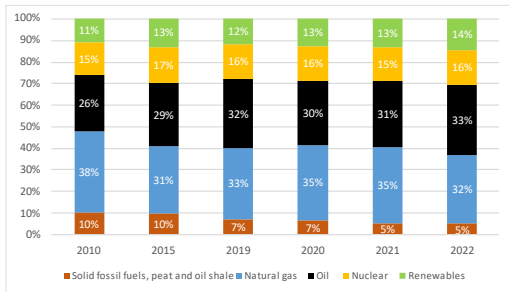


State of the Energy Union 2024: Hungary

Key energy figures

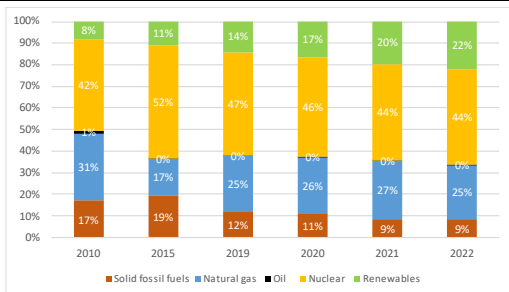
Graph 1: **Energy mix**



(1) The 2022 gross inland energy consumption was 1 million TJ. (1.8% of the total EU consumption).

Source: Eurostat

Graph 2: **Electricity mix**



(1) The 2022 gross electricity production was 35.8 TWh. (1.3% of the total EU production).

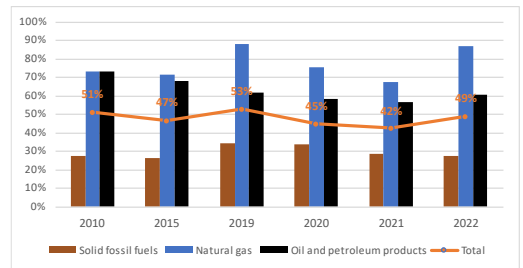
Source: Eurostat

- Fossil fuels account for 69.5% of Hungary's **energy mix** (similarly to 69% at EU level). The share of nuclear was 16.1% and renewables 14.3%.
- The **electricity mix** of Hungary is dominated by nuclear energy (44%). Fossil fuels account for 33.5% (compared to 38.6% at EU level) and renewable energy 22.1% of the electricity mix (compared to 39.4% at EU level).

Security, solidarity and trust

1. DIVERSIFICATION OF ENERGY SOURCES AND REDUCTION OF IMPORT DEPENDENCY

Graph 3: **Import dependency on fossil fuels**



(1) The graph shows the Member States' import dependency on third countries by fuel type.

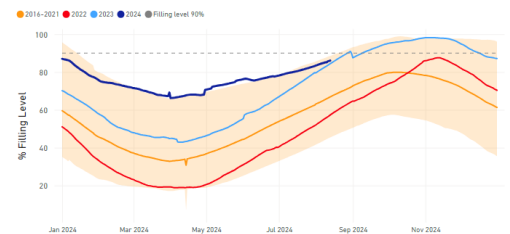
(2) Combustible renewables and electricity are excluded.

(3) The total amount takes into consideration the energy mix of the country.

Source: Eurostat

2. FLEXIBILITY OF THE ENERGY SYSTEM

Graph 4: **Storage levels in Hungary**



Source: JRC calculation based on AGSI+ Transparency Platform, 2024

- Hungary has **one gas storage facility** with a total capacity of **6.5 bcm**, representing 67% of its annual gas consumption in 2022.
- On 17 August 2024, the country's storage capacity was filled to 86.92%.

3. NUCLEAR FUEL DIVERSIFICATION

- The nuclear energy sector still depends on Russian technology, services and nuclear fuel. The Paks NPP currently operates four VVER-440 reactors. All four units reached their original 30-year design lifetime between 2012 and 2017 and received a 20-year license extension. In December 2022, the Hungarian Parliament approved plans for the further 20-year lifetime extension of the units meaning that they are now expected to operate until 2052-2057. The nuclear fuel diversification process is progressing, albeit rather at a gentle pace. Currently, the Paks NPP is in discussions with alternative fuel suppliers for the nuclear power plant, but the related contracts have not been signed yet. The two new VVER-1200 reactor units (Paks II project) which Hungary plans to finalise by 2030 also have a Russian vendor.

Integrated internal energy market

1. ELECTRICITY INTERCONNECTIVITY

Table 1: Electricity interconnectivity

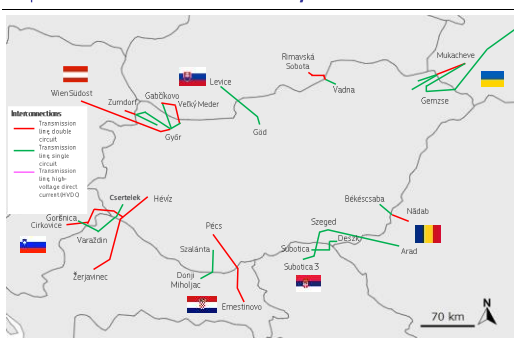
2024	2030 target
41.7 %	At least 15%

(1) The electricity interconnectivity is a ratio of electricity import capacity of a given Member State (sum of net transfer capacities of interconnectors with neighbouring Member States) and its total power generation capacity. The 2030 level represents the general interconnectivity target of 15%.

Source: European Commission's own calculations based on the ENTSO-E Winter Outlook 2023-2024 data

2. ENERGY TRANSMISSION INFRASTRUCTURE

Map 1: Cross-border electricity infrastructure



Source: DG ENER map recreation (based on ENTSO-E)

(1) ACER, 2024 Retail Market Monitoring Report, Energy retail and decarbonisation (forthcoming).

Map 2: Cross-border gas infrastructure



(1) The capacities are based on ENTSO-G 2024 capacity dataset (as of 11 January 2024) and the ENTSO-G Transparency Platform. Source: DG ENER map recreation (based on ENTSO-G)

3. MARKET INTEGRATION

Rollout of electricity smart meters

- The latest ACER/CEER Market Monitoring Report indicates that Hungary only has 9% smart meter roll out with consumers having no access to near real time consumption data.⁽¹⁾

Diversification of gas supplies

- In 2023, Hungary had 6 natural gas supply sources, the same as in 2021. Its three largest suppliers accounted for 79%, with Russia being the main supplier, holding a share of 69%. In 2021, Russia with 61%, its own domestic production with 15%, and Austria (13%) were Hungary's biggest natural gas supply sources.⁽²⁾

4. ENERGY POVERTY, SOCIAL CLIMATE PLAN AND JUST TRANSITION

Table 2: Energy poverty

Indicator	%	2023	2021	Evolution compared to	EU average
EED NECPs four main indicators		7.2	+1.8 pp	+0.4 pp	10.6
Inability to keep home adequately warm		7.3	-2.4 pp	-6.6 pp	6.9
Arrears on utility bills		12.6	-7.8 pp (2020)	-12.2 pp	15.5
Share of pop. With leak, damp or rot in dwelling		13.1	+0.5 pp	-0.3 pp	16.2
AROP (At risk of poverty)					

Source: Eurostat

Social Climate Plan

- Member States need to submit these plans to the European Commission by June 2025.
- Maximum financial allocation for Hungary: EUR 3 129 million or 4.33 % of total SCF.

(2) ACER-CEER Annual Report Monitoring: the Internal Gas Market in 2022 and 2023.

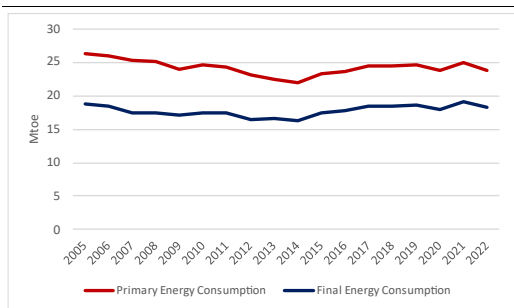
Just Transition Plan

- The Hungarian Territorial Just Transition Plans (TJTP) outline the transition away from coal-based energy production in the single largest coal region in North-Hungary. The plans set out how the Just Transition Fund (JTF), with a national allocation of EUR 261 million, will support the development of renewable energy sources, economic diversification, and modernisation of industries. The draft updated NECP refers to 2030 as coal phase out date.

Energy efficiency

1. ENERGY EFFICIENCY

Graph 5: Primary and final energy consumption

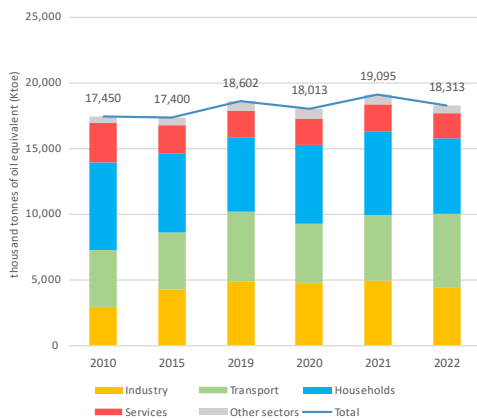


Source: Eurostat

- In 2022, Hungary's **Primary Energy Consumption (PEC)** amounted to 23.9 Mtoe, 4.3% lower than in 2021, while its **Final Energy Consumption (FEC)** amounted to 18.3 Mtoe, 4.1% lower than in 2021.

⁽³⁾ Following JRC's methodology (see for reference "Energy Consumption and Energy Efficiency trends in the EU, 2000 – 2020).

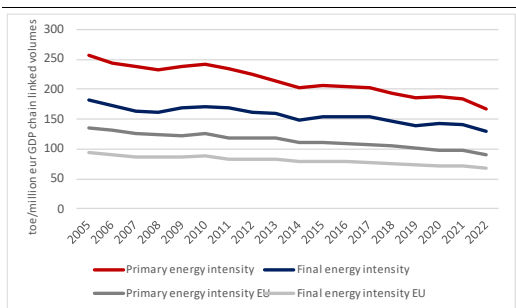
Graph 6: Final energy consumption by sector



(1) Final energy consumption excludes consumption of the energy sector (including transformation and distribution losses) and non-energy use of energy carriers.

Source: Eurostat

Graph 7: Primary and final energy intensity



Source: Eurostat

2. ENERGY PERFORMANCE OF BUILDINGS

- In 2022, Final Energy Consumption (FEC) in the Hungarian **residential sector** was **5.8 Mtoe**, representing a **reduction of 8.9%** compared to 2021. In the **services sector**, FEC was **1.9 Mtoe**, with an **9.0% decrease** compared to 2021. However, climate corrected data ⁽³⁾ show a **residential FEC increase of 0.4%** from 2021 to 2022, indicating that the above reduction is mostly climate-related (e.g. milder winter) rather than linked with an improvement of the building stock.
- Heating and cooling account for around **85%** of the country's residential final energy consumption, with renewables supplying approximately **20%** of the gross final energy consumption for heating and cooling. Almost

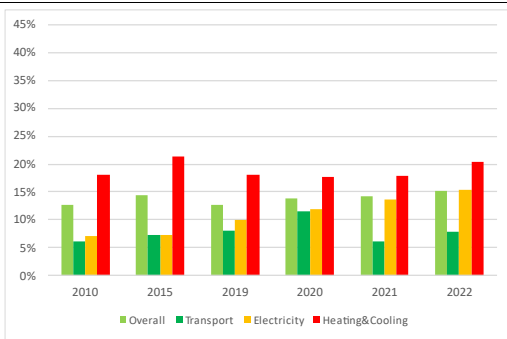
12,000 heat pumps were sold in 2023, reaching a total stock of around 48,000 installed heat pumps, as per the European Heat Pump Association (EHPA).

- In 2023, **7.3%** of the total population was experiencing difficulties on paying their utility bills while **7.2%** was not able to keep their home adequately warm over the cold periods of the year (with a mixed evolution compared to 2021, when such figures were, respectively, 9.7% and 5.4%). This underlines the importance to increase rate and depth of building renovation, specifically of worst-performing buildings.

Decarbonisation and climate action

1. SECTORAL SHARE OF RENEWABLE ENERGY

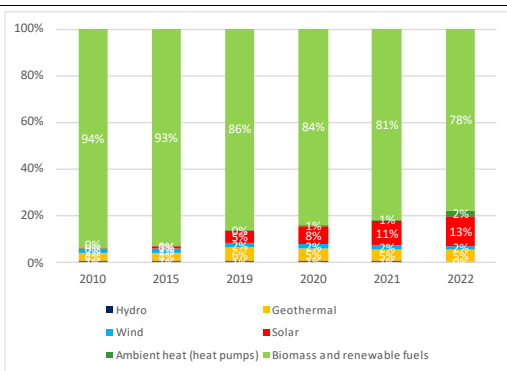
Graph 8: Share of renewable energy sources



(1) In % of gross final consumption of energy.

Source: Eurostat

Graph 9: Renewable energy mix

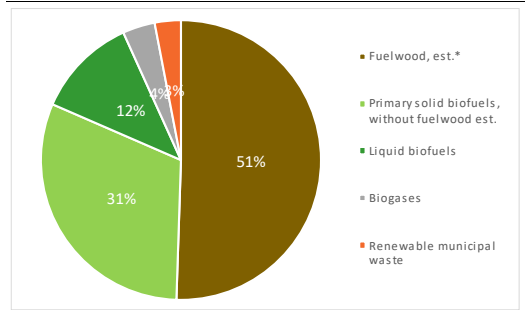


(1) In % of gross final consumption of energy.

Source: Eurostat

2. BIOENERGY MIX

Graph 10: Bioenergy mix



(1) In % of gross final consumption of energy (2022).

(2) * Fuelwood estimate, based on the Primary solid biofuels consumption in Other sectors, Eurostat and industry secondary data, DG ENER estimations.

Source: Eurostat and DG ENER

- For more information see the dedicated [website on biomethane country fiches](#).

3. HYDROGEN

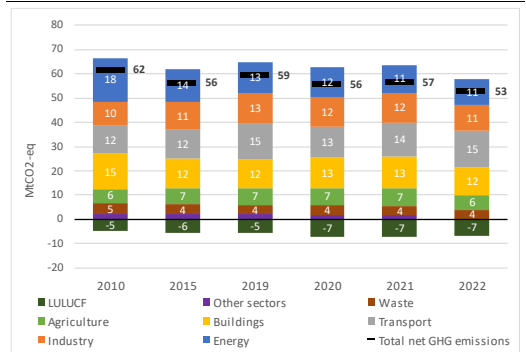
Table 3: Operational hydrogen projects

Name	Description
Aquamarine	2 MW from renewables

Source: European Commission based on IEA data

4. GREENHOUSE GAS EMISSIONS

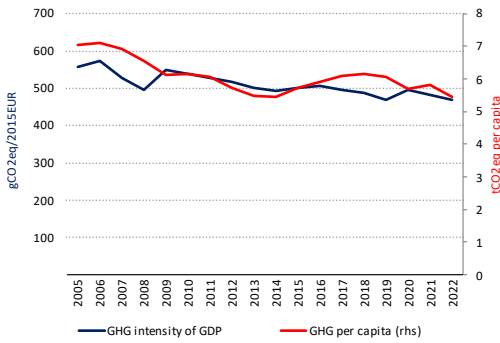
Graph 11: Greenhouse gas emissions by sector



Based on UNFCCC GHG Inventory reporting as per the IPCC categories: (1) Energy sector refers to electricity and heat production and petroleum refining. (2) Industry includes fuel combustion in manufacturing and construction and emissions in industrial processes and product use. (3) Buildings include emissions from energy use in residential and tertiary buildings, and energy use in agriculture and fishery sectors. (4) Total net GHG emission including LULUCF and excluding international aviation.

Source: Greenhouse gas inventory 1990-2022 (EEA)

Graph 12: **GHG per capita and GHG intensity of GDP**



(1) Total greenhouse gas emissions, including LULUCF and excluding international aviation.

Source: Greenhouse gas inventory 1990-2022 (EEA). Real GDP in 2015-prices (AMECO, European Commission). Population (Eurostat).

- With 468 gCO₂eq/2015EUR, Hungary lies above the EU average in terms of GHG intensity of GDP.
- With 5 tonnes of CO₂ equivalent per capita, Hungary is below the EU average in terms of GHG emissions per capita.
- For more detailed information on country profiles see [Progress on climate action \(europa.eu\)](https://europea.eu).

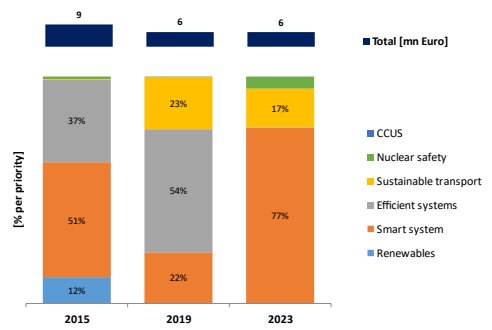
Research, innovation and competitiveness

1. INVESTMENT IN R&I

- Public investment in research and innovation (R&I) in Energy Union priorities⁽⁴⁾ decreased from 0.008% in 2015 to 0.003% in 2023 (share of GDP).⁽⁵⁾

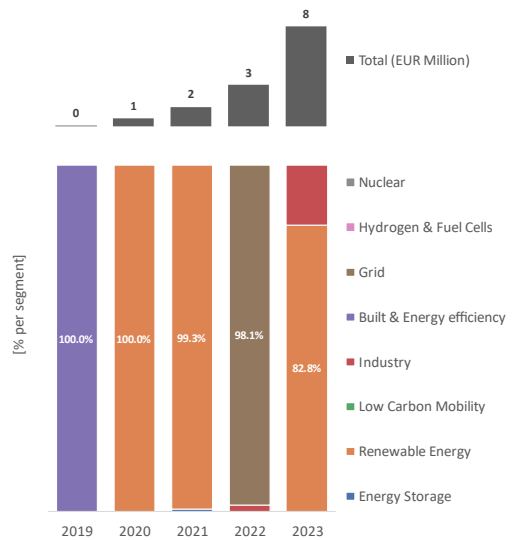
⁽⁴⁾ Renewables, smart system, efficient systems, sustainable transport, CCUS and nuclear safety, COM(2015) 80 final ('Energy Union Package').

Graph 13: **Public investment in Energy Union R&I priorities**



Source: JRC SETIS 2024

Graph 14: **Venture capital investment in net-zero energy technology (start-ups and scale-ups)**



(1) Firms typically use venture capital to expand, break into new markets, and grow faster. Venture capital is essential for the growth of innovative firms and it is key to foster the EU's competitiveness and to strengthen the EU's technology sovereignty in the net-zero energy sector.

Source: JRC elaboration based on PitchBook data (08/2024)

2. NET-ZERO ENERGY TECHNOLOGIES

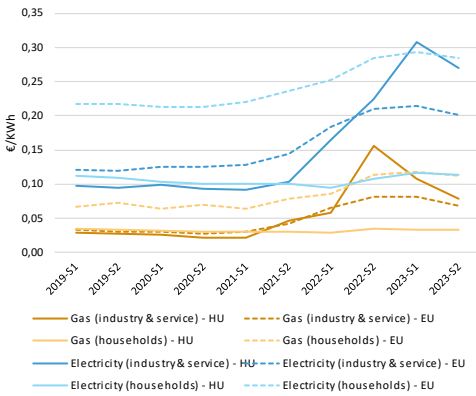
- Hungary has limited domestic PV manufacturing capacity compared to the total solar energy capacity installed in the country. One Hungarian manufacturer stands as the sole active player, operating one production facility with an annual cell manufacturing capacity of approximately 100MW. It has ambitious plans to expand this capacity significantly, targeting a range of 500-

⁽⁵⁾ Source: JRC SETIS 2024

600MW in the coming years. Hungary is positioning itself as one of the world's leading batteries suppliers for EVs. A South-Korean multinational operates a prominent battery cell plant in Göd, recently expanded to a total capacity of 30 000 MWh. The same company has announced an investment project of nearly EUR 62 million in September 2023, to boost research and development activities in Göd. Another South Korean company operates a plant in Komárom with a capacity of 7 500 MWh. In 2023, several manufacturers – mainly Chinese – announced around EUR 10 billion of investment in battery manufacturing. A planned joint Chinese-German investment project in Debrecen is worth more than EUR 7.3 billion and would have a total capacity of 100GWh. This would be the largest battery manufacturing plant in Europe. Hungary's appeal for battery producers is also explained by the presence of a significant number of automotive manufacturers already based in the country. Adding to the momentum, a prominent Chinese company announced plans in December to construct a new EV plant near the southern Hungarian city of Szeged.

3. ENERGY PRICES DEVELOPMENT

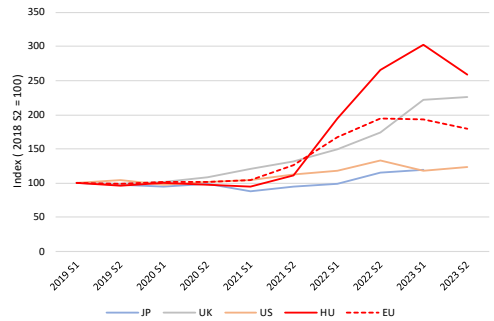
Graph 15: Hungary's energy retail prices for households and industry & service



- (1) For industry, consumption bands are I3 for gas and IC for electricity, which refer to medium-sized consumers and provide an insight into affordability.
- (2) For households, the consumption bands are D2 for gas and DC for electricity.
- (3) Industry prices are shown without VAT and other recoverable taxes/levies/fees as non-household consumers are usually able to recover VAT and some other taxes.

Source: Eurostat

Graph 16: Trends in electricity prices for non-household consumers (EU and foreign partners)

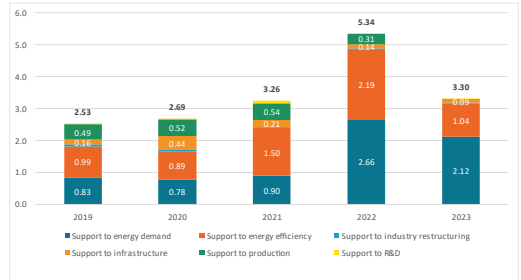


- (1) For Eurostat data (EU and HU), the band consumption is ID referring to large-sized consumers with an annual consumption of between 2 000 MWh and 20 000 MWh, such as in electricity intensive manufacturing sectors, and gives an insight into international competitiveness.
- (2) JP = Japan

Source: Eurostat, IEA

4. ENERGY SUBSIDIES

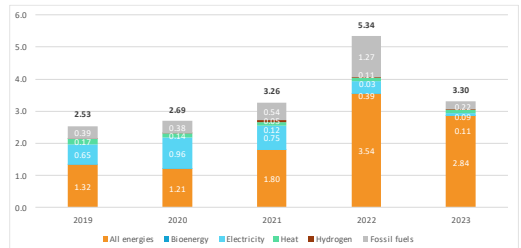
Graph 17: Energy subsidies by purpose



- (1) Subsidies in EUR 2023 billion
- (2) Some 2023 data were not fully available or validated at the time the study was completed (August 2024). For missing 2023 values, 2022 data were taken as a basis for an estimate.

Source: Enerdata. Inventory of energy subsidies in the EU27 – 2024 edition

Graph 18: Energy subsidies by carrier



- (1) Subsidies in EUR 2023 billion
- (2) Some 2023 data were not fully available or validated at the time the study was completed (August 2024). For missing 2023 values, 2022 data were taken as a basis for an estimate.

Source: Enerdata. Inventory of energy subsidies in the EU27 – 2024 edition

European Semester 2024

- **Country Specific Recommendation (Energy):** Reduce overall reliance on fossil fuels, accelerate the diversification of gas supply towards non-Russian sources, and take steps to phase out fossil fuel subsidies.⁽⁶⁾
- For more information see the [2024 European Semester Country Report](#).

National Energy and Climate Plan (NECP)

- The **draft updated NECP** was submitted to the European Commission in September 2023.
- Member States were due to submit their **final updated NECP by 30 June 2024**, taking into account the Commission recommendations.
- **The final updated NECP** was not submitted yet to the European Commission.
- For documents and information see the dedicated [webpage of the European Commission on the NECPs](#).

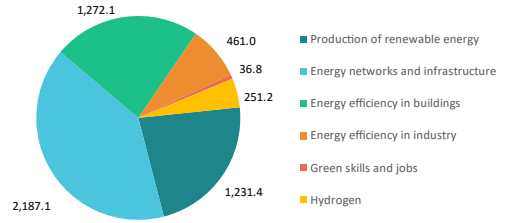
Recovery and Resilience Plan (RRP and REPowerEU chapter)

- The Hungarian RRP has a total allocation of EUR 6.5 billion in grants and EUR 3.9 billion in loans, with 67% of available funds supporting climate objectives.
- **EUR 5.4 billion are allocated to energy-related measures**, with the largest amount for **energy networks and infrastructure** [EUR 2.2 billion]:
 - More than EUR 1.6 billion support **smart grid development of transmission system operator and distribution system operators**; EUR 56 million for dissemination of smart metering.
- The Commission disbursed so far only the pre-financing.

⁽⁶⁾ Council of the European Union 11709/24.

Graph 19: **Energy-related investments in the RRP (in EUR million)**

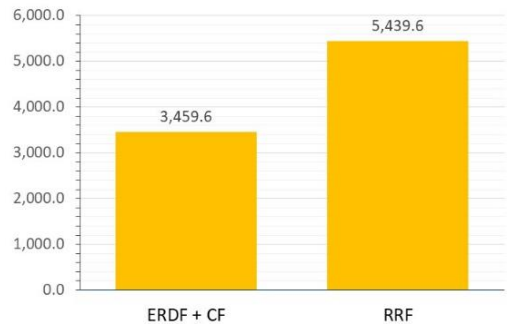
HU Energy-related investments EUR5,439.6 mn



Source: European Commission

EU Funds supporting energy related investments

Graph 20: **Energy-related investments across EU funds (in EUR million) (*)**



(*) European Regional Development Fund (ERDF) + Cohesion Fund (CF): comprise EU grants & national cofinancing; RRF: comprise grants & loans. Investment categories can also differ across funds.

Source: European Commission

- **Innovation Fund: EUR 2.2 million.** For more information see the webpage [innovation-fund-projects-country_en](#).
- **Modernisation Fund: EUR 185.4 million** (approved and/or confirmed Investments from 2021-2024). For more information see the webpage [modernisationfund.eu](#).