to the share of biofuels in blended fuels. Moreover, use of biogas for transport purposes is supported through a direct premium per gigajoule of biogas sold to transport fuel consumers. Registration tax for battery electric vehicles is set at 20%, 65%, 90% and 100% of the standard rate in 2020, 2021, 2022 and 2023 respectively.

Further, PHEVs and BEVs are granted a reduction in the taxable value of the car for battery capacity of DKK 1.700 per kWh until the end of 2022. Hydrogen-powered and fuel-cell electric vehicles (FCEV) are exempt from registration tax until the end of 2021. Annual fees for public parking are reduced by at most 5000 DKK. Up to 2024 public electricity charging is at a much reduced rate for electric buses. In 2020 a temporary deduction in the annual taxation of DKK 40,000 (3,333 per month) is granted for BEVs and PHEVs, but only temporarily during the period from 1 April 2020 until 31 December 2020. Public electric vehicles/buses programmes are implemented.

So far, the assessment by the European Commission of *draft National Energy and Climate Plans* of the Member States is available. The Commission's assessment of the draft integrated National Energy and Climate Plan of Denmark – regarding the targets for year 2030 for the share of renewable energy and gross final energy consumption only – is shown below.[1]

Table 1: Overview of Denmark's actual performance (2018), targets (2020), proposed contributions (2030) under the Governance Regulation, Regulation (EU) 2018/1999 and contribution ambition assessment by the European Commission, regarding the share of renewables and the level of gross final energy consumption

National targets and contributions	2018	2020	2030	Assessment of 2030 ambition level
Share of energy from renewable sources in gross final consumption of energy (%)	35.8	30.0	55.0	Above 46% (result of RES formula)
Final energy consumption (Mtoe)	15.0	14.7	15.8	Very low

Source: European Commission, (2019); eurostat (2020a, 2020b)

Based on the formula contained in Annex II of the Governance Regulation, Danmark's renewables share would have to reach the level of **46%** in 2030 (European Commission, 2019) against the historical rate of 35.8% in 2018. Hence, the European Commission (2019) concludes that the draft NECP promises a significantly higher renewables contribution than the one suggested by the Commission's elaboration of Annex II of the Governance Regulation. In contrast, the Commission deemed the ambition level of the proposed **15.8 Mtoe** contribution to the EU 2030 target for final energy consumption as "very low".

Denmark's final integrated National Energy and Climate Plan retained the ambitious 55% target for the renewables share by year 2030. Its achievement warrants adequate progress regarding a diverse portfolio of new renewable technologies and relevant regional cooperation for a, such as notably the North Seas Energy Cooperation for notably offshore wind development and the Nordic energy, energy research, and climate cooperation under the aegis of the Nordic Council. Denmark assumes a very active role in advancing progress in these fora, as described in its final NECP. In fact, Denmark sets out to extend well into the future its longstanding frontrunner role in the renewable energy and climate domains. As for the 2030 gross final energy consumption target, Denmark has been a longstanding high performer on energy efficiency frontier. Denmark, in its final NECP, holds on to the 660,8 PJ (**15.8 Mtoe**) target, proposed in the draft NECP, advancing the following arguments:

- Increased activities (economic growth) in the different sectors
- The establishment of several new big datacentres in Denmark. In the outlook these are consuming 25 PJ (0,60 Mtoe) of electricity in 2030 equal to 15 % of the total electricity

[1] The core renewables policy performance metric in the EU is the ratio of annual *gross final renewable energy consumption* and annual *gross final energy consumption*. Other factors remaining the same, gross final energy consumption reduction boosts the share of renewables as defined by the aforementioned metric.

consumption in 2030. Without the increased consumption from the new datacentres, the final energy consumption would be almost stable from 2020 to 2030.

- No specific new energy efficiency measures for the period 2025-2030 exist as The Energy Agreement from June 2018 only covers the period of 2021-2024.

Summary of policies

- In general, there are two types of **training programmes for installers of RES plants:** The Quality Assurance Scheme for the installers of solar heating plants, PV installations and biofuels, and the Heat Pump Scheme covering the installation of heat pumps. Apart from that, the vocational education for specific professions covers all the requirements of the European RES Directive.
- The **Danish Certification Scheme for wind energy plants** comprises two kinds of certification: type certification, which certifies the general type of wind energy plant, and project certification to evaluate individual installations.
- There are two types of **Research, Development and Demonstration Programmes**: "Forsk-El Programme Forsk-El Programme" and "The Energy Technology Development and Demonstration Programme EUDP".

OVERVIEW OF MAIN SUPPORTING POLICIES

Tables 2 and 3 provide an overview of support instruments used to promote the deployment of renewable energy in Denmark.

Table 2: Overview of support schemes to promote renewable energy in Denmark

	NON-FISCAL SUPPORT SCHEMES					FISCAL AND OTHER STATE FUNDED INCENTIVES			
	Feed-in premium	Premium tariff	Quota obligation with certificates system	Tendering	Net-metering/ net-billing	Capital subsidy, grants	Tax regulation mechanism	Direct premium	Loan guarantees to local initiative projects
RES-E									
- Offshore wind	o			o					
- Onshore wind	o				o				o
- Solar	o				o				o
- Hydro	o				o				
- Geothermal									
- Solid biomass	o				o				
- Biogas	o				o				
RES-H/C									
- Solar thermal							o		
- Geothermal							o		
- Biomass							o		
- Biogas							o	o	
- Large ambient heat application									
- Small scale installations, e.g. solar thermal collects, heat pumps, biomass boilers and pellet stoves									
- Others, i.e. aerothermal, hydrothermal									
RES-T									
- Bio gasoline			o				o		
- Biodiesel			o				o		
- Biogas								o	

Sources: RES-Legal Europe (2019), EurObserv'ER

Table 3: Brief description of key policy instruments aimed at promoting RES in Denmark

Instrument	*Description*
Feed-in premium	Eligible operators of wind and solar PV electricity plants receive a floating premium contingent on the contractual reference price bid into the tender concerned and the average electricity price. Apart from operators of geothermal projects, certain other renewable electricity plant operators can get a fixed premium.
Tenders	Offshore and onshore wind as well as PV energy plant operators have to submit competitive bids into tenders to allocate feed-in premium support money. Moreover, tenders are organized to stimulate innovate wind turbine manufacturing.
Tax benefits	Renewable heat and biofuels are exempt from energy taxes. Blended transport fuels benefit from energy tax deduction proportionate to the share of biofuels in these fuels.
Loan guarantees for local wind and solar PV initiatives	Associations of wind and solar energy plant owners and other local initiatives may apply for guarantees for loans for feasibility studies that are conducted in the run-up to the construction of a wind or PV energy plant.
Net-metering	Electricity prosumers (electricity producers consuming partially or fully their own production) can benefit from a net-metering scheme, which exempts them (partially or fully) from the public service obligation surcharge on their electricty bill.
Biofuels quota scheme	Participants are exempted from fossil energy taxes proportionate with the biofuels share in blended transport fuels.
Direct premium	Granted to eligible biogas based heat producers and suppliers of biogas for transport purposes

For further information:

CEER, 2017. Status Review of Renewable Support Schemes in Europe. http://www.ceer.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Electricity/2017/C16-SDE-56-03%20Status%20Review%20RES%20Support%20Schemes.pdf

DTU, 2020. Design of the upcoming offshore wind tender Thor in Denmark. AURES II Project Deliverable D2.2-SK. Copenhagen, December http://aures2project.eu/wp-content/uploads/2020/09/AURES_II_case_study_planned_Denmark_offshore.pdf

European Alternative Fuels Observatory, https://www.eafo.eu/countries/denmark/1730/incentives

EurObserv'ER 16th annual overview barometer, https://www.eurobserv-er.org/category/all-annual-overview-barometers

European Commission, 2019. Assessment of the draft National Energy and Climate Plan of Denmark. SWD(2019) 275. Brussels, 18 June https://ec.europa.eu/energy/sites/ener/files/documents/dk_swd_en.pdf

EEA, 2019. Progress towards renewable energy source targets at member State and EU-28 levels. Copenhagen, 19 December https://www.eea.europa.eu/data-and-maps/daviz/actual-res-progress-indicative-trajectory-9#tab-chart_3

European Union, 2018. Regulation (EU) 2018/1999 on the Governance of the European Union and Climate Action, OJEU L328/1, Brussels, 21 December

https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1999&from=EN

Eurostat, 2020a. Renewable energy statistics; Share of renewable energy almost doubled between 2004 and 2018. Luxembourg, January
https://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics

Eurostat, 2020b. Energy consumption in 2018. Primary and final energy consumption still 5% and 3% away from 2020 targets. Luxembourg, 4 February
https://ec.europa.eu/eurostat/documents/2995521/10341545/8-04022020-BP-EN.pdf/39dcc365-bdaa-e6f6-046d-1b4d241392ad

Government of Denmark, 2019. Denmark's Integrated Energy and Climate Plan. Danish Ministry of Climate, Energy and Utilities, Copenhagen, December.
https://ec.europa.eu/energy/sites/ener/files/documents/dk_final_necp_main_en.pdf

International Energy Agency (IEA) database on policies and measures
https://www.iea.org/policies?topic=Renewable%20Energy

Member State Progress Report, available at the Renewable Energy pages of the European Commission, https://ec.europa.eu/energy/en/topics/renewable-energy/progress-reports

Ministry of Foreign Affairs of Denmark. New ambitious Danish Energy Agreement secured. Copenhagen, 2018 [The link below provides a summary of the Energy Agreement of June 2018 with a further link to the full Agreement text in Danish.] https://investindk.com/insights/new-ambitious-danish-energy-agreement

REN21, 2020. Global Status Report 2020. Paris, 16 June
https://www.ren21.net/wp-content/uploads/2019/05/gsr_2020_full_report_en.pdf

RES Legal database: http://www.res-legal.eu/search-by-country/denmark

https://ec.europa.eu/commission/sites/beta-political/files/energy-union-factsheet-denmark_en.pdf
(European Commission/ DG ENER, Energy Union Factsheet Denmark, November 2017)

What is meant by …?

Auctions for granting renewable energy support	An auction is a process of granting production or investment support to renewable energy projects based on the lowest bids by eligible project developers.
Feed-in tariff (FiT)	A support scheme which provides for a technology-specific remuneration per unit of renewable energy payable to eligible renewable energy producers. A proper, periodic review of FiT rates is often undertaken with the aim to prevent both too high FiTs so as to minimise regulatory rents, i.e. supra-normal returns and too low FiTs to preclude below-target market uptake because of FiT levels that are perceived by market participants to be less attractive. In addition, feed-in tariffs often include "tariff degression", a mechanism according to which the price (or tariff) ratchets down over time.
Feed-in premium (FiP)	A scheme which provides for a support level per unit of renewable energy to eligible renewable energy producers, typically for a period of 10-20 years, at a pre-set fixed or floating rate. The premium is typically adjusted periodically to exactly offset change in the average energy wholesale market price, based on a pre-specified benchmark market price. A floating FiP may move freely or may only be allowed to move within a pre-set interval.
Grants	Grants are non-repayable funds disbursed by one party (grant makers), often a government department, corporation, foundation or trust, to a recipient, often (but not always) a non-profit entity, educational institution, business or an individual. (Source: Wikipedia.org)
Green public procurement	In Green public procurement contracting authorities take environmental issues into account when tendering for goods or services. The goal is to reduce the impact of the procurement on human health and the environment. (Source: Wikipedia.org)
Renewable quota scheme (RQS)	A RQS mandates certain market actors (typically retail suppliers or large energy end-users) to respect a pre-set minimum share or amount of their total energy procurements from renewable sources of energy. Typically a tradable green certificate (TGC) scheme is operated to enable the obligated parties to prove their compliance with the prevailing renewable quota target by means of TGCs.
Sliding feed-in-tariff	A FiT scheme which pre-sets technology-specific declining feed-in tariffs for certain prospective vintages in line with the technology-specific learning curve, as projected by the National Regulatory Agency (NRA). Often a degression rate is used indicating the %/annum decrease in the rate level.
Soft loans	Loans at concessional (below market-based) terms, for example at sub-market-conform interest rates, made available in several Member States to stimulate certain renewable energy technologies.
Tax credits	These are amounts a tax paying entity is allowed to deduct when declaring payable taxes, for example company tax or income tax, to the tax authorities , for example the producer tax credits (PTCs) used in the United States to stimulate among others wind energy deployment.

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Disclaimer

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