

Energy in Denmark 2024

Key developments, system drivers and implications



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About this dashboard

Navigate the 2024 Danish energy story through three chapters.

Each chapter opens a set of interactive pages with figures, short explanations and data notes.

Data are from the Danish Energy Agency, except where noted in chapter 3.



1. Developments

Explore the main developments in the Danish energy system.

Emissions trend

Electricity & Heat Generation

Renewables share

Gas & Oil production



2. System Drivers

Understand the underlying system drivers behind the annual developments.

Final energy
Consumption

Electricity
demand

Electricity supply

Electricity trade

Efficiency & energy intensity



3. Implications

Assess the wider implications through energy prices and international comparison.

Prices

Renewable Energy Map

Renewable Electricity Map



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Key developments, system drivers and implications



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[Home](#) > [Chapter 1](#)



About this chapter

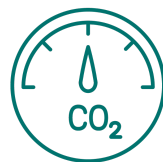
This chapter highlights the main changes in the Danish energy system during the last decades.

Use the topic cards to navigate across the key developments.

Data are from the Danish Energy Agency.

1. Developments

What changed in 2024? Explore the main developments across emissions, generation, renewables and domestic gas and oil production



1. Emissions trend

Track the overall emissions development and long-term reduction trend.



2. Electricity & heat generation

See how domestic power and heat generation has changed.



3. Renewables share

Review the roll of renewable energy in the Danish Energy System.



4. Gas & oil production

Explore the production situation for domestic gas and oil.



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[Home](#) > [Chapter 2](#)



About this chapter

This chapter explains the underlying drivers behind the changes seen in 2024.

Use the topic cards to navigate across the key developments.

Data are from the Danish Energy Agency.

2. System drivers

How did the energy system change? Understand the underlying system drivers behind the annual developments.

1. Final energy consumption

Explore trends in total final energy use across sectors.

2. Electricity demand

Understand electricity development by sector and drivers.

3. Electricity supply

See how electricity is generated and the key ors.

4. Electricity trade

Review electricity imports, exports and net trade balance.

5. Efficiency & energy intensity

Examine energy efficiency progress and energy intensity trends.



Energy in Denmark 2024

Key developments, system drivers and implications



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[Home](#) > [Chapter 3](#)



About this chapter

This chapter helps interpret the Danish energy system developments through electricity prices in an international arena.

Use the topic cards to navigate across the key developments.

Data source in this chapter: Eurostat.

3. Implications

What do all those changes mean in a global context? Explore the implications through electricity prices and international comparison.



1. Electricity prices

Assess what the 2024 energy developments mean for prices and prices signals.



2. International comparison

See how Denmark compares with other countries on selected indicators.

CO2 emissions fell much faster than gross energy consumption

By 2024, CO2 emissions from energy consumption had fallen much more sharply than gross energy consumption since 1990.

The Danish Energy Agency calculates observed energy consumption (including international aviation and the effect border trade) and CO2 emissions from energy consumption as well as adjusted figures. The adjusted figures take annual temperature variations and foreign trade in electricity into account. The purpose of the adjustment is to illustrate any underlying trends.

1.1. Emissions trends

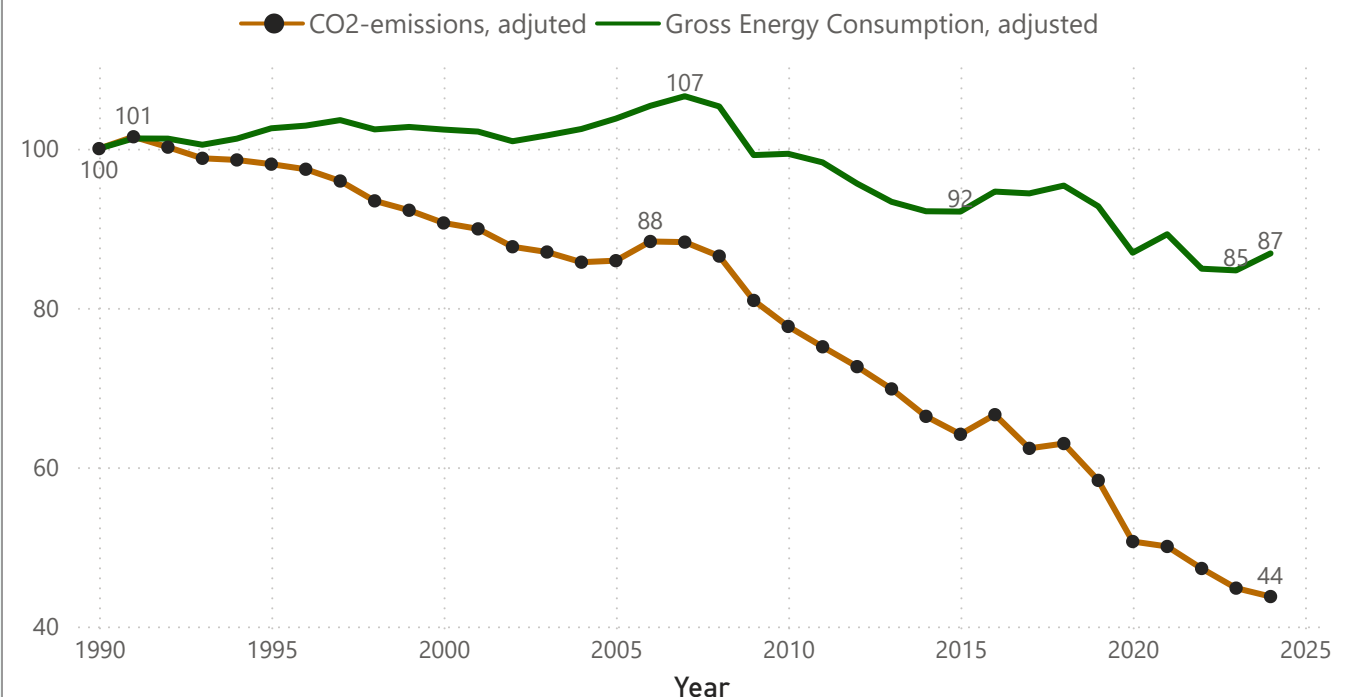
CO2 & Energy consumption

CO2 by consumption sector

CO2 by fuel used

CO2 Emissions and Gross Energy Consumption

Index, 1990 = 100



The transformation sector shows the biggest structural change.

Since 1990, CO₂ emissions from energy consumption have declined much faster than gross energy consumption, mainly due to a sharp reduction in emissions from the **transformation** sector.

The transformation sector covers the conversion of fuels into electricity and district heating.

1.1. Emissions trends

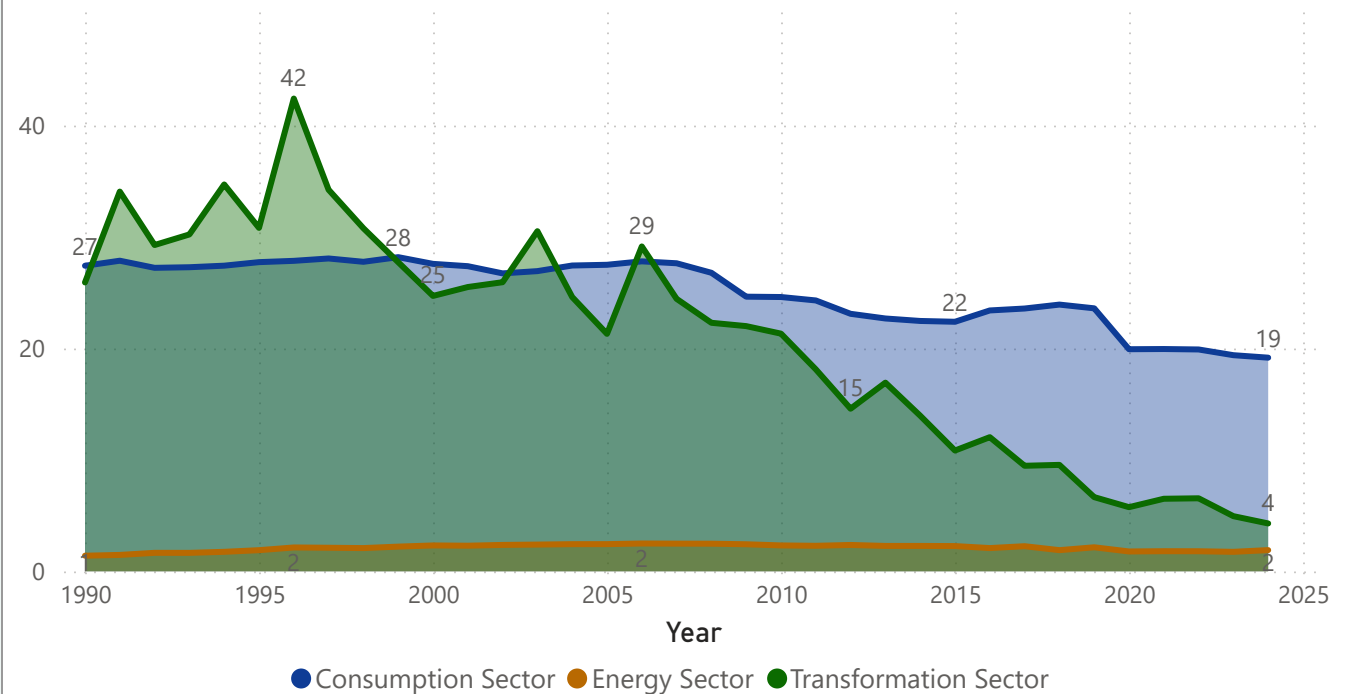
CO₂ & Energy consumption

CO₂ by consumption sector

CO₂ by fuel used

CO₂ Emissions by Sector

Million Tonnes (Adjusted)



Coal phase-down is the biggest emission story.

Since 1990 emissions from coal and coke declined sharply, while emissions from oil products fell more gradually and remained the largest source.

1.1. Emissions trends

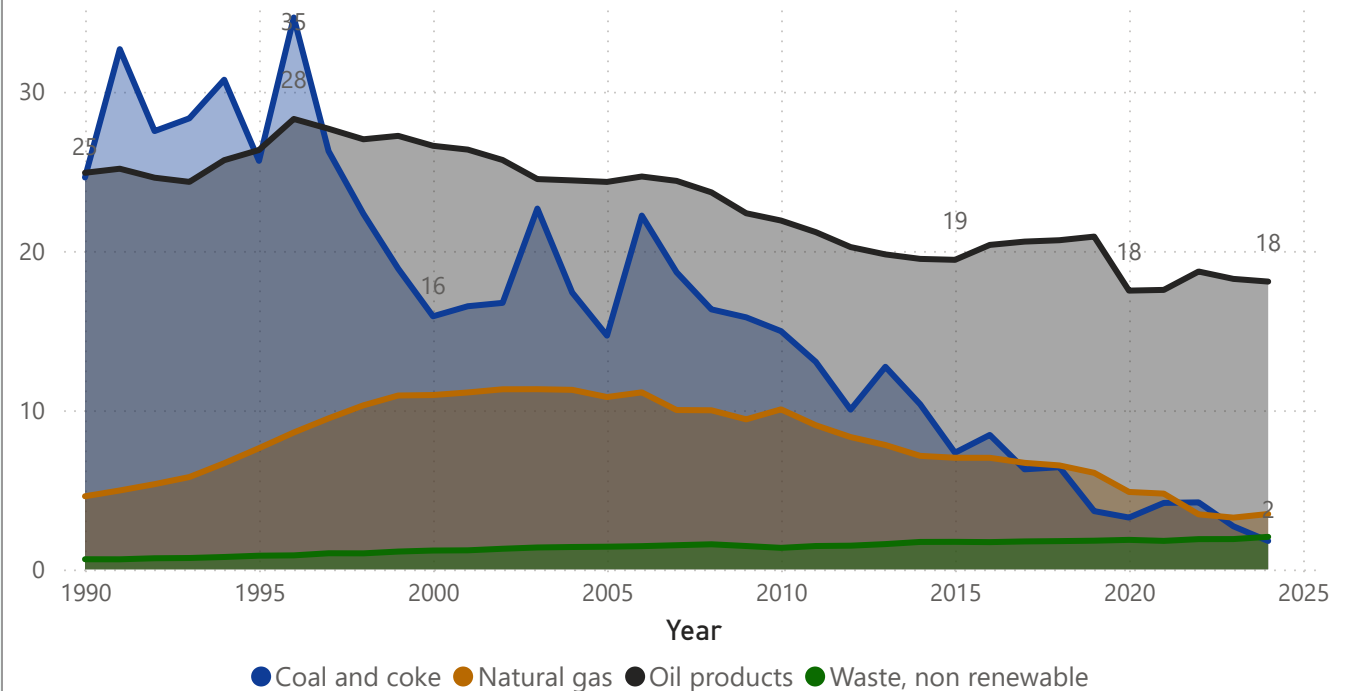
CO2 & Energy consumption

CO2 by consumption sector

CO2 by fuel used

CO2 Emissions by Energy Product Consumed

Million Tonnes (Adjusted)



Electricity decarbonization is driven mainly by rapid wind expansion and declining fossil generation, while biofuels play a smaller but growing role.

Until 2011 fossil fuels dominated electricity generation, but their share fell steadily to around one quarter to one third in recent years.

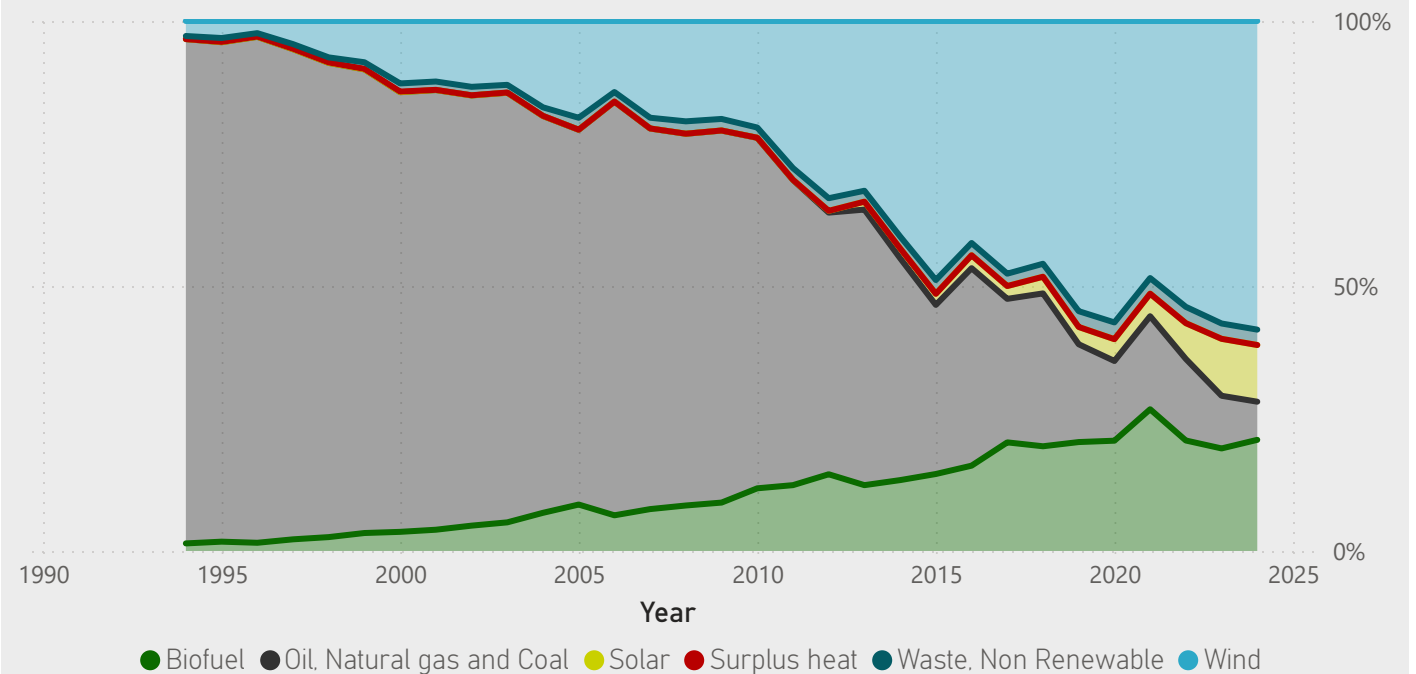
Over the same period, wind power grew to become the largest source, accounting for about half of total generation, while biofuels increased to around 15%-20%. Solar power shows a rapid increase in recent years.

1.2. Electricity & heat generation

Electricity Generation

Heat generation

Share of Electricity Generation by Type of Fuel



District heating production has shifted away from fossil fuels towards biofuels.

District heating production from fossil fuels lost ground over time, while biofuels expanded strongly from a relative small share in 1990s to become the dominant source, accounting roughly two-thirds of district heating generation in recent years.

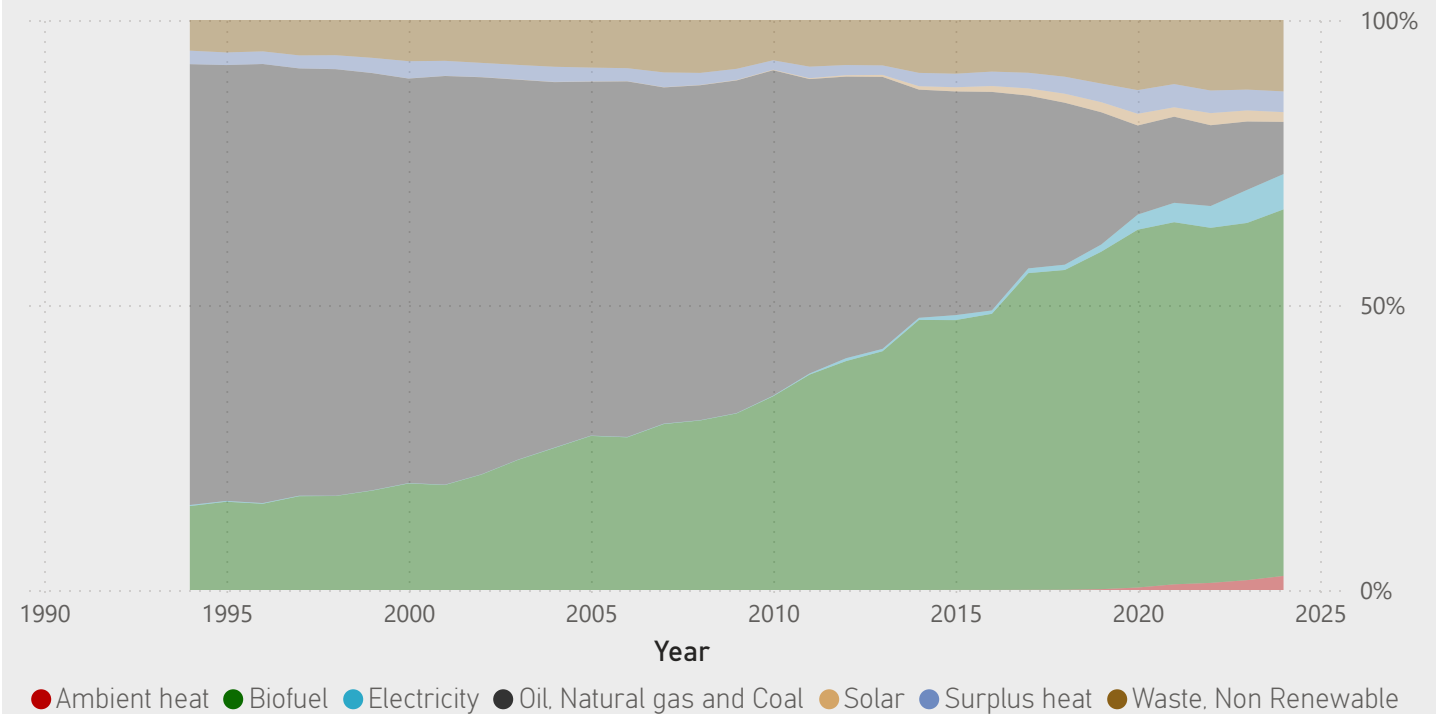
In recent years district heating production from electricity and ambient heat has increased but continue to play comparatively minor roles.

1.2. Electricity & heat generation

Electricity Generation

Heat generation

Share of District Heating Generation by Type of Fuel





Renewable energy has grown strongly over time, driven mainly by biomass and wind.

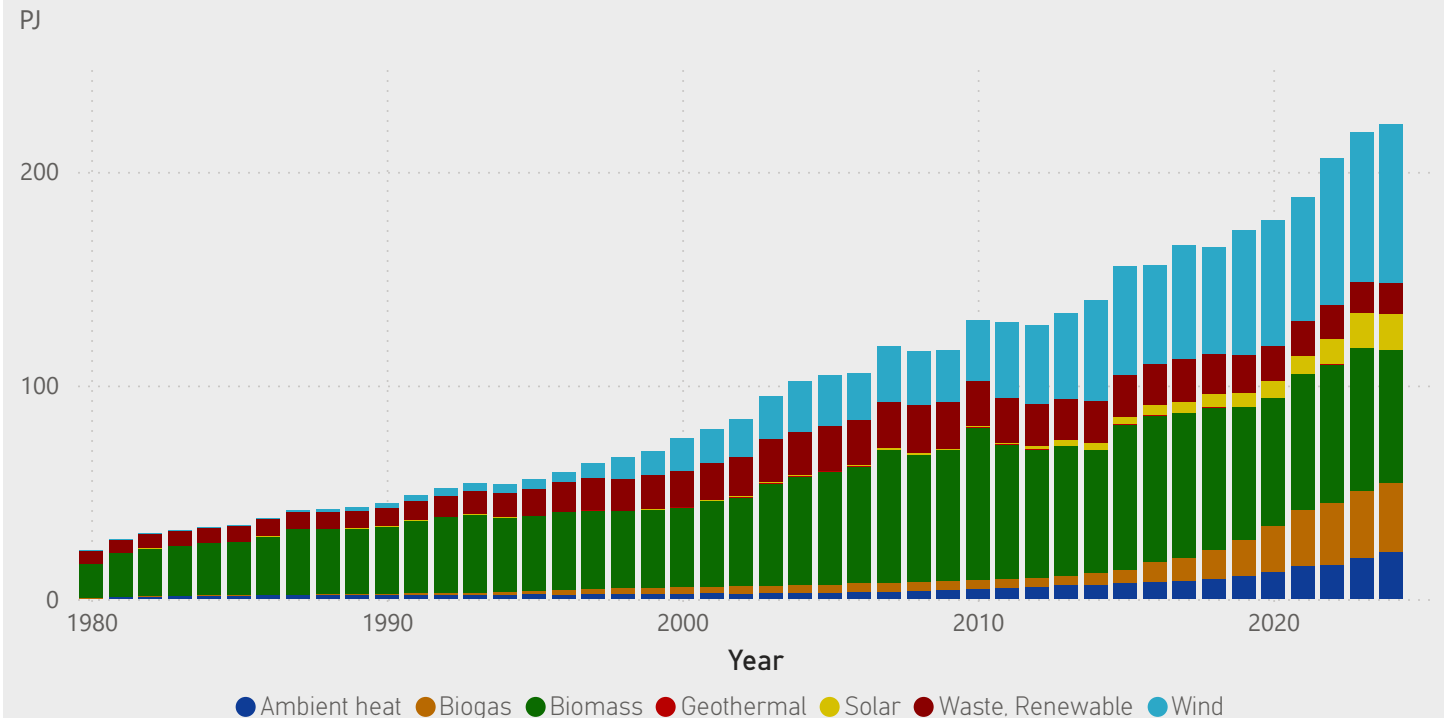
Renewable energy production has expanded strongly over time. Biomass has remained the dominant source, mainly used in electricity and heat generation, while wind has shown the strongest growth. Ambient heat and biogas have also increased in recent years. Solar is still relatively small but growing, while geothermal energy and renewable waste remain minor sources.

1.3. Renewables share

Renewable energy production

Renewable energy consumption

Renewable Energy Production by Type





Renewable energy has grown strongly over time, driven mainly by biomass and wind.

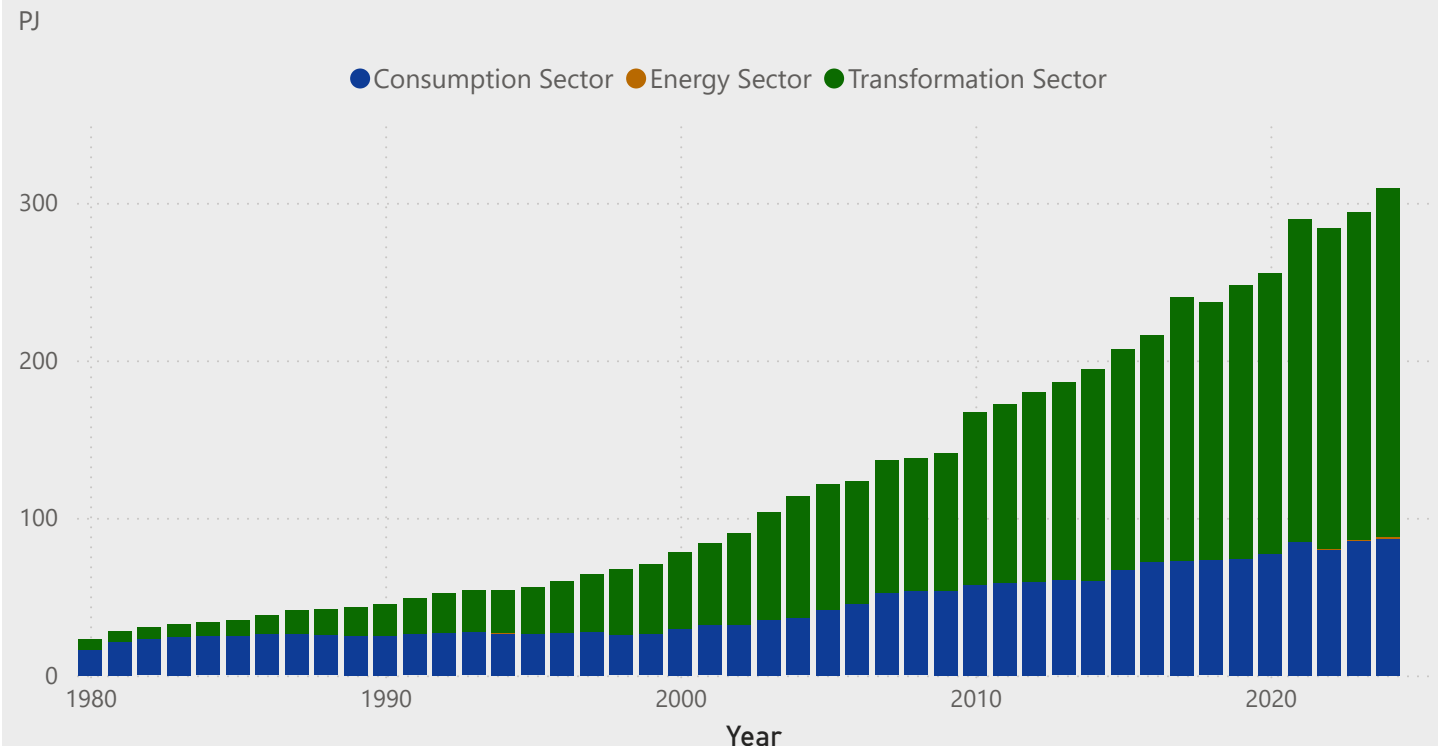
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1.3. Renewables share

Renewable energy production

Renewable energy consumption

Renewable Energy Consumption by Sector





Denmark's fossil-based primary energy production expanded strongly, peaked, and then declined marked, while renewable energy gradually gained importance.

Domestic fossil fuel production, especially oil and natural gas, increased until the early 2000s and then declined substantially.

Denmark produce oil and natural gas in several fields in the North Sea. One of the fields was closed for redevelopment from 2019 to 2024 affecting the production.

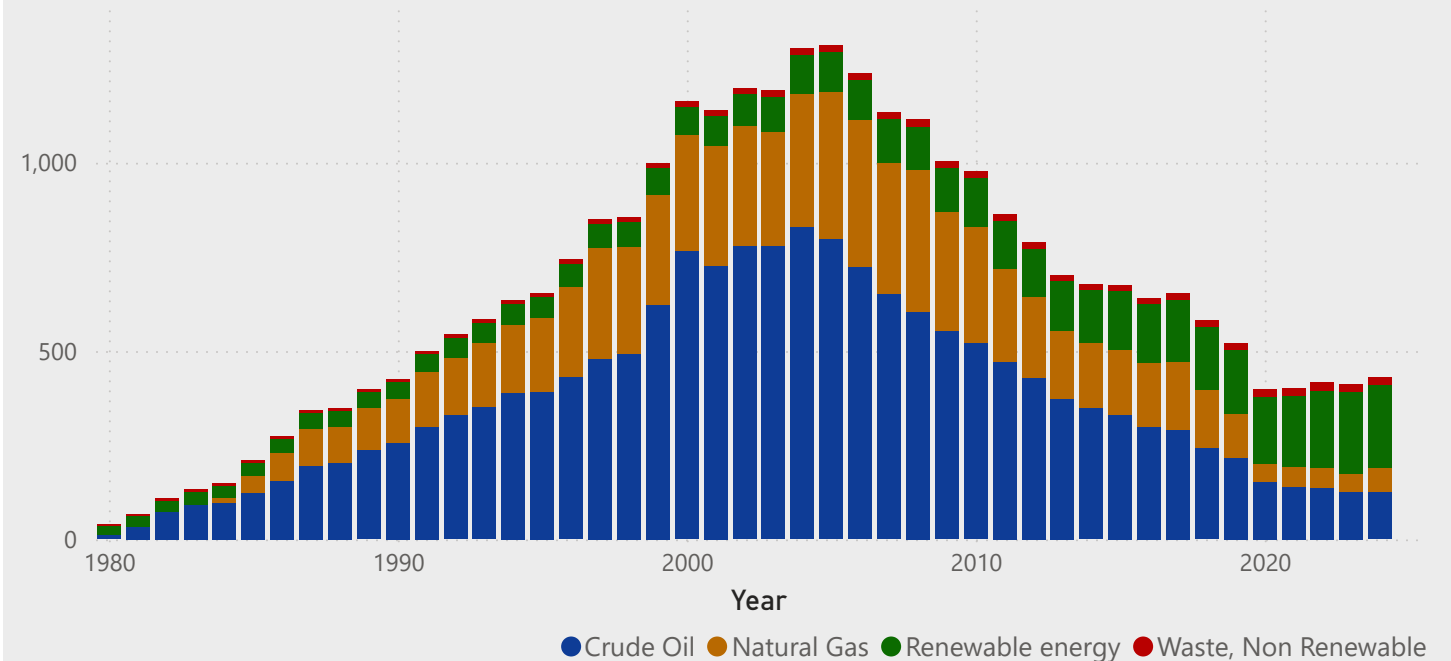
1.4. Gas & Oil situation

Primary Energy Production

Self-sufficiency

Primary Energy Production

PJ





Denmark's fossil-based primary energy production expanded strongly, peaked, and then declined marked, while renewable energy gradually gained importance.

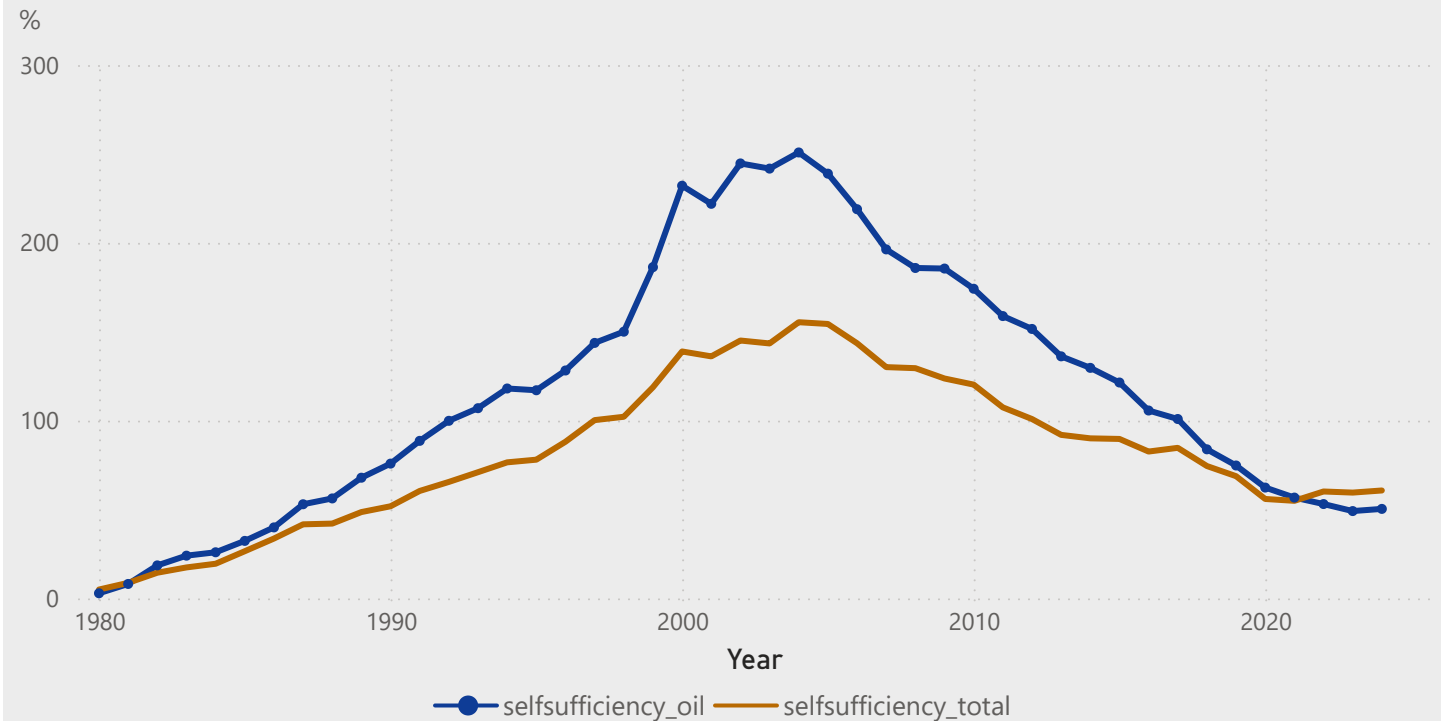
Denmark was previously highly self-sufficient in energy, with domestic production at one point well above domestic consumption. Since around 2004, self-sufficiency has gradually declined to a lower level. A similar trend is observed for oil where self-sufficiency increased markedly to above 200% before falling back to around 50% in recent years.

1.4. Gas & Oil situation

Primary Energy Production

Self-sufficiency

Self-sufficiency





Demand remained broadly stable across sectors.

Final energy consumption by sector fluctuated around 600 PJ over the period, with transport and households accounting for the largest shares. This suggests that the decline in emissions was not driven by a drop in final energy demand, but by changes in the fuel mix and in how energy was produced and used across sectors.

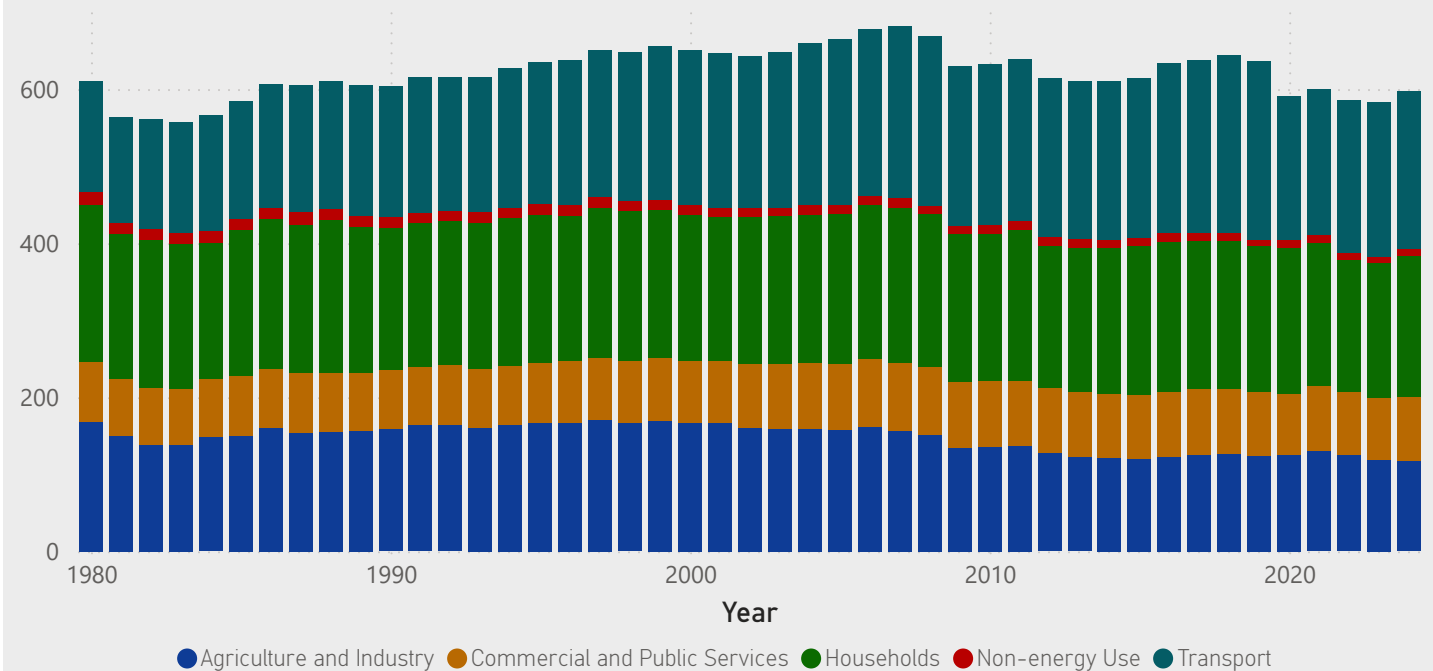
2.1. Final energy consumption

Consumption by Sector

Consumption by Fuel

Final Energy Consumption by Sector

PJ (Climate Adjusted)





2.1. Final energy consumption

Consumption by Sector

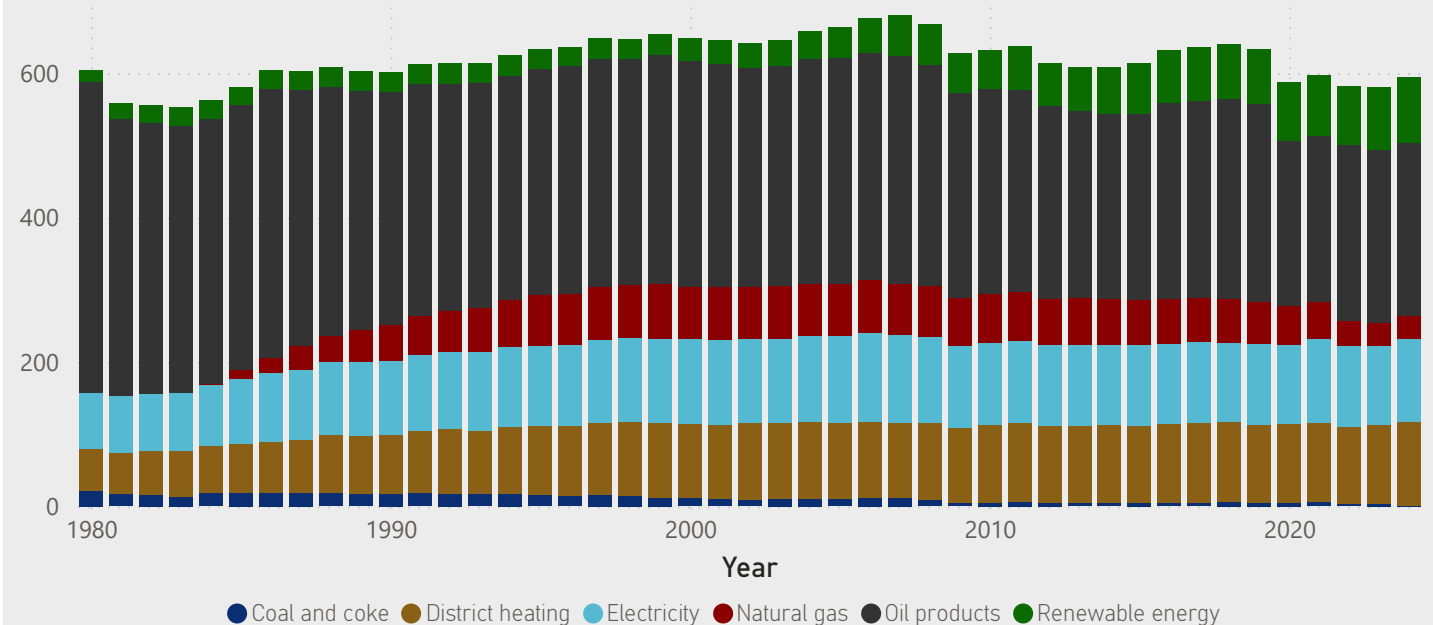
Consumption by Fuel

The share of renewables is increasing

Consumption of oil products remains the largest share in the final energy consumption (mainly in the transport sector) but is declining gradually, while electricity, district heating, and renewables has gained importance. Natural gas peaked around the 2000s before falling, and coal became marginal.

Final Energy Consumption by Fuel

PJ (Climate Adjusted)





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Home > System Drivers > Electricity Demand

Hourly electricity demand follows a clear seasonal pattern in 2024, with higher levels in winter and lower demand in summer.

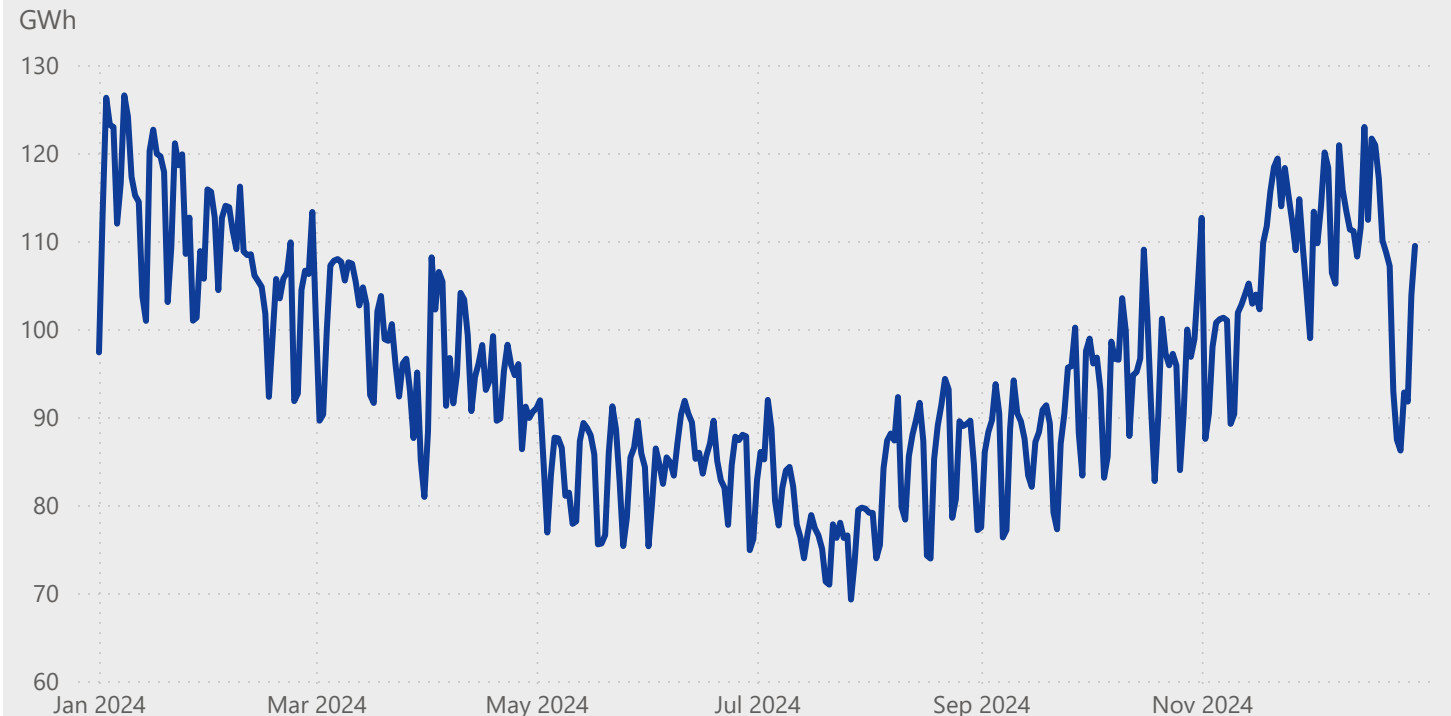
Dataset is an aggregated hourly consumption of business sector, public sector and private units available at [Energi Data Service](#) provided by Energinet.

2.2. Electricity Demand

Hourly demand

Representative days

Electricity Demand through 2024 (moving average)



2.2. Electricity Demand

Hourly demand

Representative days

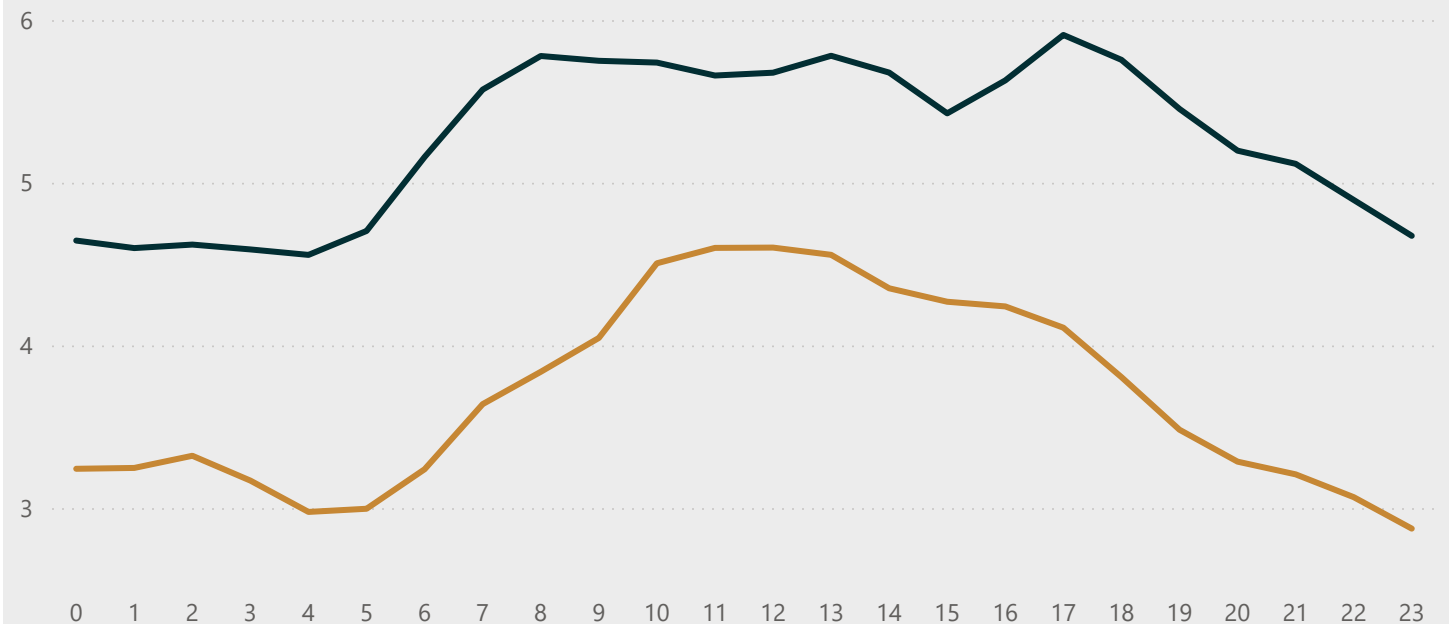
Daily demand profiles differed markedly between winter and summer, with higher winter demand and a more pronounced evening peak.

Data source: [Energi Data Service](#) provided by Energinet.

Two representative days in winter and summer

GWh

● Monday, January 08, 2024 ● Friday, July 05, 2024



2.3. Electricity Supply

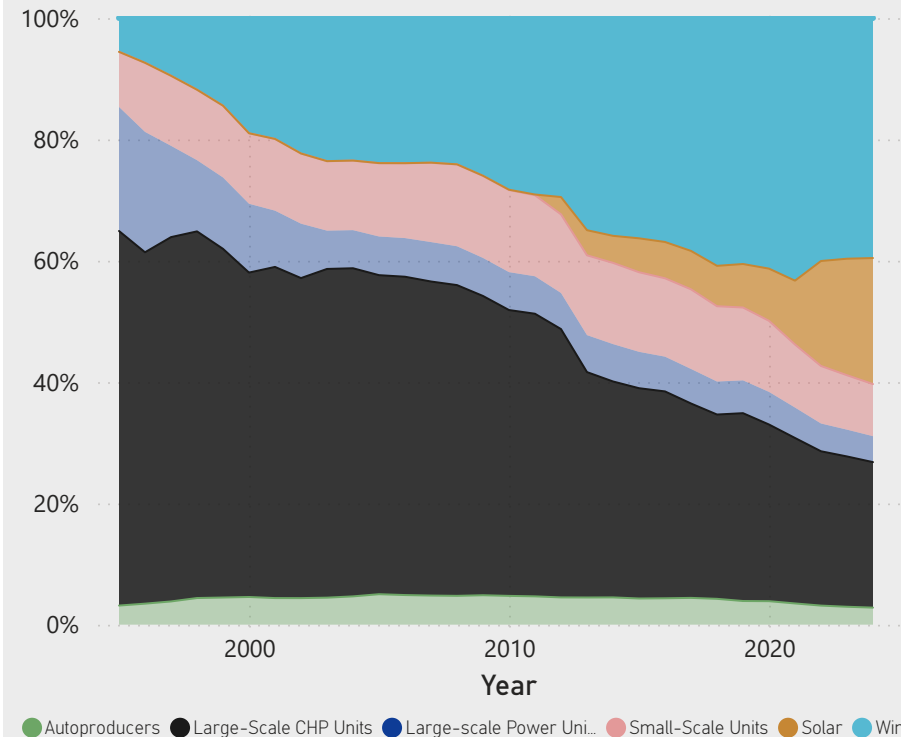
Capacity by producer type

Wind installed capacity

Increasing share of electricity production from solar and wind power units.

Electricity is produced at different types of generating units. For thermal units, that is, units that use fuels in production process, electricity is generated at large-scale electricity and combined heat and power (CHP) plants, at small-scale CHP plant, and by so-called autoproducers, whose primary activity is not electricity generation, for example, industrial CHP plants.

Share of Electricity Capacity by Producer Type



Producer / GW	2024
Wind	7.51
Large-Scale CHP Units	4.55
Solar	3.95
Small-Scale Units	1.63
Large-scale Power Units	0.81
Autoproducers	0.53
Total	18.98



2.3. Electricity Supply

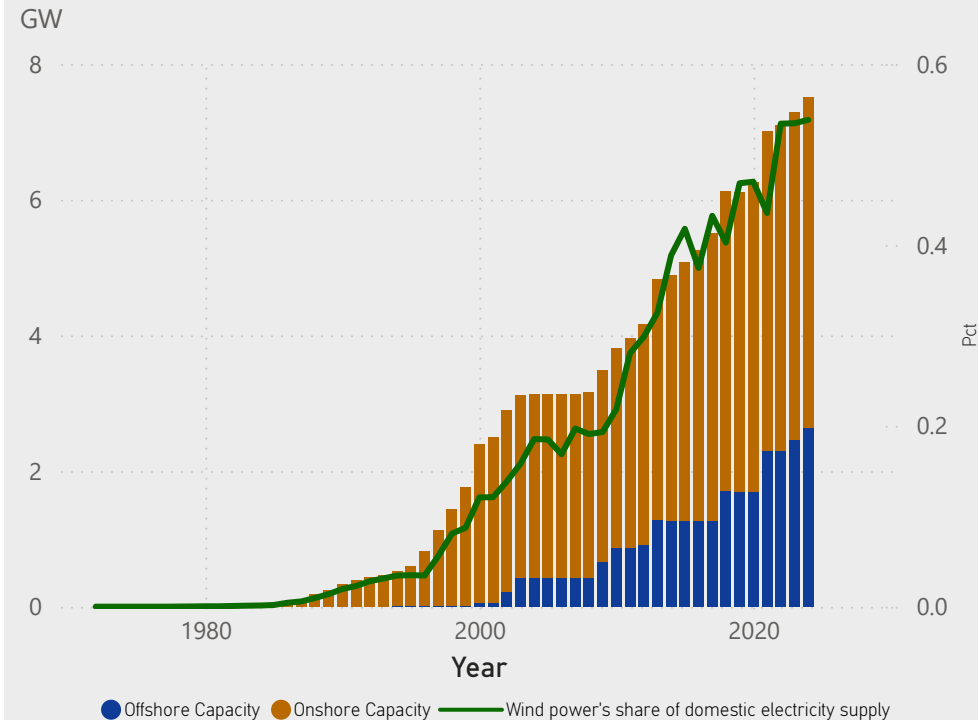
Capacity by producer type

Wind installed capacity

Wind became a major driver of electricity decarbonization.

Wind capacity and generation increased markedly over time, and wind came to account for more than half of domestic electricity supply in recent years.

Wind Installed Capacity and Share of Domestic Electricity Supply



Year

Multiple selections

Electricity Capacity

GW

Onshore Offshore

96.13

27.42

2.4. Electricity Trade

Next Exports of Electricity

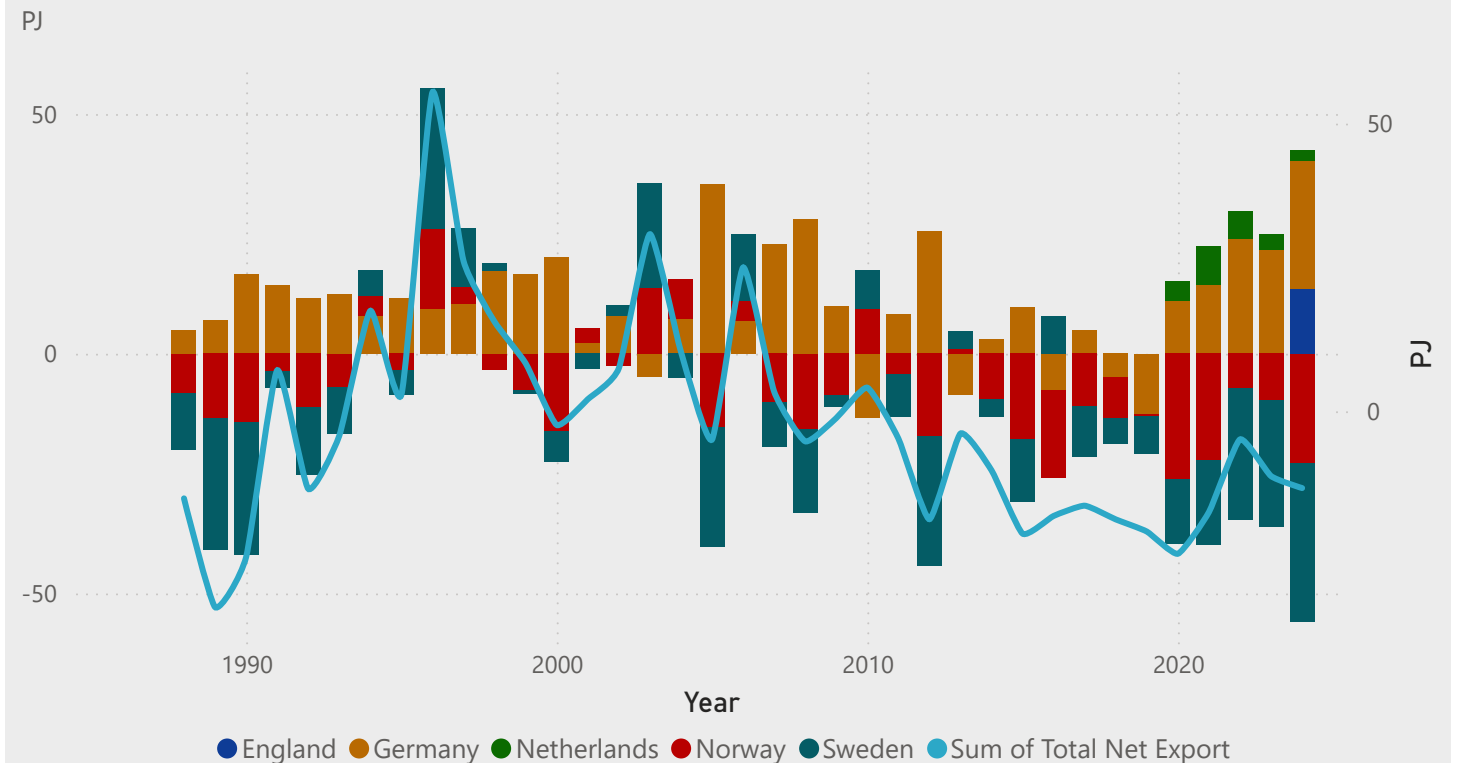
The electricity sector is closely linked to foreign markets.

Cross-border electricity trade became increasingly important for balancing domestic generation and demand.

Denmark has, to varying degrees, been a net importer of electricity overall since 2011.

Part of Denmark's electricity trade reflects its role as a transit country linking the Nordic and continental European power markets.

Net Exports of Electricity



2.5. Efficiency and energy intensity

Energy use in space heating

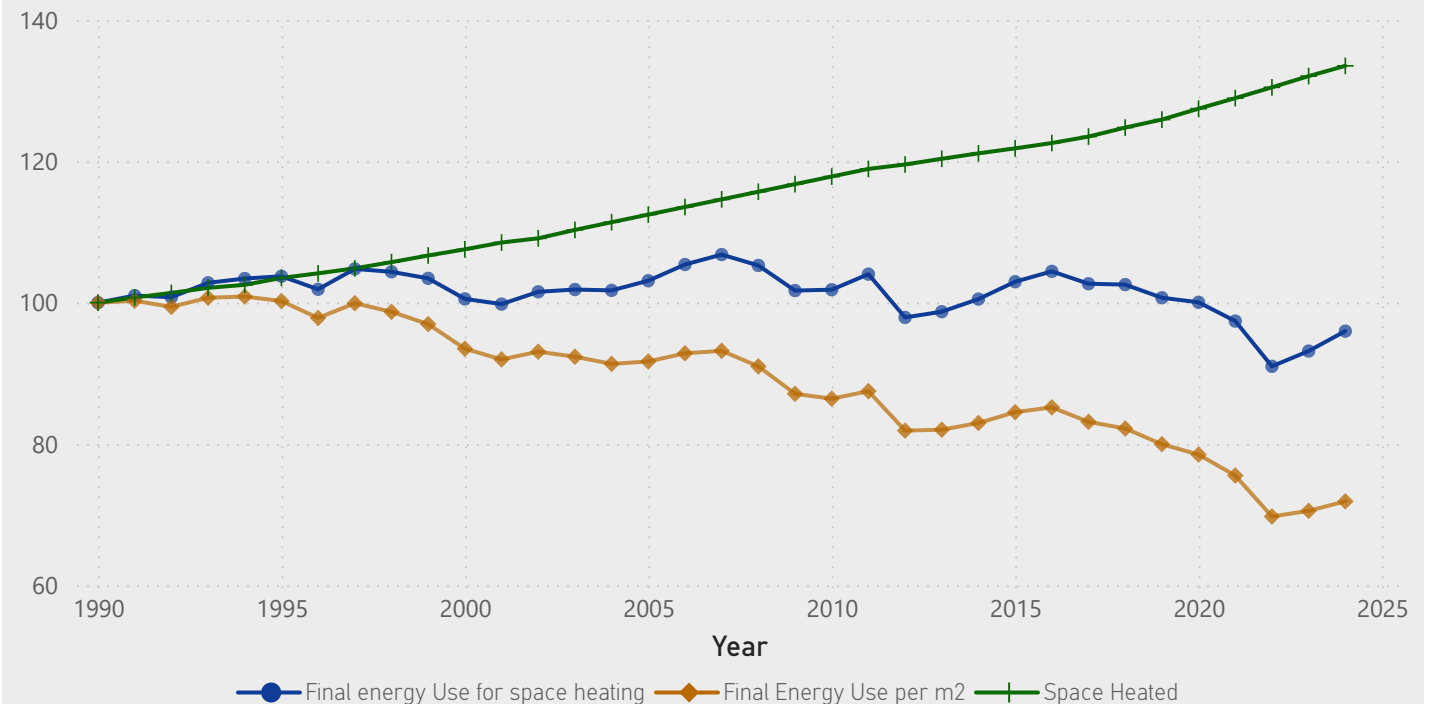
Energy Intensity

More heated space, lower energy use per m².

The decline in energy intensity is also reflected in end-use trends. In households, energy use for space heating per square metre declined markedly over the period, while total heated area increased steadily.

Energy Use for Space Heating in Households

Index 1990 = 100



Growth became less energy-intensive.

Since 1990, GDP rose strongly, while gross energy consumption remained broadly stable and energy intensity fell to around half its 1990 level. This indicates that the economy became significantly less energy-intense over time, reflecting efficiency gains and structural changes.

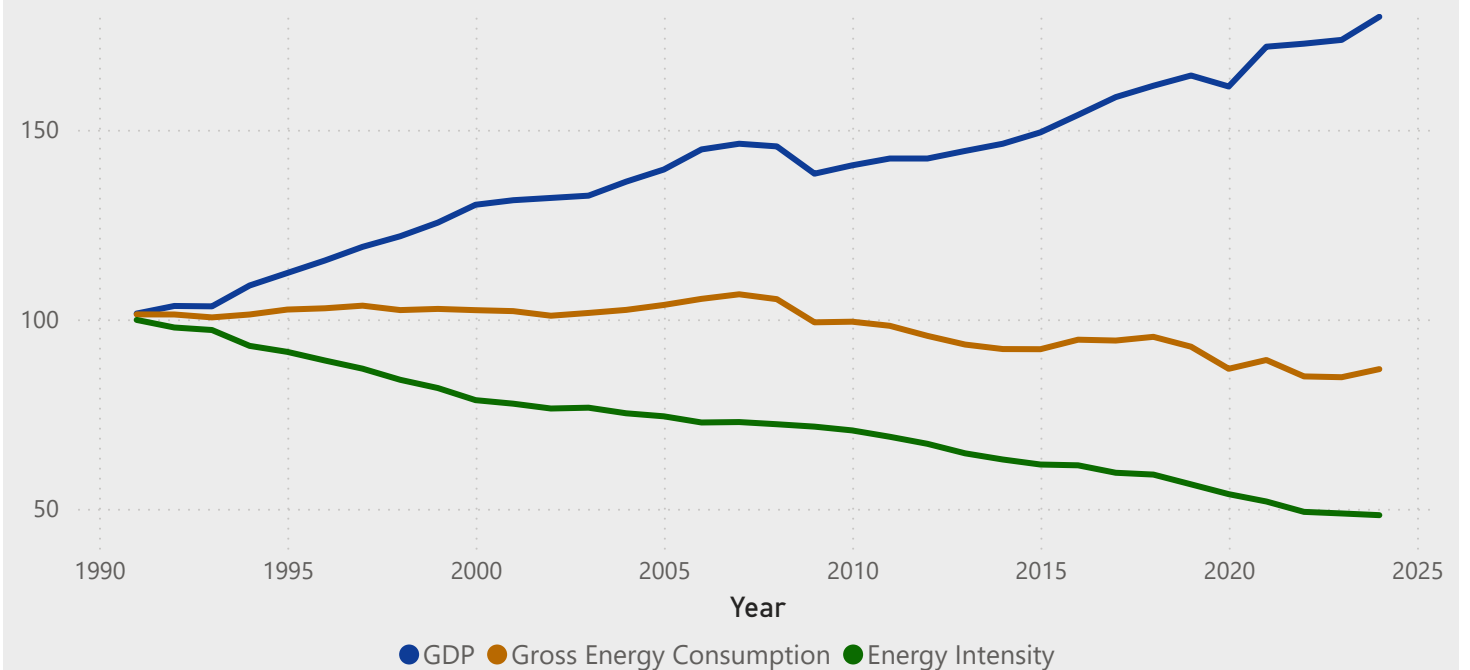
2.5. Efficiency and energy intensity

Energy use in space heating

Energy Intensity

GDP, Gross Energy Consumption and Energy Intensity

Index (1990=100)





Home > Implications > Electricity Prices

Denmark's pre-tax electricity prices remain broadly competitive in a European comparison.

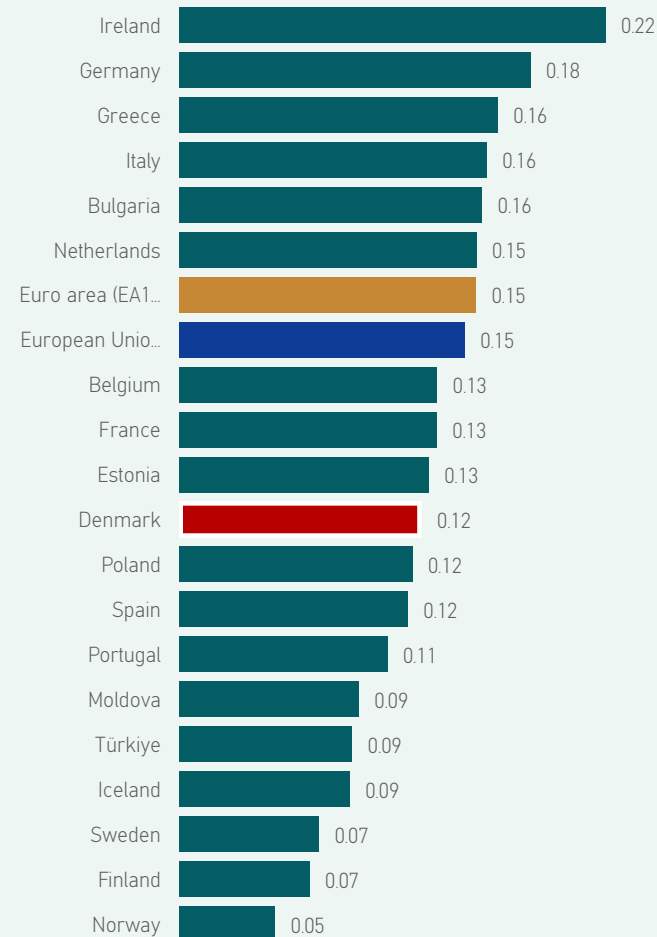
Denmark's electricity prices for both industrial and household consumers appear around or below the EU average. This suggests that the transition toward a more wind-based and lower-emission electricity system has not, in itself, resulted in particularly high pre-tax electricity prices relative to other European countries.

This comparison should be interpreted with caution, as it excludes taxes and does not capture price volatility or total end-user costs.

Data source: Eurostat

Electricity Prices for Industry

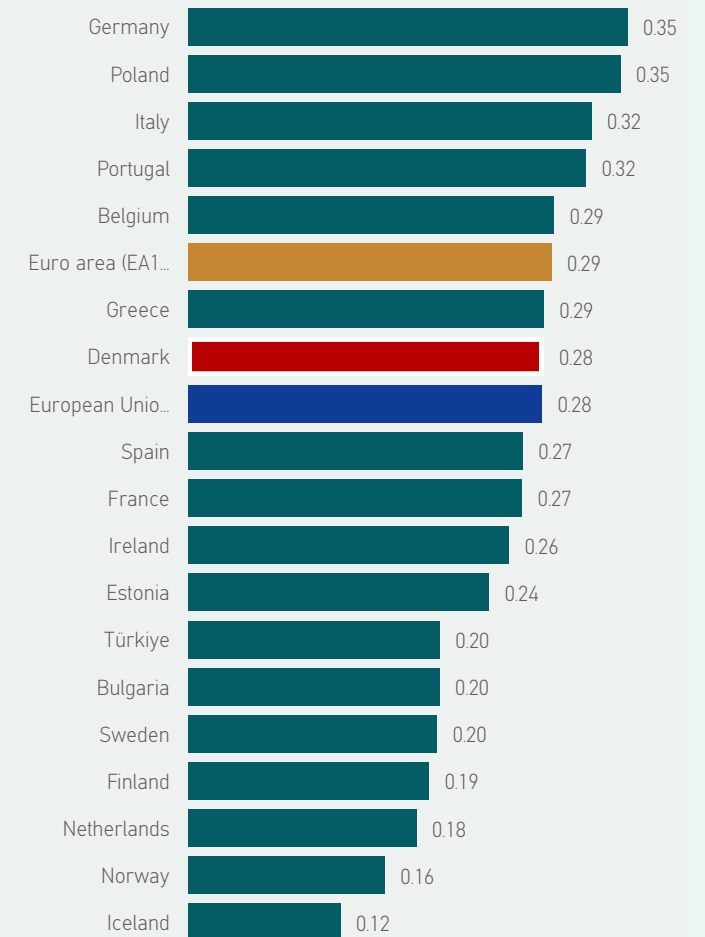
Selected consumer brands and countries, excluding taxes



Euro per kWh

Electricity Prices for Households

Selected consumer brands and countries, excluding taxes



Euro per kWh



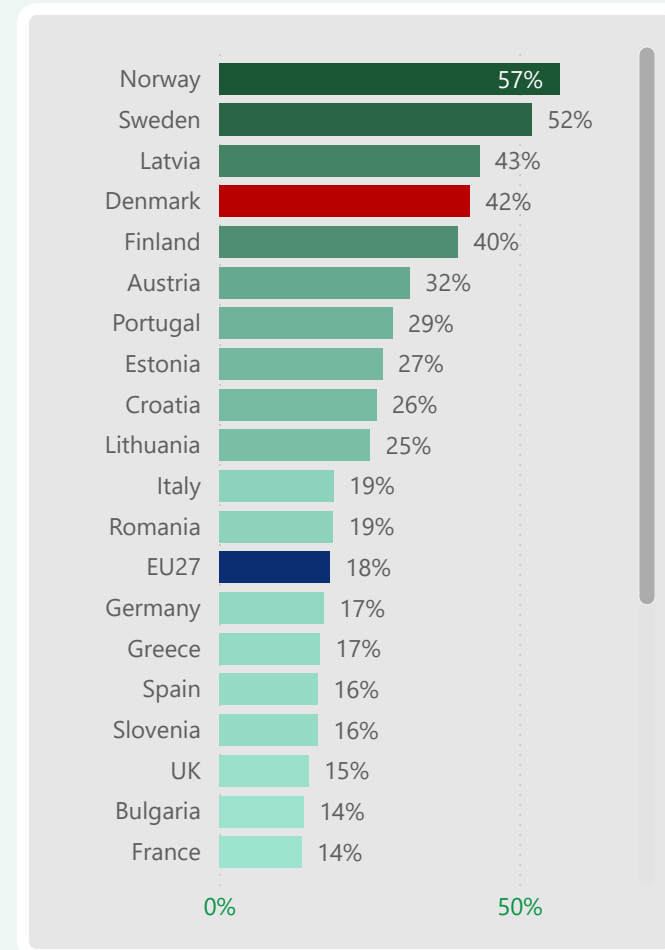
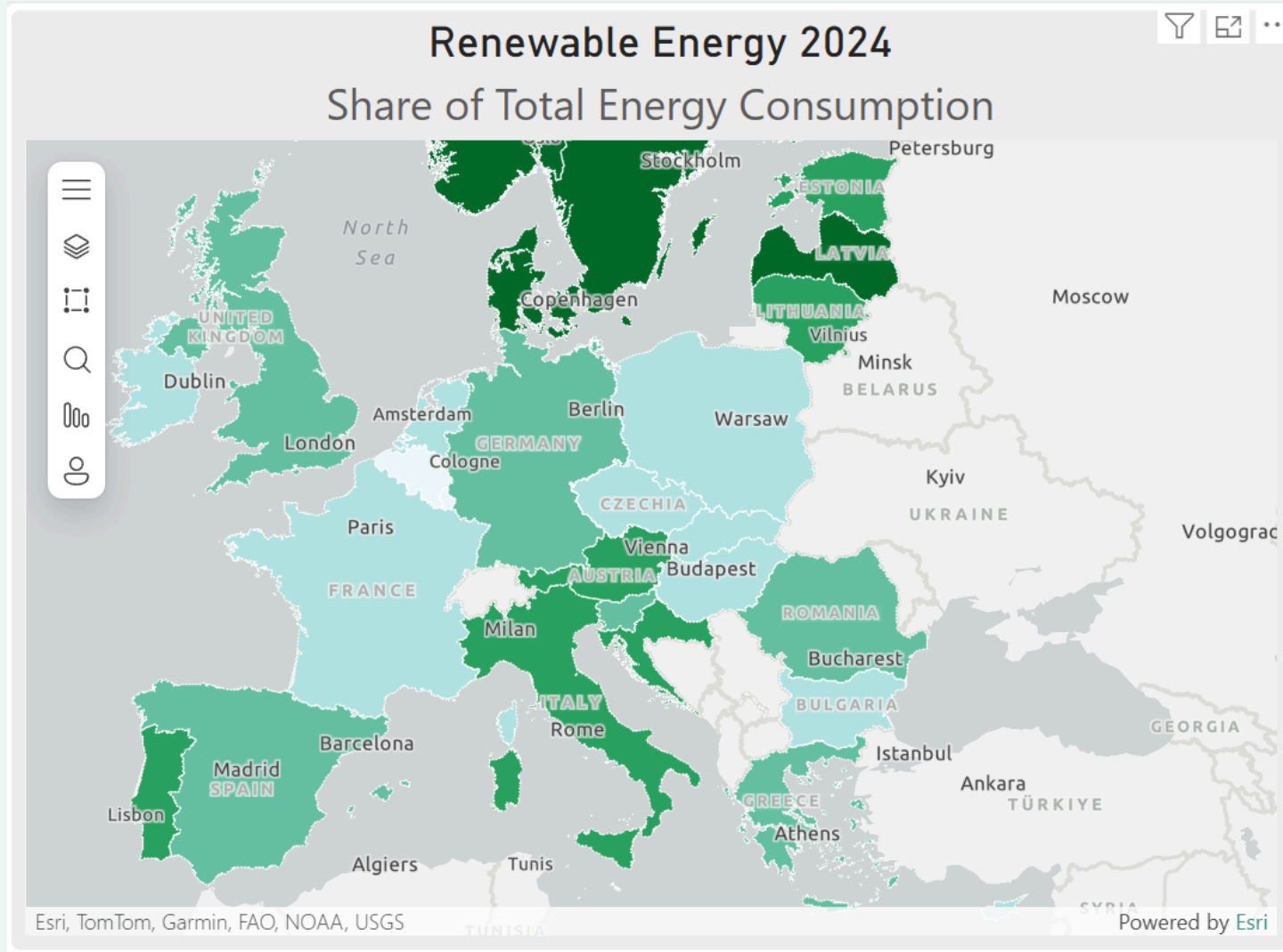
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Share of renewables in energy consumption

Share of renewables in electricity production

Data source: Eurostat



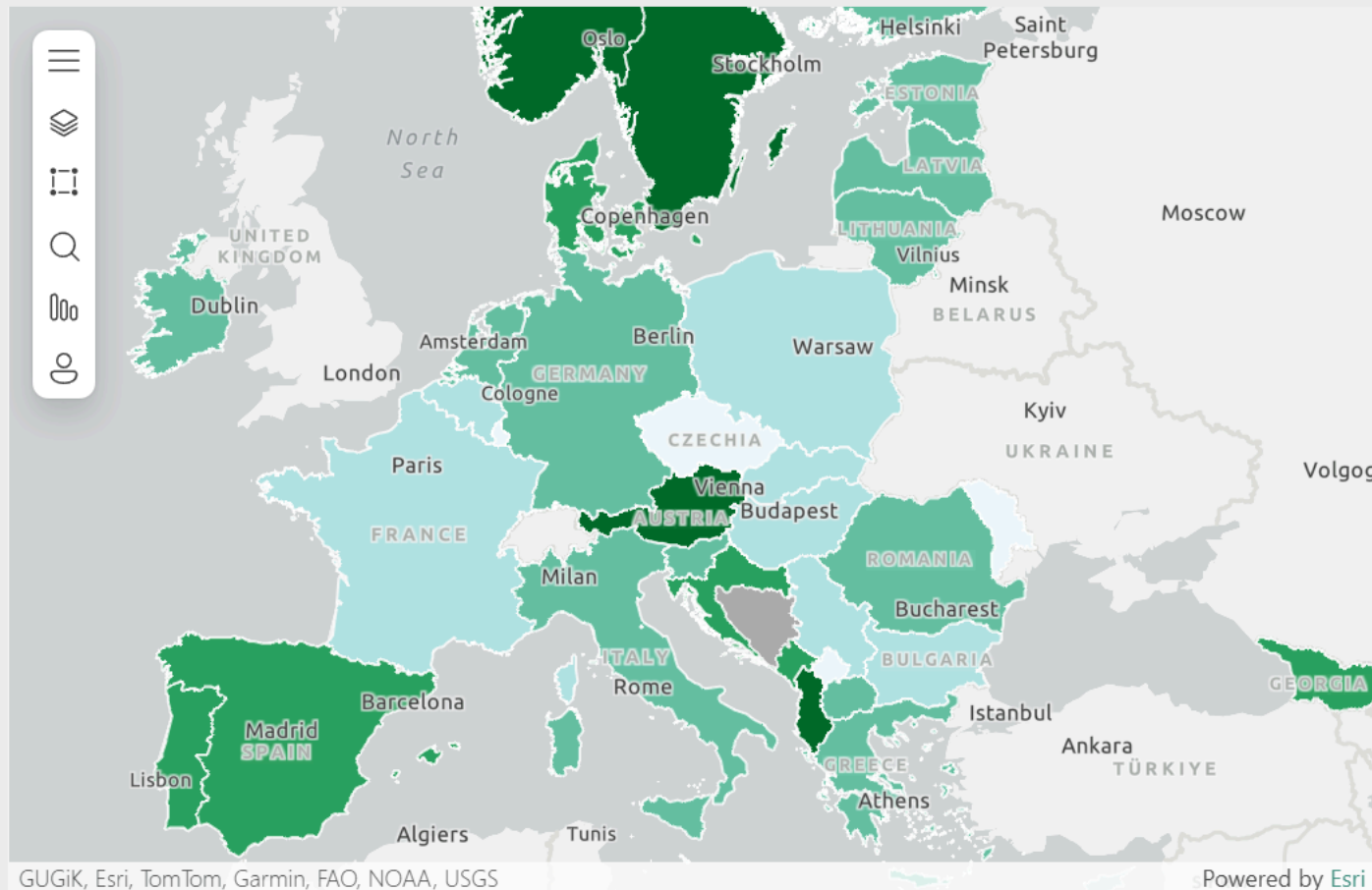
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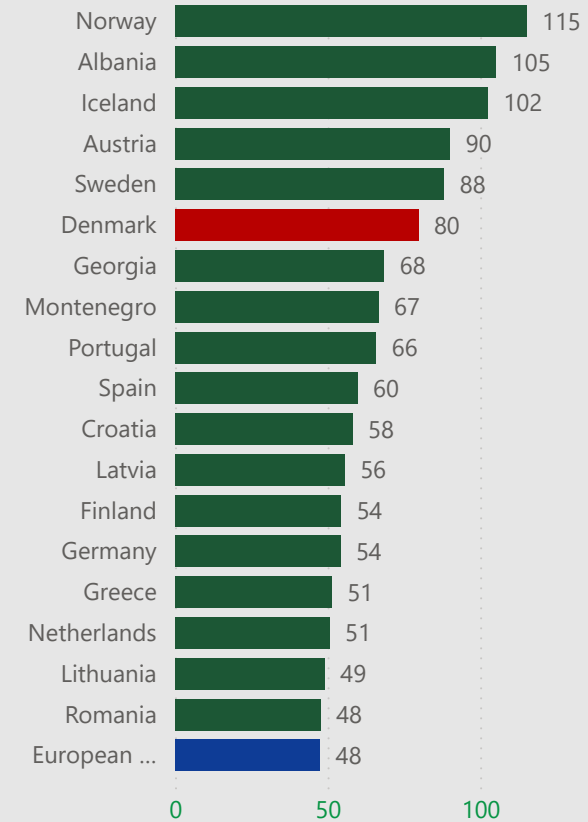


Renewable Electricity 2024

Share of electricity from renewable sources



Unit of measure: Percentage



Share of renewables in energy consumption

Share of renewables in electricity production

Data source: [Eurostat](#)
Online data code: nrg_ind_ren