Energy transition in Central Europe in the light of current trends

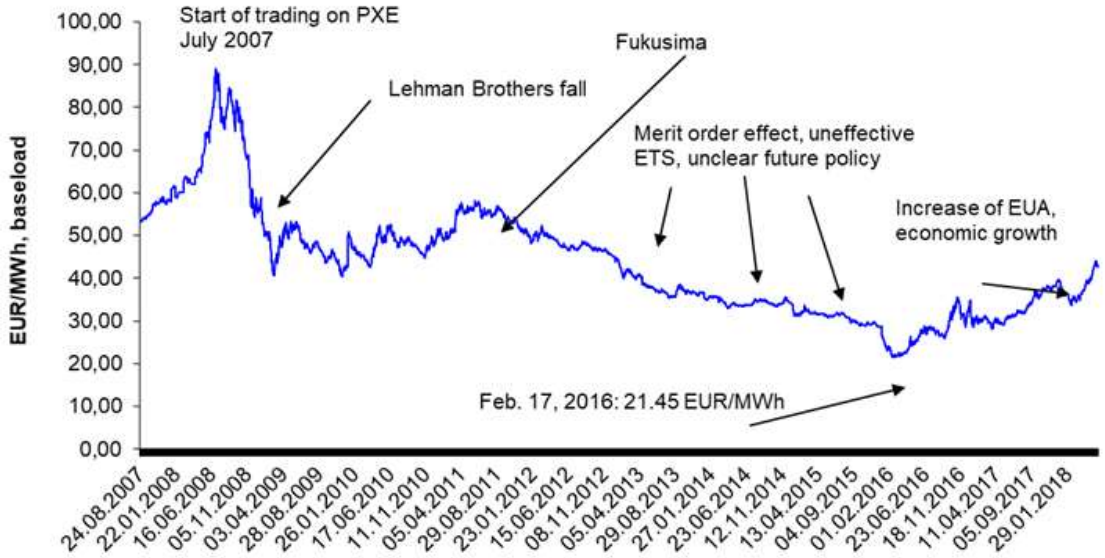
Jaroslav Knápek

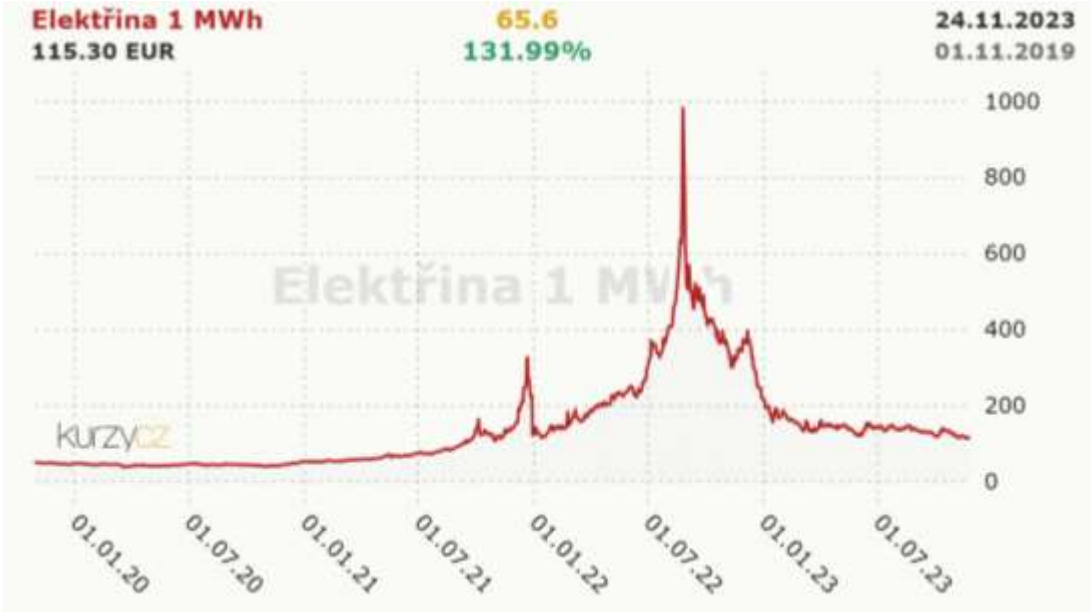
CZ-AT EEG

CZECH-AUSTRIAN ENERGY EXPERT GROUP

Looking back

The electricity market reflects many changes in the surrounding world - changes in technology, changes in priorities, new policies, geopolitical aspects, etc.





Source: PXE, one year contract, base load

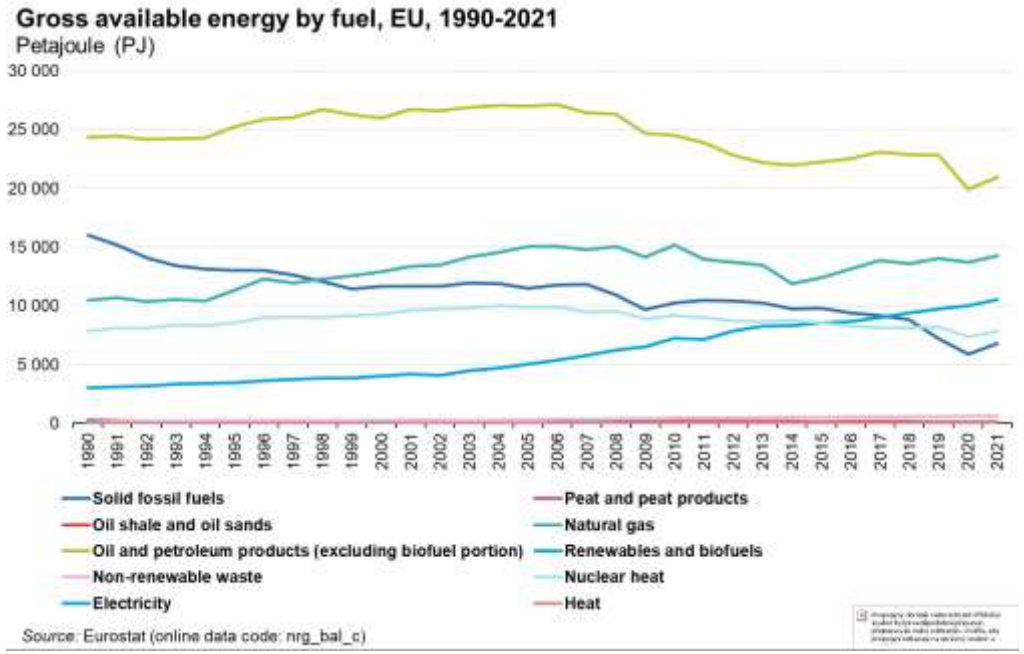
Looking back

Also natural gas market reflects external environment - changes in technology, changes in priorities, new policies, geopolitical aspects, etc.

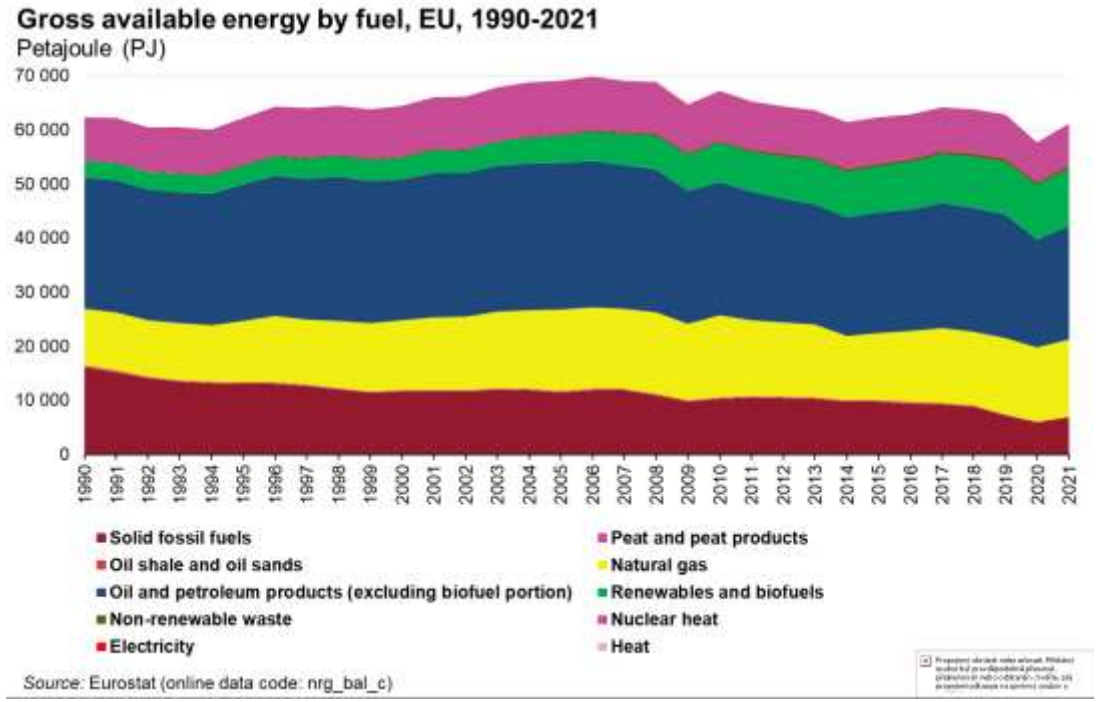
1.11.2019: 17,5 EUR/MWh
24.11.2023: 50,44 EUR/MWh

Source: PXE, one year contract, base load

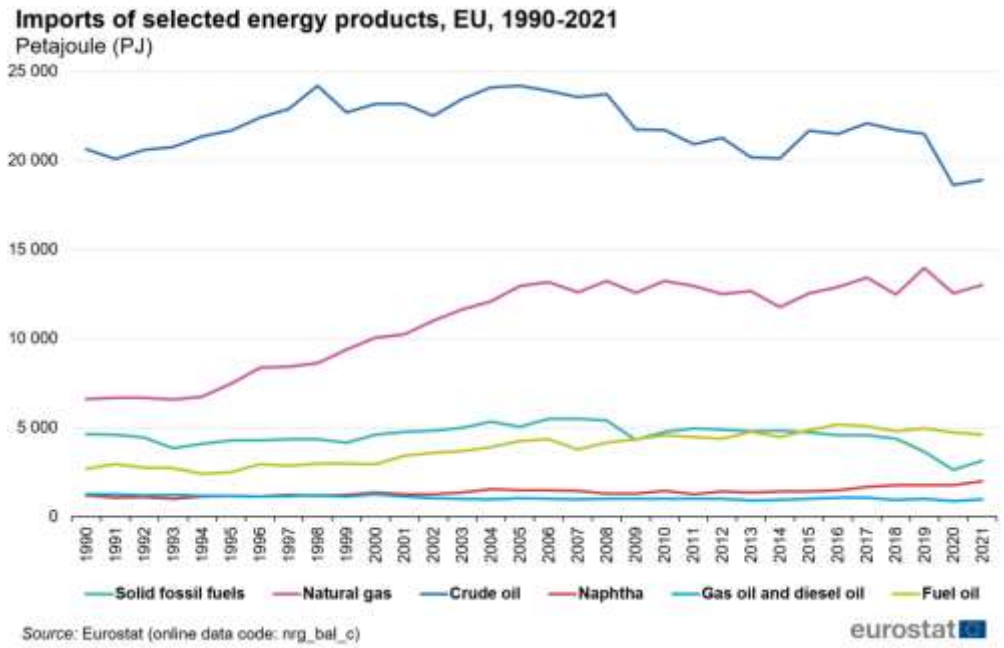
Energy structure development - EU



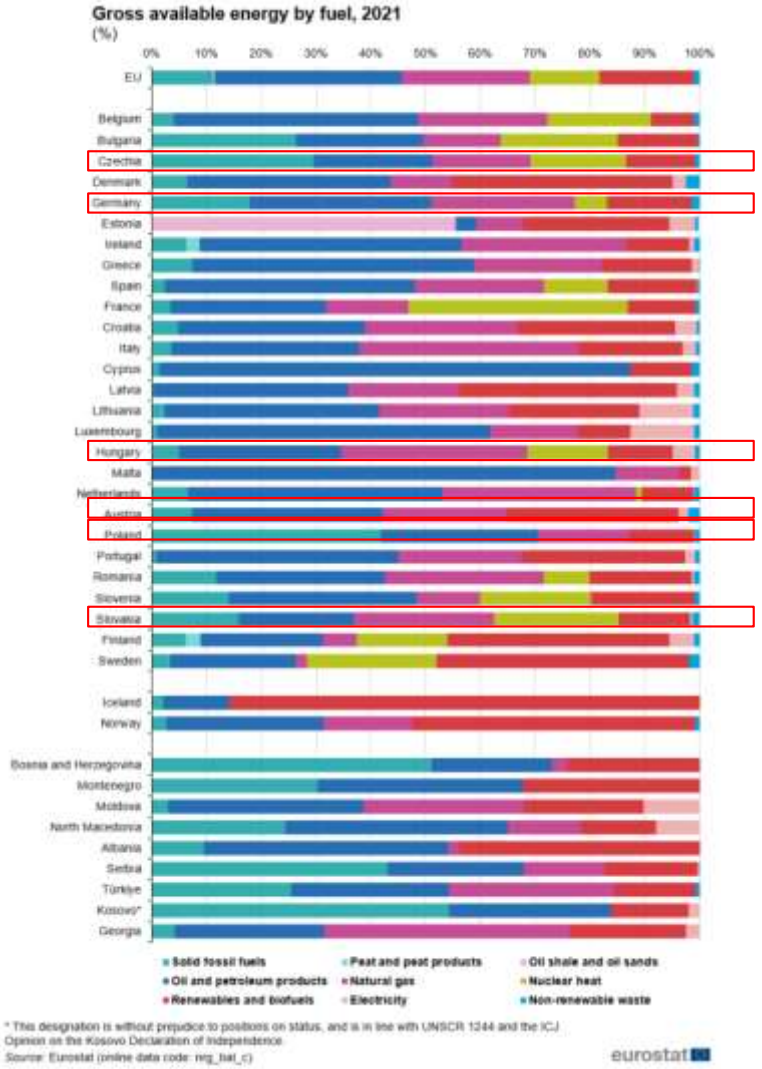
https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_statistics_-_an_overview#Primary_energy_production



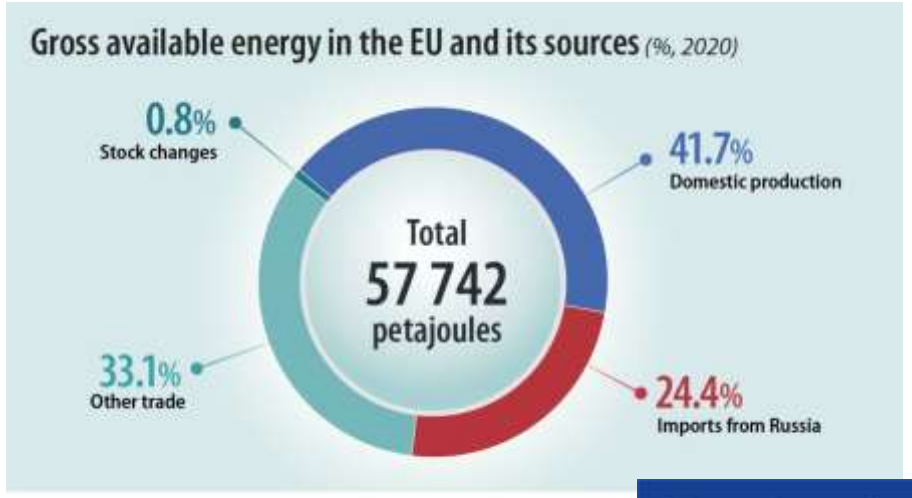
Energy structure development - EU



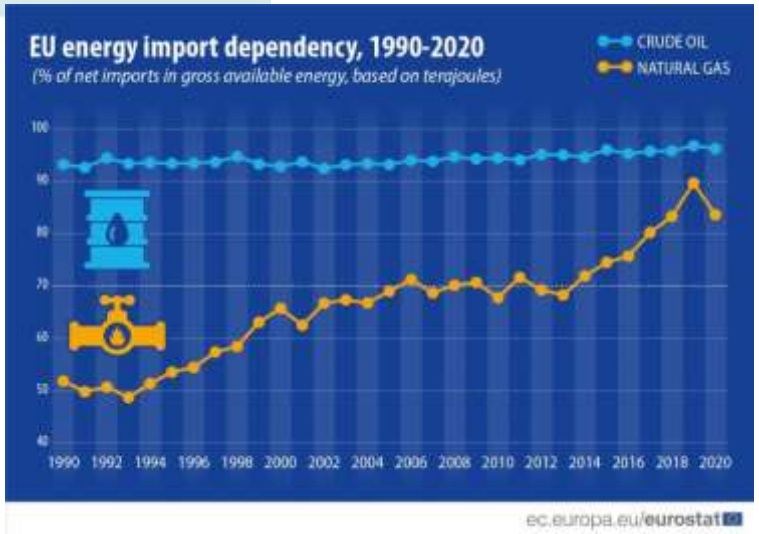
https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Imports_of_selected_energy_products,_EU,_1990-2021_Petajoule_(PJ).PNG

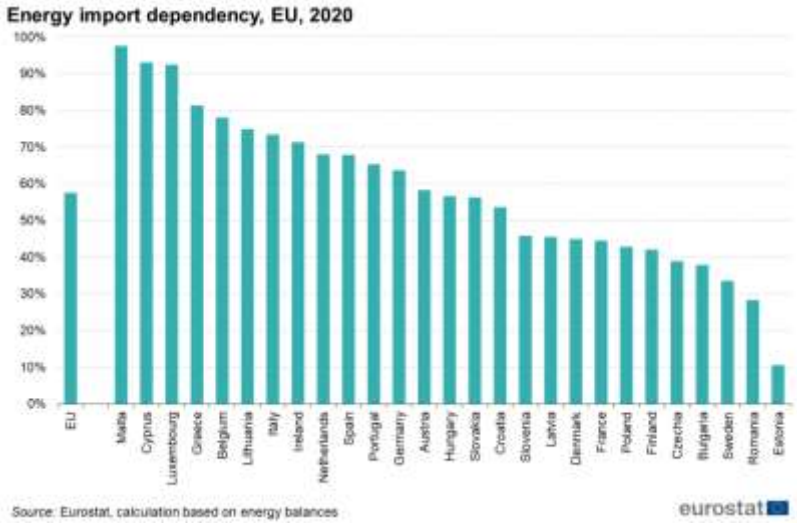


Energy structure development - EU



In 2020, the European Union imported 57.5% of the energy it consumed as its own production and stock changes satisfied only 42.5% of its needs. Russia is the leading supplier of natural gas, oil and coal to the EU.

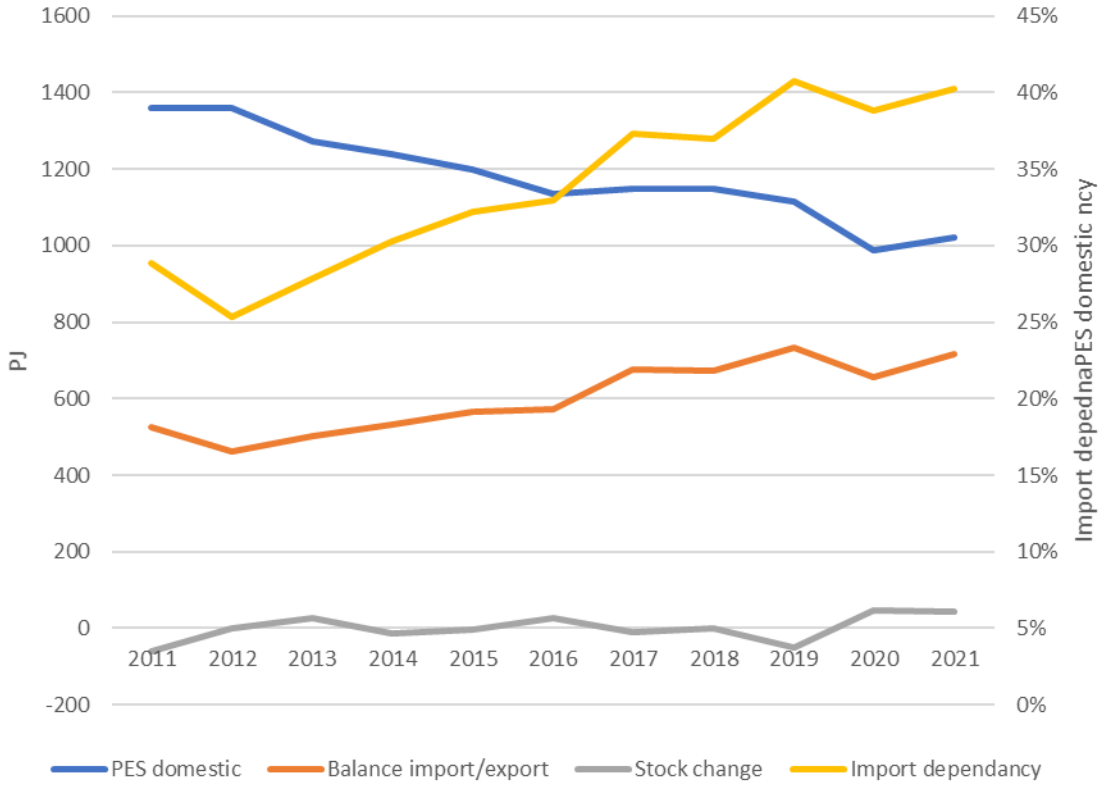




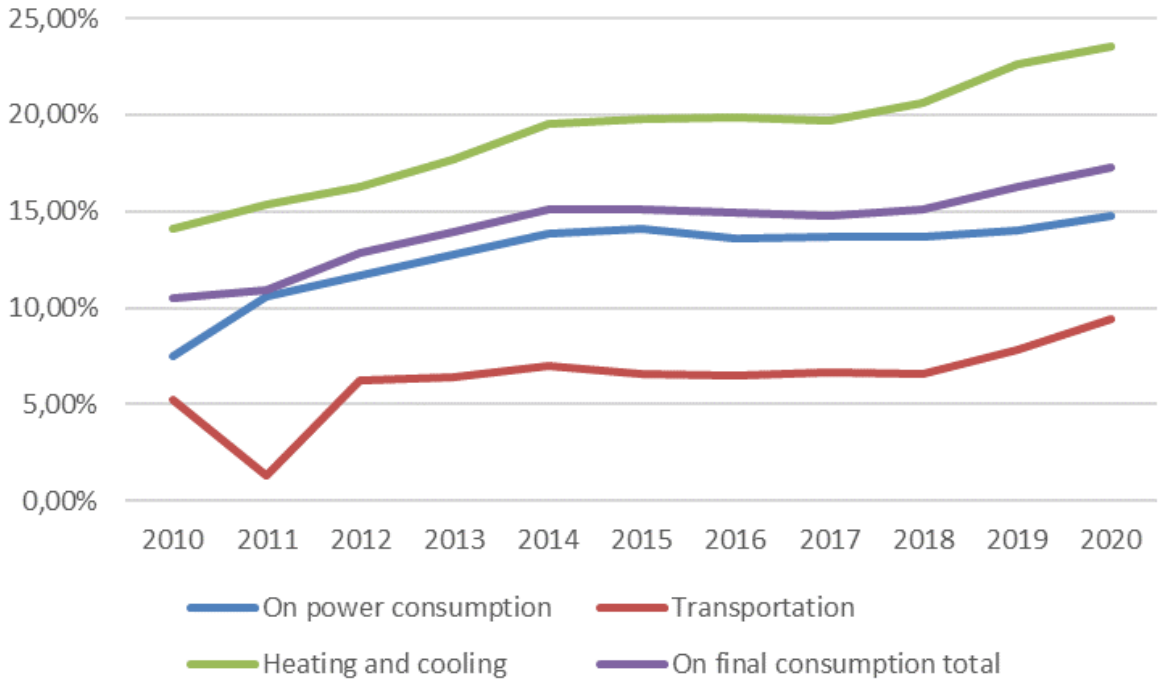
https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:EU_energy_mix_and_import_dependency

Czech Republic

Import dependence – Czech Republic



RES share generation

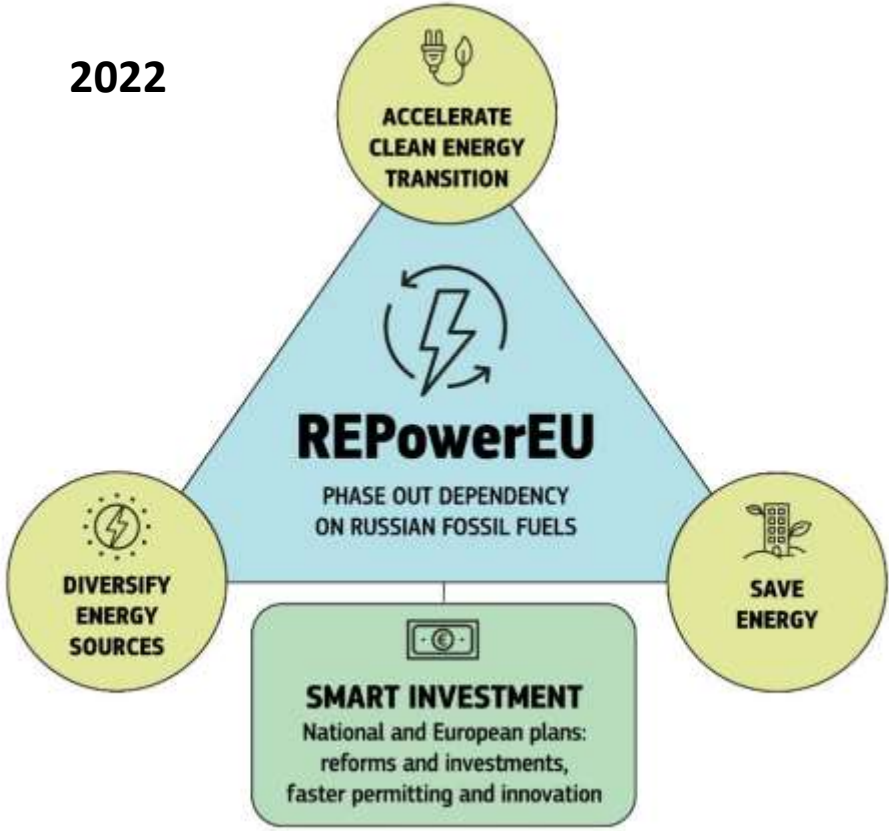


Energy transition – main challenges

Five dimensions of Energy Union – EU Directive [2018/1999](2018/1999)

Source: https://twitter.com/EU_Commission/status/1116975588554813440

2022



Source: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022DC0230

Energy transition – main challenges

1. **Recovery of economies after the Covid 19**

2. **Long term decarbonization strategy:**
   - **Coal phase-out**
   - **Roles and natural gas time horizon**
   - **RES development**
   - **Future role of nuclear power**

3. **Diversification of sources, reduction of dependence on energy imports**

4. **Grid infrastructure development**

5. **Accumulation and flexibility services**

6. **Comprehensive transformation of all sectors of the energy sector, respecting the links between them**

7. **Creating new forms of energy markets reflecting technological and organizational changes, changes in fuels used and changes in the consumption sector (both in terms of the amount and structure of consumption)**

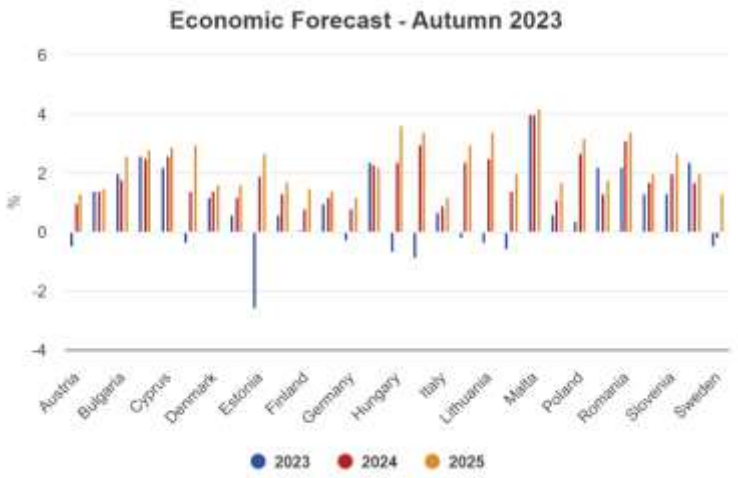
8. **Socio economic aspects, energy poverty**

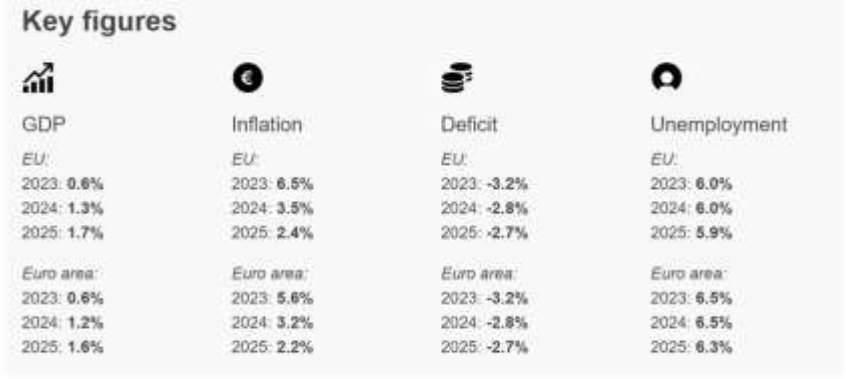
Energy transition – main challenges

1. Recovery of economies after the Covid 19

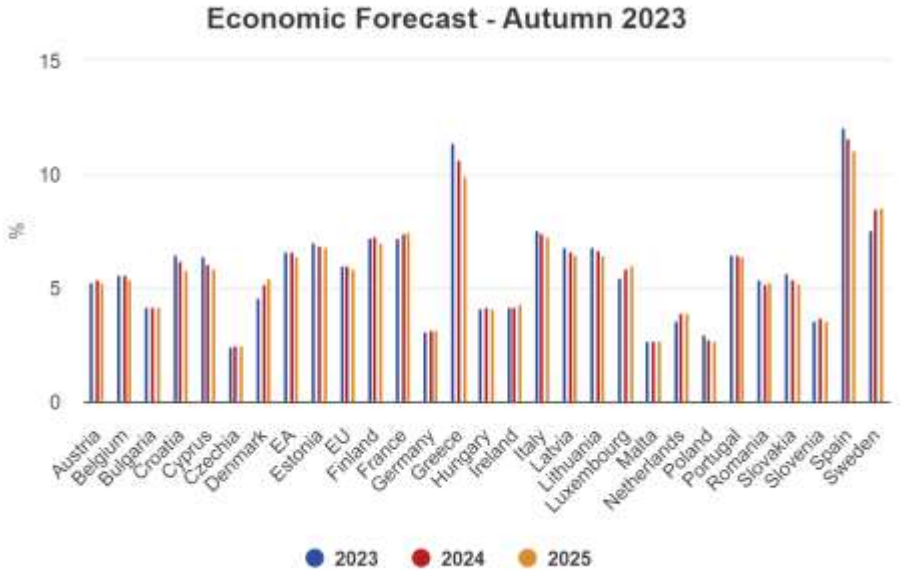
https://economy-finance.ec.europa.eu/economic-forecast-and-surveys/economic-forecasts/autumn-2023-economic-forecast-modest-recovery-ahead-after-challenging-year_en#key-figures

GDP





Unemployement



The recovery is accompanied by fundamental changes in production and logistics chains

Public debt					Gov. Balance			
% of GDP	2023	2024	2024		% of GDP	2023	2024	2024
ČR	44,7	45,5	45,5		ČR	-3,8	-2,4	-1,8
Poland	50,9	54,4	56,2		Poland	-5,8	-4,6	-3,9
Austria	76,3	75,6	74,8		Austria	-2,6	-2,4	-2,2
Slovakia	56,7	59,9	62,9		Slovakia	-5,7	-6,5	-6,8
Germany	64,8	63,6	62,7		Germany	-2,2	-1,6	-1,3
Hungary	69,9	71,7	70,3		Hungary	-5,8	-4,3	-3,8

Energy transition – main challenges

Long-term decarbonisation strategy:

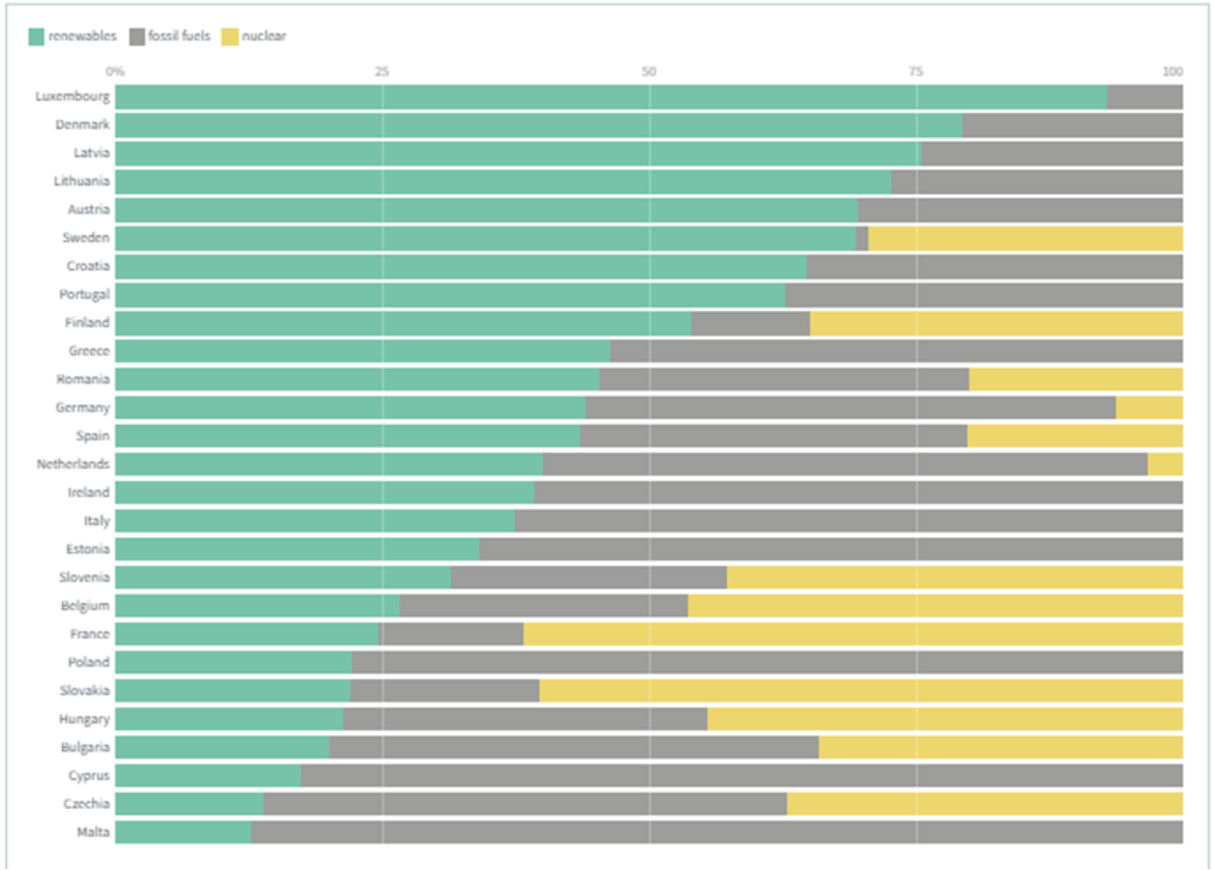
- The role of natural gas and the horizon of use (requirements for long-term LNG supply contracts)
  - Potential impacts of CH4 leakages on green house effect
- Horizon for coal-fired power plant retirement and coal phase-out
  - But necessary to solve also heating branch (important namely for Czech Rep.) and individual consumers
- **What is the validity of national coal phase-out plans? Won't emission allowance prices solve this?**
- Poland: ? 2049 Czech Republic 2033 ?? Germany 2035 ?? Others ??

Prices of emission allowances development

Energy transition – main challenges

Long-term decarbonisation strategy:

- RES:



EU Solar Energy Strategy

The strategy puts forward a target of over 320 GW of newly installed solar photovoltaic capacity by 2025, and almost 600 GW by 2030.

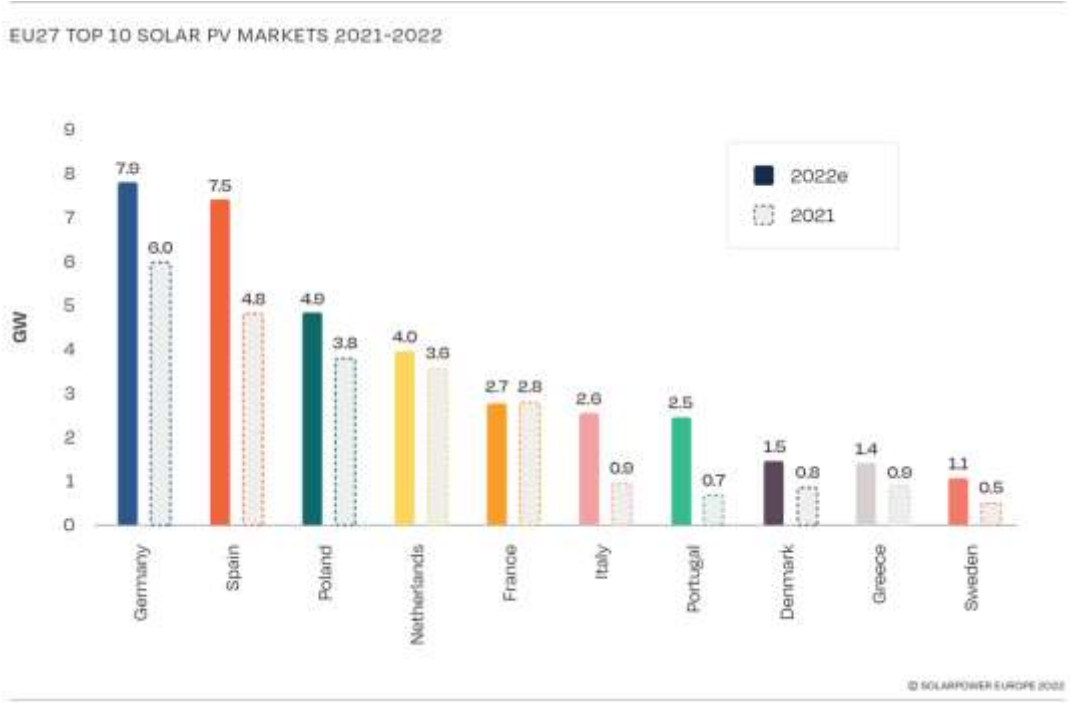
The need to strengthen the grid, build storage capacity, increase the need for flexibility on the production (SVR) and consumption (DR) side, reshape markets, change behaviour

https://www.consilium.europa.eu/en/infographics/how-is-eu-electricity-produced-and-sold/

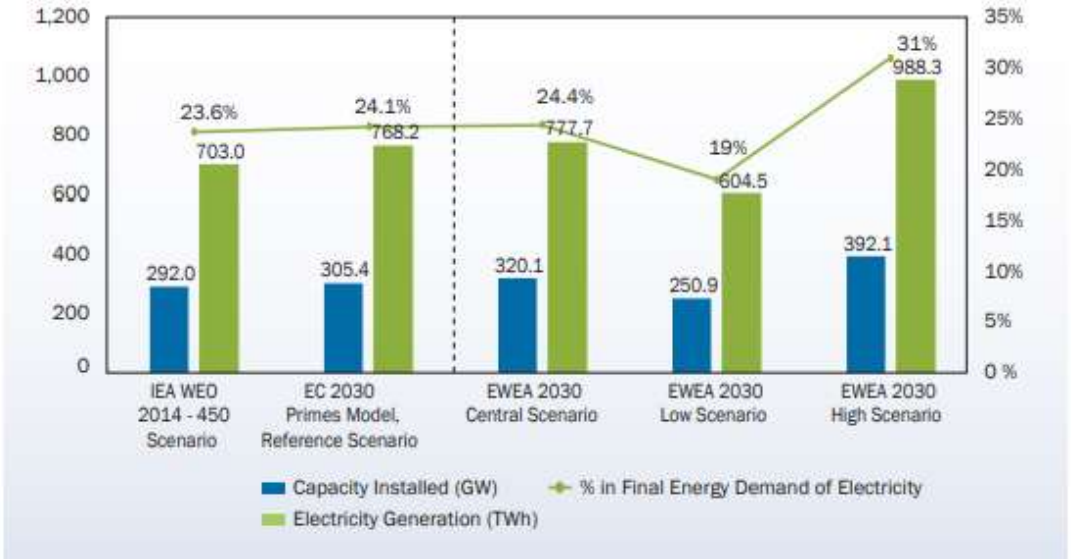
Energy transition – main challenges

Long-term decarbonisation strategy:

- RES: dominant share of PV and wind power



https://www.pv-magazine.com/2022/12/19/europe-added-41-4-gw-of-new-solar-in-2022/



Source: https://www.ewea.org/fileadmin/files/library/publications/reports/EWEA-Wind-energy-scenarios-2030.pdf

Energy transition – main challenges

Long-term decarbonisation strategy:

- RES – selected opened questions:

- Providing flexibility services (role of natural gas, uncertaint speed of accumulation technologies development, Power to X)

- **Efficient use of surplus electricity production and meeting demand in times of low production from PV and wind power**

- Changes on the consumption side - change in consumer behaviour, impact of electromobility and electrification of the consumption sector (e.g. heating)

- Motivating investors to find efficient solutions (sizing of power plants, choice of technologies, etc.)

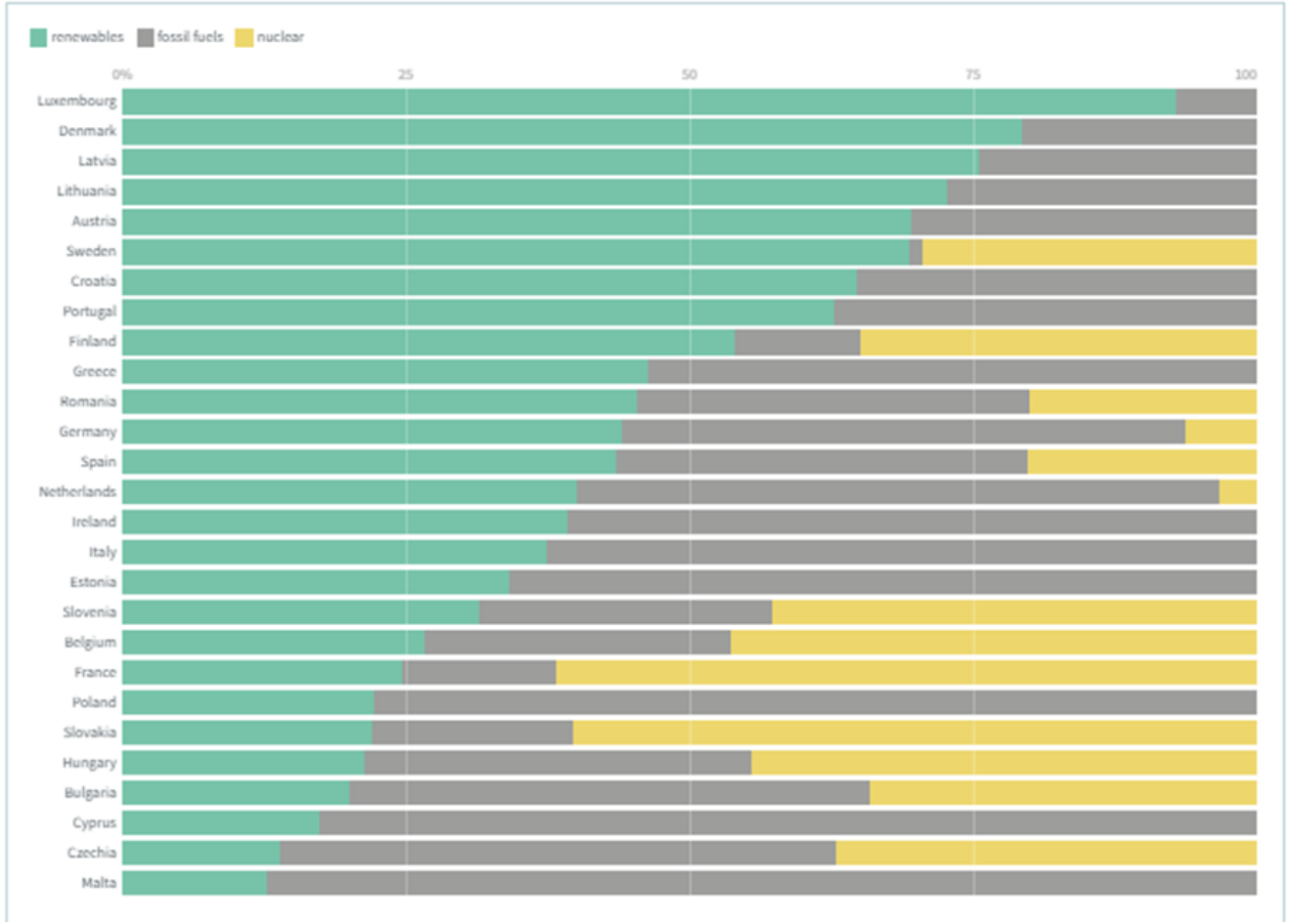
Energy transition – main challenges

Long-term decarbonisation strategy:

- Nuclear:
  - Poland - 6 big reactors between 2033 and 2043, currently no NPP
  - Czech republic – tendr for new block in Dukovay site (+non binding option for 3 other blocks), 4290 MW inst., currently 31 TWh brutto (36,7% of gross power generation)
  - Austria – no nuclear power, no plans
  - Germany – all NPP phased out
  - Slovakia – 4 blocks in operation, 5th in testing, 6th in construction, NPP currently 59% of power generation
  - Hungary – 4 blocks (2000 MW), 50% of power generation, 2 new block (2x1200 MW) under construction preparation (Rosatom)

  - **Open questions about construction time, financing, delivery capacity**

Energy transition – main challenges



Nuclear fuel for VVER-440 and VVER-1000 units operated by 5 EU Member States and Ukraine (18 VVER-440 units and 17 VVER-1000 units in total

Efforts to get rid of dependence on Russian nuclear fuel

APIS project – Westinghouse + 11 partners

https://www.consilium.europa.eu/en/infographics/how-is-eu-electricity-produced-and-sold/

Energy transition – main challenges

Development of grid infrastructure

- **Condition for efficient use of electricity from RES**
- The need to strengthen both transmission and distribution systems
- **Danger that the development of RES-based electricity generation plants will outpace the development of infrastructure**
- Follow-up on the development of storage technologies (should they be part of the infrastructure?)
- A new tariff scheme to fairly reflect the cost of network infrastructure in the cost of electricity supply to individual consumer groups

Energy transition – main challenges

New market schemes

- To reflect technological and organizational changes, changes in fuels used and changes in the consumption sector (both in terms of the amount and structure of consumption
- Prosumers
- Aggregators
- Flexibility services providers
- Coordinated development of biogas and biomethane development (to reach win-win position)
- **Creating transparent and long-term signals for investors in the energy sector**

Thank you for your attention !