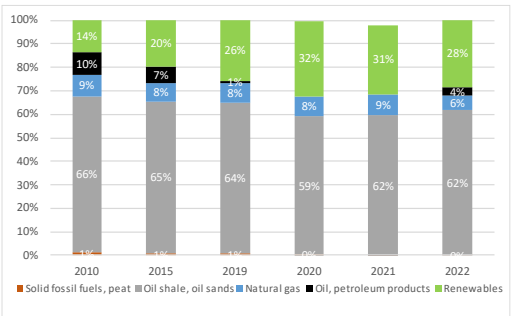
State of the Energy Union 2024: Estonia

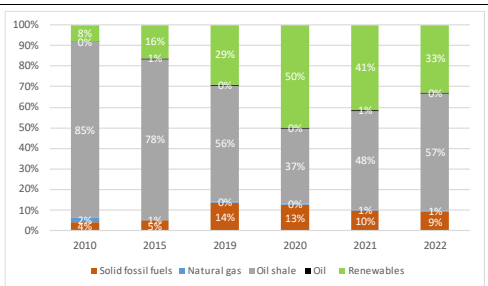
Key energy figures

Graph 1: **Energy mix**



(1) The 2022 gross inland energy consumption was 199 575 TJ. (0.4% of the total EU consumption).
Source: Eurostat

Graph 2: **Electricity mix**



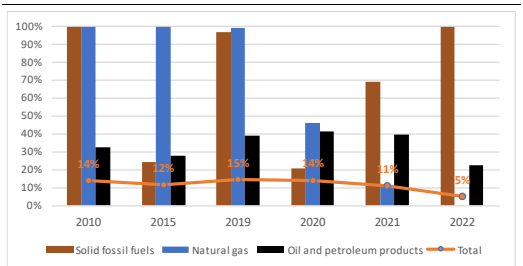
(1) The 2022 gross electricity production was 8.9 TWh. (0.3% of the total EU production).
Source: Eurostat

- Fossil fuels accounted for 71.6% of Estonia´s **energy mix** (compared to 69% at EU level), with oil shale covering alone 61.7%. The remaining 28.4% were renewables.
- The **electricity mix** of Estonia is dominated by fossil fuels (66.6%). Renewable energy accounted for the remaining third (33.3%) 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

- Estonia **does not operate any gas storage facility** but has access to the Latvian Incukalns one. In accordance with the burden-sharing mechanism [1], Estonia arranged the purchase of 1 TWh (30% of the annual consumption) as a national strategic reserve to be stored in Latvia [2].

[1] Regulation (EU) 2022/1032 of the European Parliament and of the Council of 29 June 2022 amending Regulations (EU) 2017/1938 and (EC) No 715/2009 with regard to gas storage.

[2] Report from the Commission to the European Parliament and the Council of 27 February 2024 on certain aspects concerning gas storage based on Regulation (EU) 2017/1938 of the European Parliament and of the Council.

Integrated internal energy market

1. ELECTRICITY INTERCONNECTIVITY

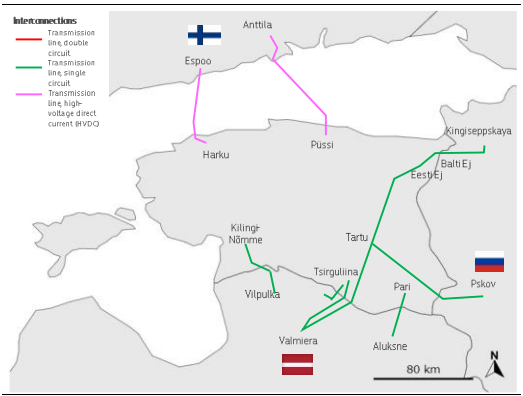
Table 1: **Electricity interconnectivity**

2024	2030 target
62.8 %	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

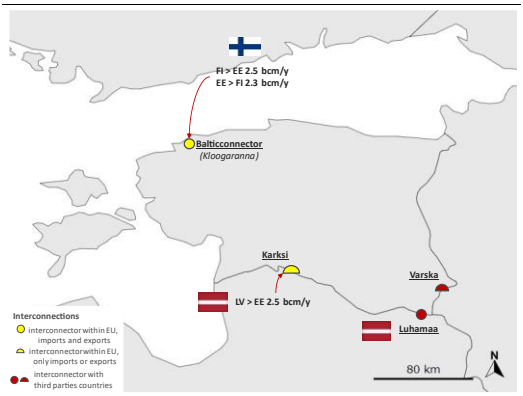
2. ENERGY TRANSMISSION INFRASTRUCTURE

Map 1: **Cross-border electricity infrastructure**



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

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

- Estonia has achieved a 99% smart meter rollout, with a near real-time access to consumption data based on a 60-minute interval [3].

Diversification of gas supplies

- In 2023, Estonia had 5 natural gas supply sources, compared to 2 in 2021. Its three largest suppliers accounted for 97%, with the United States being the main supplier, holding a share of 72%. In 2021, Latvia with 88% and Russia (12%) were Estonia's biggest natural gas supply sources. [4]

4. ENERGY POVERTY, SOCIAL CLIMATE PLAN AND JUST TRANSITION

Table 2: **Energy poverty**

Indicator	%	Evolution compared to		EU average
EED NECPs four main indicators	2023	2021	2017	
Inability to keep home adequately warm	4.1	+2.1 pp	+1.2 pp	10.6
Arrears on utility bills	4.6	+0.5 pp	-1.7pp	6.9
Share of pop. With leak, damp or rot in dwelling	10.5	+0.3 pp (2020)	-3.4 pp	15.5
AROP (At risk of poverty)	24.2	+2 pp	+0.9 pp	16.2

Source: Eurostat

Social Climate Plan

- Member States need to submit these plans to the European Commission by June 2025.
- Maximum financial allocation for Estonia: EUR 207 million or 0.29 % of total SCF.

Just Transition Plan

- Estonia's Territorial Just Transition Plan (TJTP) focuses on the Ida-Viru region, which is heavily dependent on oil shale mining and power generation. The plan sets out how the Just Transition Fund (JTF), with a national allocation of EUR 353 million, will support activities on economic diversification through SME development and start-ups, investments into clean energy, upskilling and reskilling of workers, of the activities. The Government of Estonia set an objective in 2021 to cease electricity production from oil shale by 2035 and phase out of oil shale in energy production by 2040 at the latest.

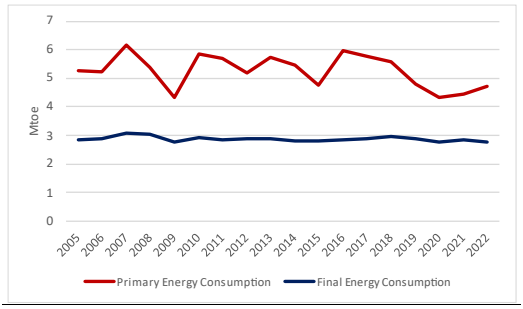
(3) ACER, 2024 Retail Market Monitoring Report, Energy retail and decarbonisation (forthcoming).

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

Energy efficiency

1. ENERGY EFFICIENCY

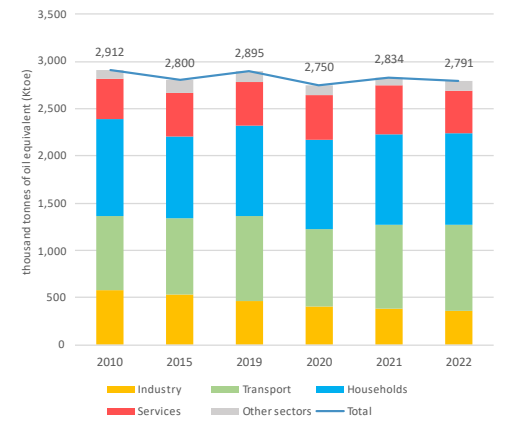
Graph 4: **Primary and final energy consumption**



Source: Eurostat

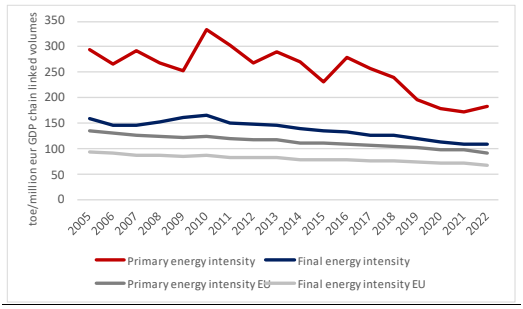
- In 2022, Estonia's **Primary Energy Consumption (PEC)** amounted to 4.7 Mtoe, 6.1% higher than in 2021, while its **Final Energy Consumption (FEC)** amounted to 2.8 Mtoe, 1.9% lower than in 2021.

Graph 5: **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 6: **Primary and final energy intensity**



Source: Eurostat

2. ENERGY PERFORMANCE OF BUILDINGS

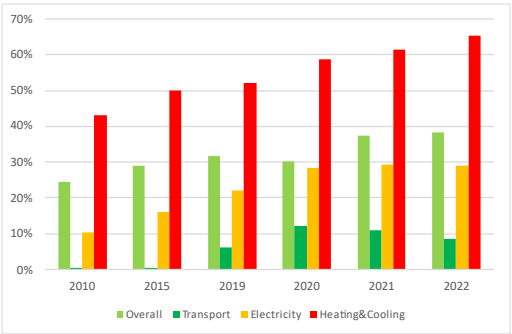
- In 2022, Final Energy Consumption (FEC) in the Estonian **residential sector** was **1.0 Mtoe**, representing **a reduction of 0.1%** compared to 2021. In the **services sector**, FEC was **0.5 Mtoe**, with an **11% decrease** compared to 2021. However, climate corrected data[(5)] show a **residential FEC increase of 3.9%** 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 **65%** of the gross final energy consumption for heating and cooling. Around 20,000 heat pumps were sold in 2023, reaching a total stock of around 258,000 installed heat pumps, as per the European Heat Pump Association (EHPA).
- In 2023, **4.6%** of the total population was experiencing difficulties on paying their utility bills while **4.1%** was not able to keep their home adequately warm over the cold periods of the year (growing from 2021, when such figures were, respectively, 4.1% and 2.0%). This underlines the importance to increase rate and depth of building renovation, specifically of worst-performing buildings.

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

Decarbonisation and climate action

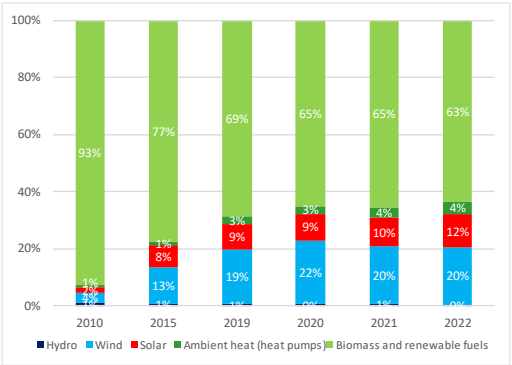
1. SECTORAL SHARE OF RENEWABLE ENERGY

Graph 7: **Share of renewable energy sources**



(1) In % of gross final consumption of energy.
Source: Eurostat

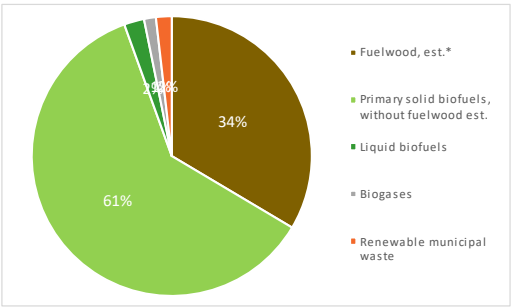
Graph 8: **Renewable energy mix**



(1) In % of gross final consumption of energy.
Source: Eurostat

2. BIOENERGY MIX

Graph 9: **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

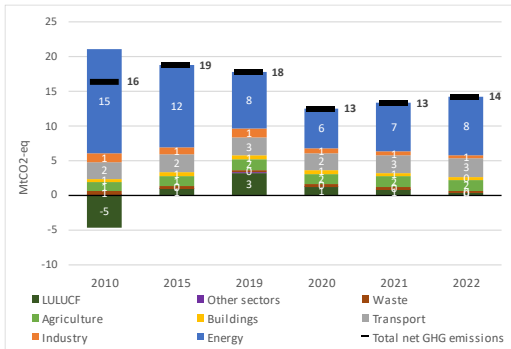
Table 3: **Operational hydrogen projects**

Name	Description
Parnu refuelling station	1 MW, online since 2019
H2Nodes, Riga	140 Nm3 H2/h, online since 2019
Narva power plant ELY	25 t H2/y from renewables

Source: European Commission based on IEA data

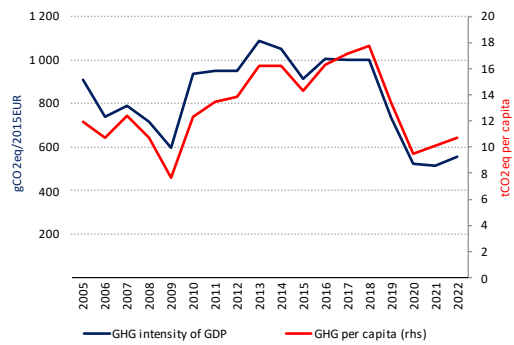
4. GREENHOUSE GAS EMISSIONS

Graph 10: **Greenhouse gas emissions by sector**



Based on UNFCC 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 11: **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).

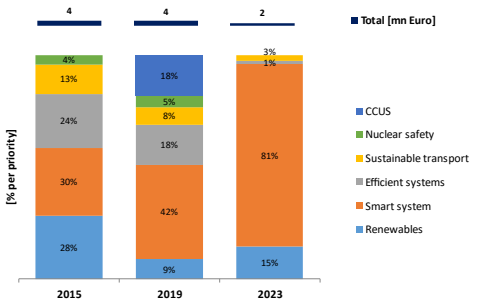
- With 556 gCO2eq/2015EUR, Estonia lies above the EU average in terms of GHG intensity of GDP.
- With 11 tonnes of CO2 equivalent per capita, Estonia is above the EU average in terms of GHG emissions per capita.
- For more detailed information on country profiles see Progress on climate action (europa.eu).

Research, innovation and competitiveness

1. INVESTMENT IN R&I

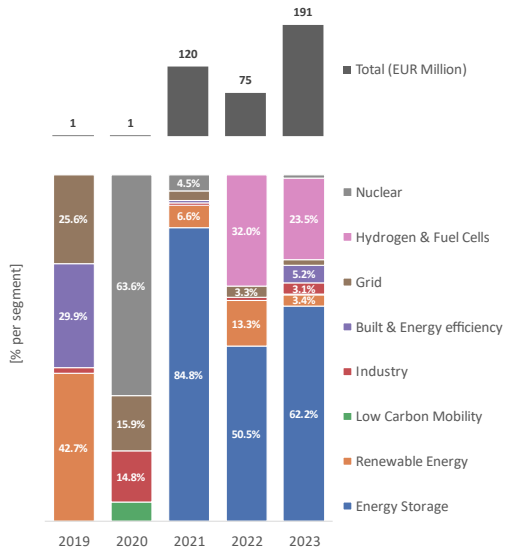
- Public investment in research and innovation (R&I) in Energy Union priorities[6] decreased from 0.021% in 2015 to 0.005% in 2023 (share of GDP).[7]

Graph 12: **Public investment in Energy Union R&I priorities**



Source: JRC SETIS 2024

Graph 13: **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

- Estonia remains highly dependent on non-EU countries for clean energy technologies but is poised to become an EU leader in rare earth manufacturing and is developing its hydrogen industry. Supported by Just Transition Fund grants, the industrial-scale rare earth plan in Sillamäe will produce rare earth magnets, a critical element for green transition technologies such as electric cars and wind turbines. The country holds a small PV modules production capacity of less than 100 MW. Estonia also has electrolyser manufacturing capacity as well as R&D infrastructure in this domain, notably supported by its status as an Important Project of Common European Interest and is aiming to develop further in that sector. Estonia also holds several elements of the on/offshore development ecosystem such as the main infrastructures, foundations and platforms. The country adopted its Hydrogen Roadmap in February 2023, but does not yet

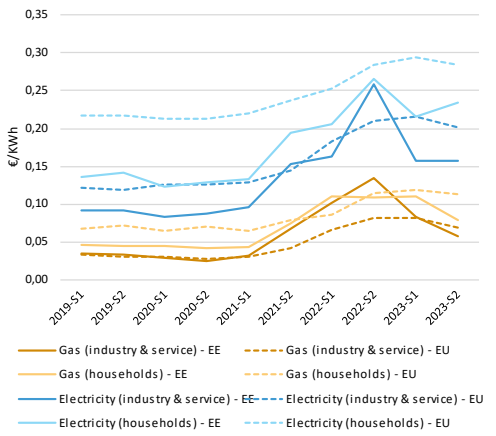
(6) Renewables, smart system, efficient systems, sustainable transport, CCUS and nuclear safety, COM(2015) 80 final ('Energy Union Package').

(7) Source: JRC SETIS 2024

have an objective for 2030 in terms of target capacity for production of hydrogen.

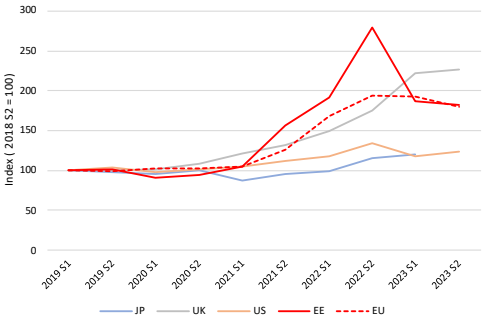
3. ENERGY PRICES DEVELOPMENT

Graph 14: **Estonia'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

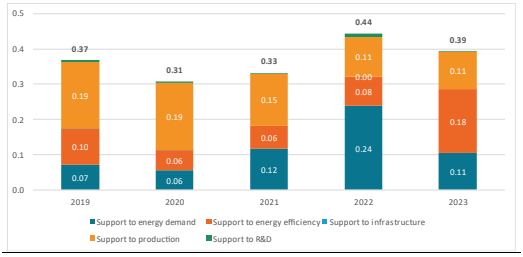
Graph 15: **Trends in electricity prices for non-household consumers (EU and foreign partners)**



(1) For Eurostat data (EU and EE), 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

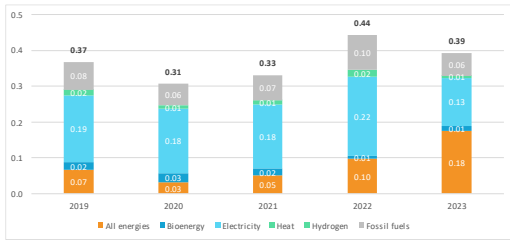
4. ENERGY SUBSIDIES

Graph 16: **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 17: **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 the share of oil shale in the energy mix and raise resource productivity through bio-based innovation. Improve labour productivity and skills supply through reskilling and upskilling, and by better attracting and retaining talent.[8]
- For more information see the 2024 European Semester Country Report.

[8] Council of the European Union 11698/24.

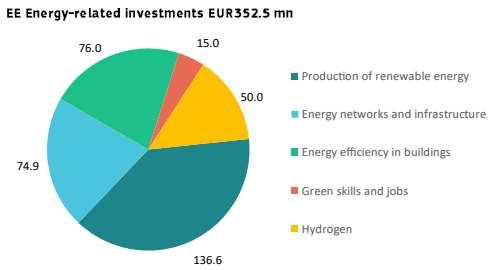
National Energy and Climate Plan (NECP)

- The **draft updated NECP** was submitted to the European Commission in August 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 Estonian RRP has a total allocation of EUR 953 million (only grants), with 57% of available funds supporting climate objectives.
- **EUR 352.5 million are allocated to energy-related measures,** with the largest amount for the **production of renewable energy** [EUR 136.6 million]:
  - **Creation of a EUR 100 million green fund** aiming to provide capital for developing new green technologies in energy, agriculture, food industry, transport and logistics, materials, and chemical industries.
  - EUR 31 million are dedicated to **support the entry into force of the legislative amendments to streamline planning, permitting and environmental impact assessment processes** for wind energy projects.
- After Estonia satisfactorily fulfilled milestones and targets, including some referred to energy related measures, The Commission disbursed the first two payments. Overall (including also pre-financing), the Commission disbursed EUR 504.79 million to Estonia. The 3rd payment request is expected in October 2024.

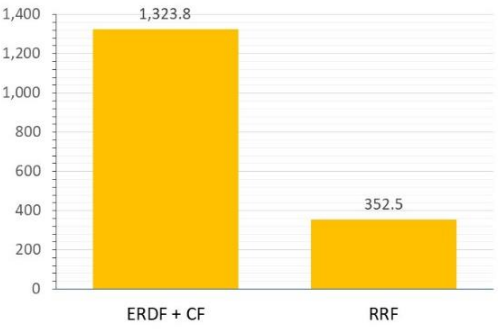
Graph 18: **Energy-related investments in the RRP (in EUR million)**



Source: European Commission

EU Funds supporting energy related investments

Graph 19: **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

- **Modernisation Fund: EUR 177.6 million** (approved and/or confirmed Investments from 2021-2024). For more information see the webpage modernisationfund.eu.
- **CEF-Energy: EUR 36.9 million** (1.9% of total EU contribution, for 2021-2027). For more information see CINEA's Project Portfolio dashboard.