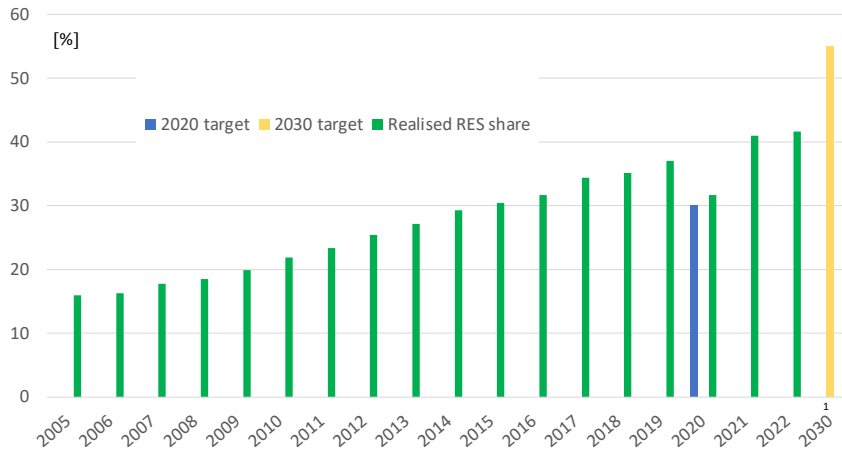


Denmark

Renewable energy status

Share of energy from renewable sources in total gross final energy consumption



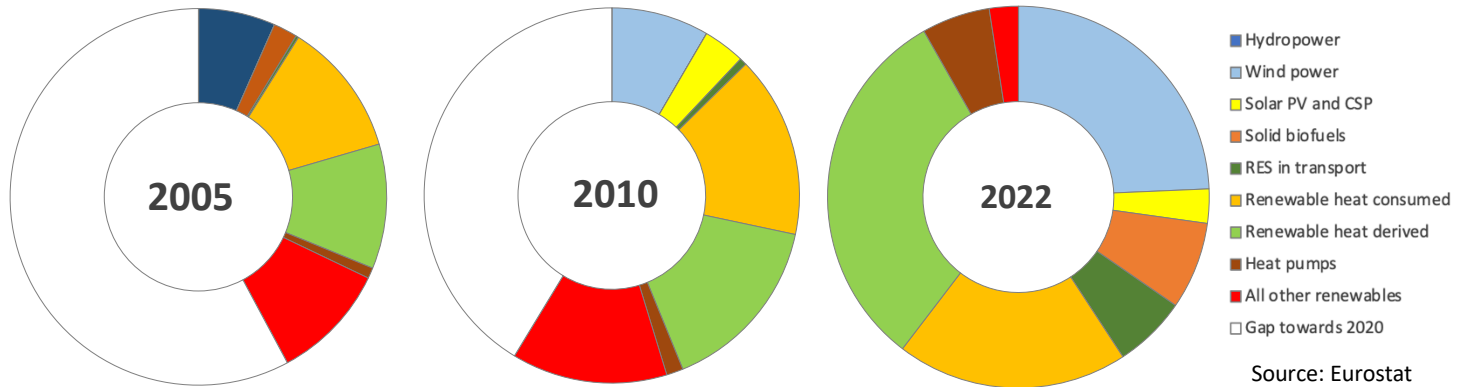
Source: Eurostat

Abbreviations used:

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

Data for 2022

Overall RES share:	41.6%	Avoided fossil fuels:	7.7 [Mtoe]
Overall RES 2020 target:	30.0%	Avoided fuel expenses:	8 319 [MEUR]
Overall RES 2030 target:	55.0%	RES Turnover:	8 960 [MEUR]
Share RES-E in electricity:	77.2%	RES Employment:	44 000 [jobs]
Share RES-T in transport:	10.2%	RES imports ² :	629 [MEUR]
Share RES-H/C in heating:	50.1%	RES exports ² :	1 309 [MEUR]



Source: Eurostat

	2005	2010	2022		
	Energy in ktoe	Energy in ktoe	Energy in ktoe	Employment in FTE	Turnover in MEUR
Hydropower	2.5	1.9	1	<100	<10
Wind power	521.7	664.5	1 588	22 600	5 030
Solar PV, and CSP	0.2	0.5	189	10 800	2 060
Solid biomass	162.9	285.8	483	5 400	880
Ren. energy in transport ³	19.1	49.3	404	<100	<10
Renew. heat consumed	914.9	1 240.8	1 282		
Renew. heat derived	846.9	1 226.1	2 051		
Heat pumps	72.5	114.3	378	4 200	710
All other renewables	797.2	1 061.9	160	800	260

Source: Eurostat, EurObserv'ER

FTE = Full time equivalent, 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 auto-producer plants. Its counterpart is the final heat consumption in the final consumption sectors (such as households).

¹ From Integrated National Energy Climate Plan

² Referring to the International Trade chapter from the publication: EurObserv'ER - *The State of Renewable Energy in Europe, 2022 edition*

³ Employment and turnover are only referring to biofuels in transport.



CURRENT RENEWABLE ENERGY POLICY

Denmark has been an early leader in renewable energies. Denmark's technology leadership is particularly prominent in offshore wind, biomethane and district heating.

RES-E

In June 2022, Denmark has agreed on a green investment fund of 7.2 bio. EUR to support green transition and phase out of fossil fuels. It covers investments from 2024 to 2040. It prioritizes larger and longer-term investments in climate, green energy and the environment, e.g. offshore wind development, afforestation, pyrolysis and carbon capture and storage.

In this framework, Denmark has launched a new auction for offshore wind power in April 2024. These new auctions follow the political agreement on tender frameworks from the spring of 2023. Six wind farm areas are tendered in the auction: Three in the North Sea, two in the Kattegat and one in the Baltic Sea. The offshore wind farms must deliver at least 6 GW (in total). The power produced by the new wind farms will be used not only for Danish consumption, but also for electricity exports and for green hydrogen production. The projects tendered in this round will be built without state subsidies and with a yearly concession payment. This means, that the bidders will participate in the tenders by bidding a yearly concession payment to the Danish state across a 30-year period, for the right to use the seabed. The tender also includes a number of requirements with regards to sustainability and social responsibility, e.g. the obligatory use of recyclable wind turbine blades as far as possible. These auction also introduces a new criteria regarding State participation. Specifically, the Danish State will co-own 20% of each wind farm. The new auctions will take place in the coming years and all wind farms must be constructed before the end of 2029.

For all other technologies, there are multiple item auctions. Electricity generation from these onshore sources are mainly promoted through a two-sided sliding premium (i.e. contract for difference (CfD)). In addition, there is an open door scheme for offshore wind parks and wave power plants. Plants applying under the open door scheme can also participate in the multi-technology auctions to receive support.

RES H&C

Denmark has ambitious renewable heat targets, as the nation aims to fully phase out fossil fuels by 2030. To achieve this goal, a boiler scrappage scheme has been in place since 2017 for oil boilers and since 2020 for gas boilers. As part of this, Danish homeowners with an oil or gas boiler in properties located outside district heating areas have been able to order a climate-friendly heat pump on a subscription basis, without having to invest too much upfront.

In addition to individual heating, collective district heating is the focus and is regulated by the Heat Supply Act. Municipalities and utilities are the main actors in this field and are responsible for heat planning and network development. District heating prices are regulated with a non-profit rule, i.e. prices can only cover necessary costs but, with a few minor exemptions, not a profit. In addition, a price cap for waste heat was introduced, which entered into force in January 2022. For geothermal heat project, the Danish parliament has adopted a new law in 2023 that effectively exempts geothermal heat projects from the price regulation. The new legislation aims to balance the need to protect consumers and district heating companies from the risks associated with the development of geothermal resources with the need for long-term and stable framework conditions. The Danish Energy Agency, as

an independent authority, has the discretion to grant the exemption and ensure that the conditions are met.

RES-T

Denmark has a proactive approach for the development of new and environmentally friendly transport technologies. In recent years, the transport system has been improved in several areas, including public transport, integration of different transport modes and new technologies such as electric vehicles and modular vehicle combinations.

To move towards independence from fossil fuels, Denmark is focusing on several initiatives such as reducing traffic congestion, increasing the use of public transport, making the rail sector more competitive and increasing the use of energy-efficient and environmental friendly technologies.

The Ministry of Transport has initiated a number of national campaigns and implemented a "drive green programme" to raise awareness among Danish citizens about energy-efficient driving habits. In addition, tools, such as green recommendations when buying a car and a voluntary certification scheme for companies and public organisations, are being used to create incentives for consumers to think green in relation to transport and to raise awareness of the economic benefits of greener transport choices. Moreover, environmental zones have been introduced in major cities in Denmark, including Copenhagen, Odense and Aalborg. In these low emission zones, there are special requirements for driving heavy goods vehicles and buses, in order to limit particulate emissions into the air. Finally, Denmark applies tax reductions for low emission vehicles. This includes a reduced registration tax as well as reduced taxes on the electricity used for charging electric cars. These measures are already having an impact, as the number of electric vehicle owners in Denmark has more than doubled between May 2021 and May 2022.

The government also focuses on the development of sustainable aviation fuels to be financed through a flat passenger fee of on all domestic flights. The goal is to establish the first sustainable domestic flight by 2025. This also creates opportunities for the maritime industry. The Danish maritime industry is one of the largest in the world, and is currently moving quickly towards green transition. Denmark has joined forces with the US, Norway, the Global Maritime Forum and the Maersk Mc-Kinney Møller Center for Zero Carbon Shipping to form a public-private partnership called the "Zero-Emission Shipping Mission", which aims to develop, demonstrate and deploy zero-emission fuels, vessels and fuel infrastructure by 2030.

Table 1: Brief description of key policy instruments aimed at promoting RES in Denmark

<i>Instrument</i>	<i>Description</i>
Auction for yearly concession payment	Bidders will participate in the auction by bidding a yearly concession payment to the Danish state across a 30-year period, for the right to use the seabed
Contracts for difference for offshore wind	Single-item auctions for determining support levels for specific offshore wind parks
Contracts for difference for other renewable electricity generation	Multi-item auctions for determining support levels for other renewable technologies for electricity generation, focusing on PV and wind onshore
Subsidies for replacing oil and gas boilers	Support payments for scrapping old boilers and investing in renewable or electricity-based alternatives
Non-profit rule for district heating	District heating prices can only cover necessary costs but, with a few minor exemptions, not a profit (exemptions for geothermal heat projects)
Drive green programme habits	Campaign to to raise awareness among Danish citizens about energy-efficient driving

For further information:

National Energy and Climate Plans (NECPs), <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/governance-energy-union/national-energy-climate-plans>

Danish Ministry of Foreign Affairs, Insight, Denmark expands renewable energy and CO2 tax, <https://investindk.com/insights/denmark-expands-renewable-energy-and-co2-tax>

Danish Energy Agency, Ongoing Offshore Wind Tenders, <https://ens.dk/en/our-responsibilities/offshore-wind-power/ongoing-offshore-wind-tenders>

IEA News, Enhancing infrastructure can help boost Denmark's clean energy investment, <https://www.iea.org/news/enhancing-infrastructure-can-help-boost-denmark-s-clean-energy-investment>

Danish Ministry of Transport, A Greener Transport System in Denmark, <https://www.trm.dk/media/wf3pcqtx/a-greener-transport-system-netversion.pdf>

Danish Ministry of Foreign Affairs, The whole world's playground for green transportation, <https://investindk.com/set-up-a-business/cleantech/green-maritime-and-transport>

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.



Disclaimer

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