ENERGY RESILIENCE IN THE BALTIC STATES

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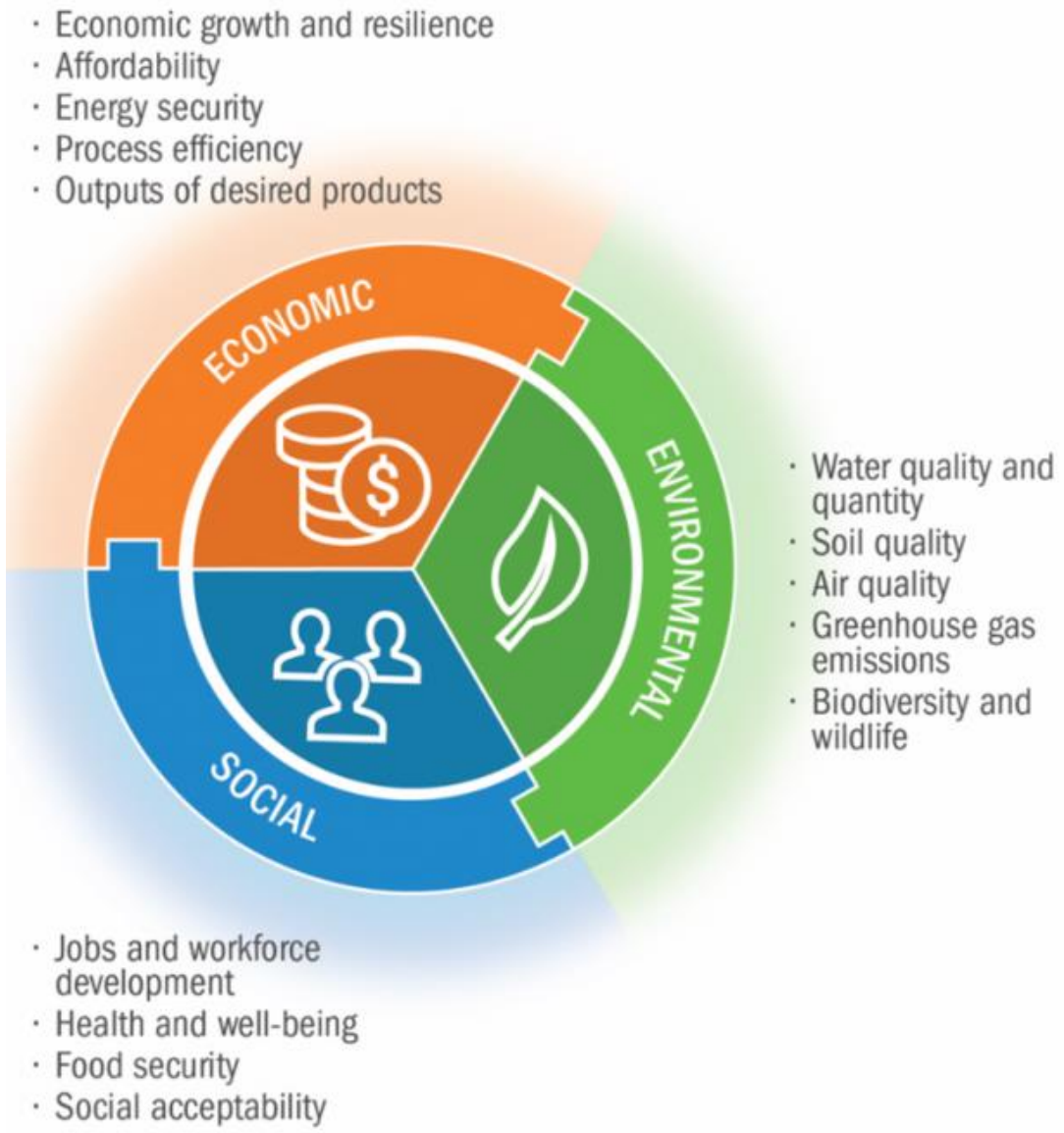
Introduction



The main issues to be addressed in the energy sector development are:

- ensuring sustainable energy supply and
- maintaining of natural energy resources.
- Energy supply is essential for human well-being, as can contribute significantly to strengthening social stability and is the main driver of development and prosperity of all sectors of modern economy.
- The concept of sustainable energy development is the key in developing energy policies (European Commission, 2011).

Introduction

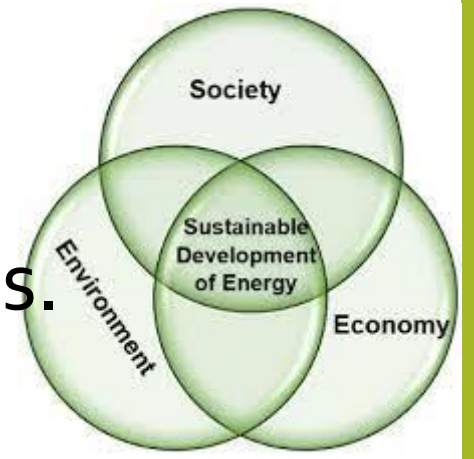
- EU has set ambitious targets to ensure sustainable energy development in EU. The main aim is to ensure just **low carbon energy transition by 2050** (European Commission, 2018).
- **Low carbon transition** means transition to renewable energy sources based energy supply and energy efficiency improvement.
- These two ways of sustainable development provides for implementation of climate change mitigation targets. "Just" means satisfying energy equality by reducing energy vulnerability and energy poverty
- The EU has developed **European energy strategy** in 2015 following various energy and climate frameworks establishing targets by 2020, 2030 and 2050 for renewables, energy efficiency and GHG emission reduction (European Commission, 2014; 2015; 2019).

Introduction

Goal 7:
Ensure access to affordable, reliable, sustainable and modern energy for all.

The progress made in the five dimensions in the whole EU can be assessed by applying the following 5 thematic area indicators:

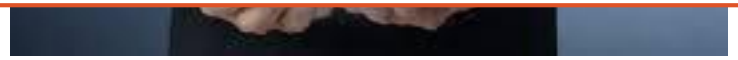
- Energy supply security, affordability, solidarity and trust of consumers;
- Development of fully integrated internal EU energy markets;
- Energy efficiency and demand side management;
- Decarbonisation of the economy and energy sector;
- Investments in R&D, innovation and competitiveness.



Why is demand increasing?

Demand is increasing due to:

- World population growth
- Economic development
- Technological advances

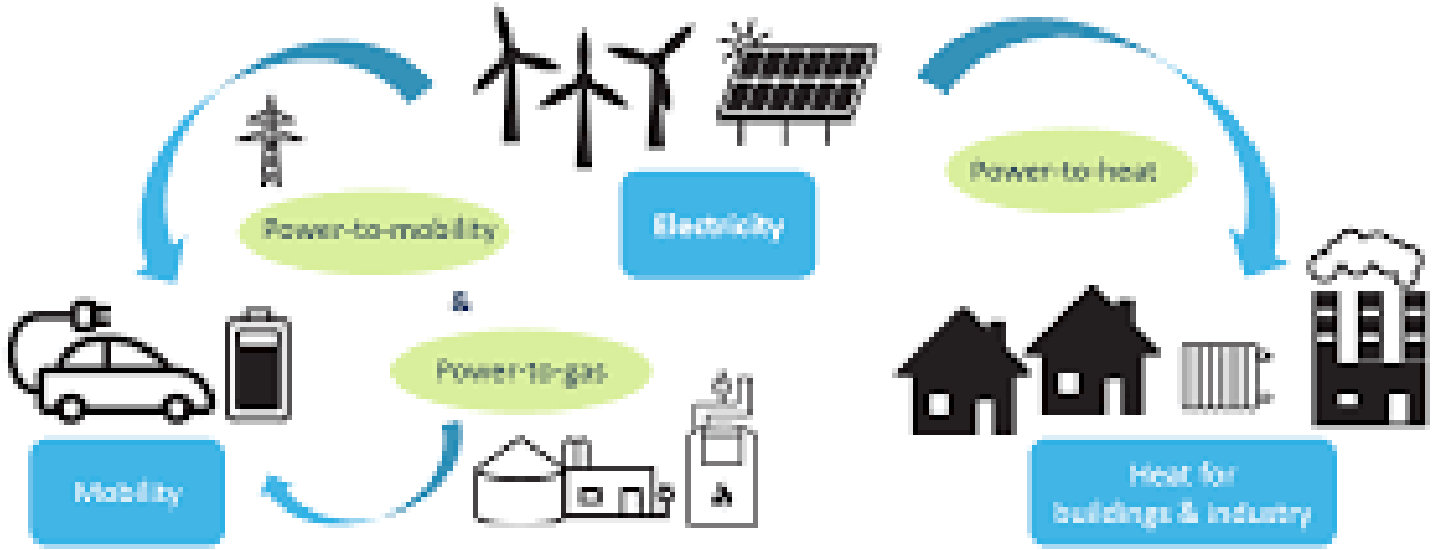


Clean energy transition

- **Decarbonising the EU's energy system is critical** to achieving our targets.
- Major strategies on **Energy System Integration**, **Hydrogen**, **Methane**, **Offshore Renewable Energy** and the **European Battery Alliance**.
- Plan to prioritise **energy efficiency**, develop a power sector based largely on **renewable sources**, have a **secure and affordable EU energy supply**, and a fully **integrated, interconnected and digitalised EU energy market**
- Aiming for **at least 32% share for renewable energy** and **at least 32.5% improvement in energy efficiency** by 2030.

Energy security

Three most important dimensions in which the activities of energy professionals make an important contribution to the long-term security of society:



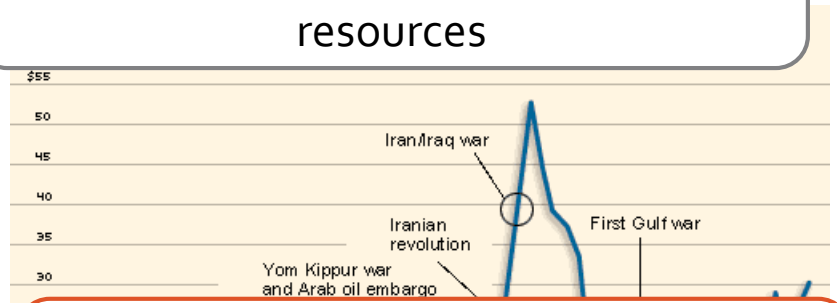
- wider electrification, especially in the transport and heating sectors.
- development of the infrastructure and integrated market in sectors of the natural gas and electricity;
- development of renewable energy resources;

What affects energy security?

PHYSICAL FACTORS
e.g. location of resources

TECHNOLOGICAL FACTORS
e.g. equipment to extract new resources

POLITICAL FACTORS
e.g. global agreements to reduce fossil fuel usage



ECONOMIC FACTORS
e.g. rapidly changing prices

Factors affecting energy supply

	Physical (natural)		Technological
	Economic (money)		Political

Variations in climate and geography affect the potential for solar, wind, tidal, HEP and wave power	Climate change has resulted in international agreements to cut greenhouse gas emissions, e.g. Kyoto Protocol	Prices of fossil fuels are volatile; they can go up or down due to availability or conflict	Cost of building new infrastructure such as power stations, wind farms, can be very high
Wars and political instability can affect a countries ability to export resources, e.g. during the Gulf War oil exports dramatically decreased	Some LICs have a lot of resources but not enough money to access and exploit them	There is an unequal distribution of fossil fuels in the world; some countries will have more than other; some may run out more quickly than others; some are more accessible than others	Some countries have energy resources but not the technology to exploit them, e.g. large uranium reserves in Niger
Fossil fuels are becoming more scarce and are therefore more expensive to extract	Some oil reserves are trapped in rocks and need specialist technology and equipment to be accessed	Concerns over safety, e.g. nuclear power stations and nuclear waste disposal, has meant its harder now to build power stations because of tighter regulations	Potential for natural disasters could affect what energy is developed, e.g. earthquakes could damage infrastructure

Challenge: which category has the BIGGEST impact on energy supply, and why?

Baltic States

Quick facts about the Baltic countries

	Estonia	Latvia	Lithuania
Flag			
Population (2021)	1,3 million	1,87 million	2,7 million
Area (% of water)	45,339 km2 (5,16%)	64,573 km2 (2,09%)	65,300 km2 (1.98%)
GDP (2020)	€ 27,167 Billion	€ 29,3 Billion	€ 48,794 Billion
GRP per capita	€ 20 440	€ 15 431	€ 17 460
Capital	Tallin	Riga	Vilnius
Population of the capital	449,000	628,000	540,000

Lithuania is the largest Baltic country measured by population and GDP, Riga is the largest city, and Estonia has the highest GDP per person.

Source: GDP data: IMF 2021. Population data: Ministry of Interior of Estonia (2021), Central Statistics Bureau of Latvia (2021), Statistics Lithuania (2021).

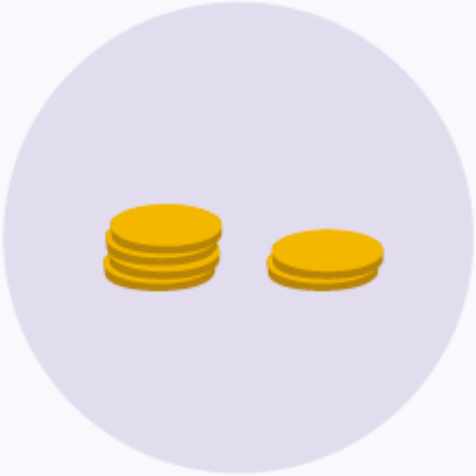
Dependence from Russia

- All three Baltic republics had been completely dependent on Russian energy sources because of their supply network that had been developed during the Soviet era from the early 1960s.
- After independence, this condition continued and they remained energy islands isolated from EU markets, and, as such, they came to be the most vulnerable EU member states in terms of energy security. The reason for this is self-evident: all three countries were nearly **90 percent** dependent on Russia **for oil** and roughly **100 percent for gas and electricity**.

The main causes of energy poverty

Main causes of energy poverty

Poor energy performance of buildings



Low revenues

Risk that the Covid-19 crisis undermines the progress made over recent years

Revenue decrease: dismissals, short-time work schemes, etc.

Energy consumption increase: lockdown.

Moving to independence

- In response to regional energy security concerns, the Baltic Energy Market Interconnection Plan (BEMIP) was developed in 2008 with the primary objective of making the Baltic electricity and gas market fully integrated with the EU, thereby ending the energy isolation of the three states. As part of the BEMIP, a number of projects have been implemented.

In the electricity sector, key infrastructure initiatives include:

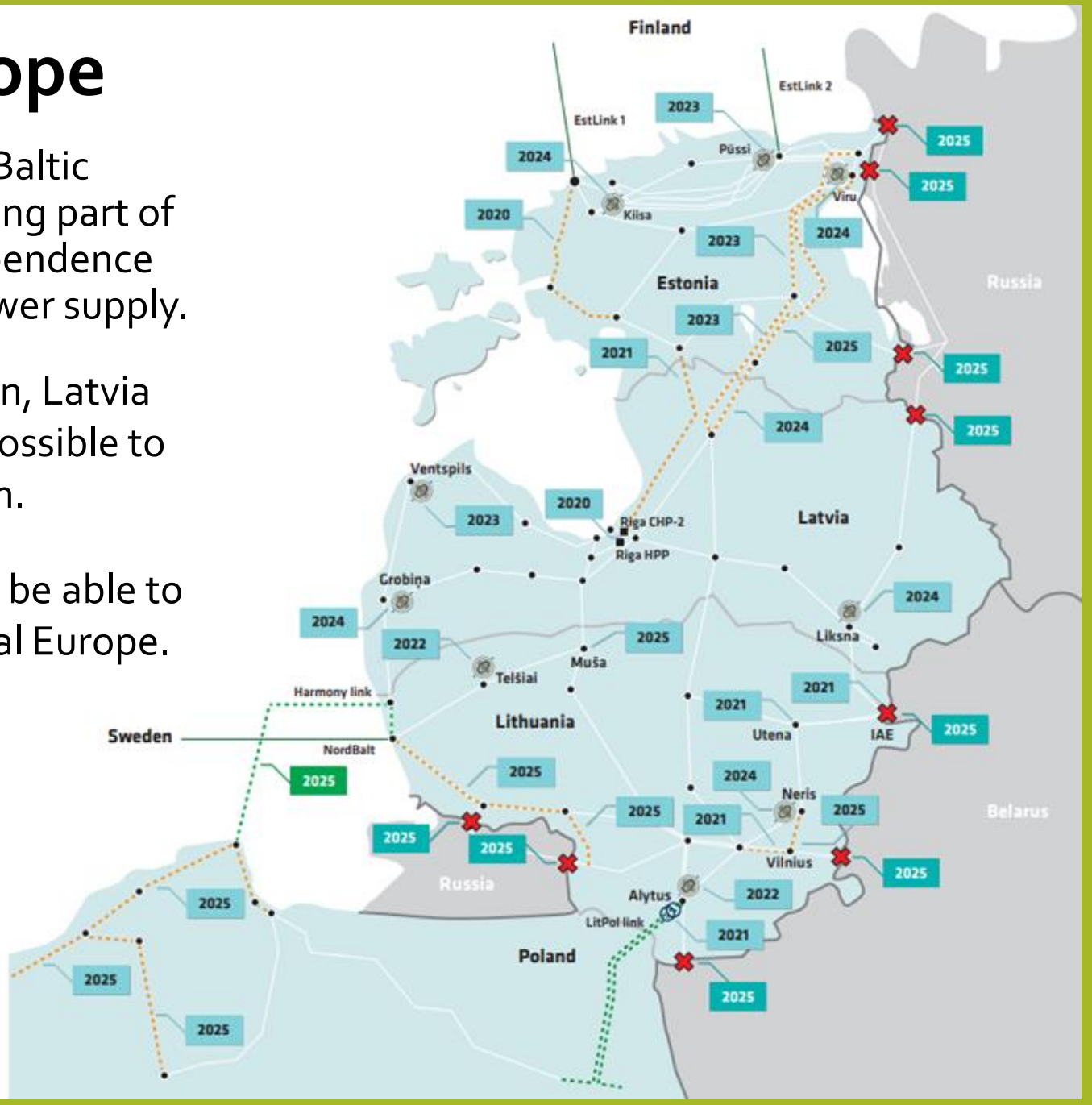
- Two high-voltage direct-current (HVDC) submarine power cables, Estlink 1 and Estlink 2, linking Estonia and Finland;
- The NordBalt power cable, also known as SwedLit, between Lithuania and Sweden;
- LitPol, a link between the Lithuanian and the Polish electricity systems.

Synchronisation with Europe

Security: synchronisation will result in the Baltic electric power transmission system becoming part of the European system, meaning more independence from Russia and a more reliable electric power supply.

Price levelling: as a result of synchronization, Latvia will join the EU market, which will make it possible to level electricity prices throughout the region.

Traders and producers of electric power will be able to sell electric power everywhere in Continental Europe.

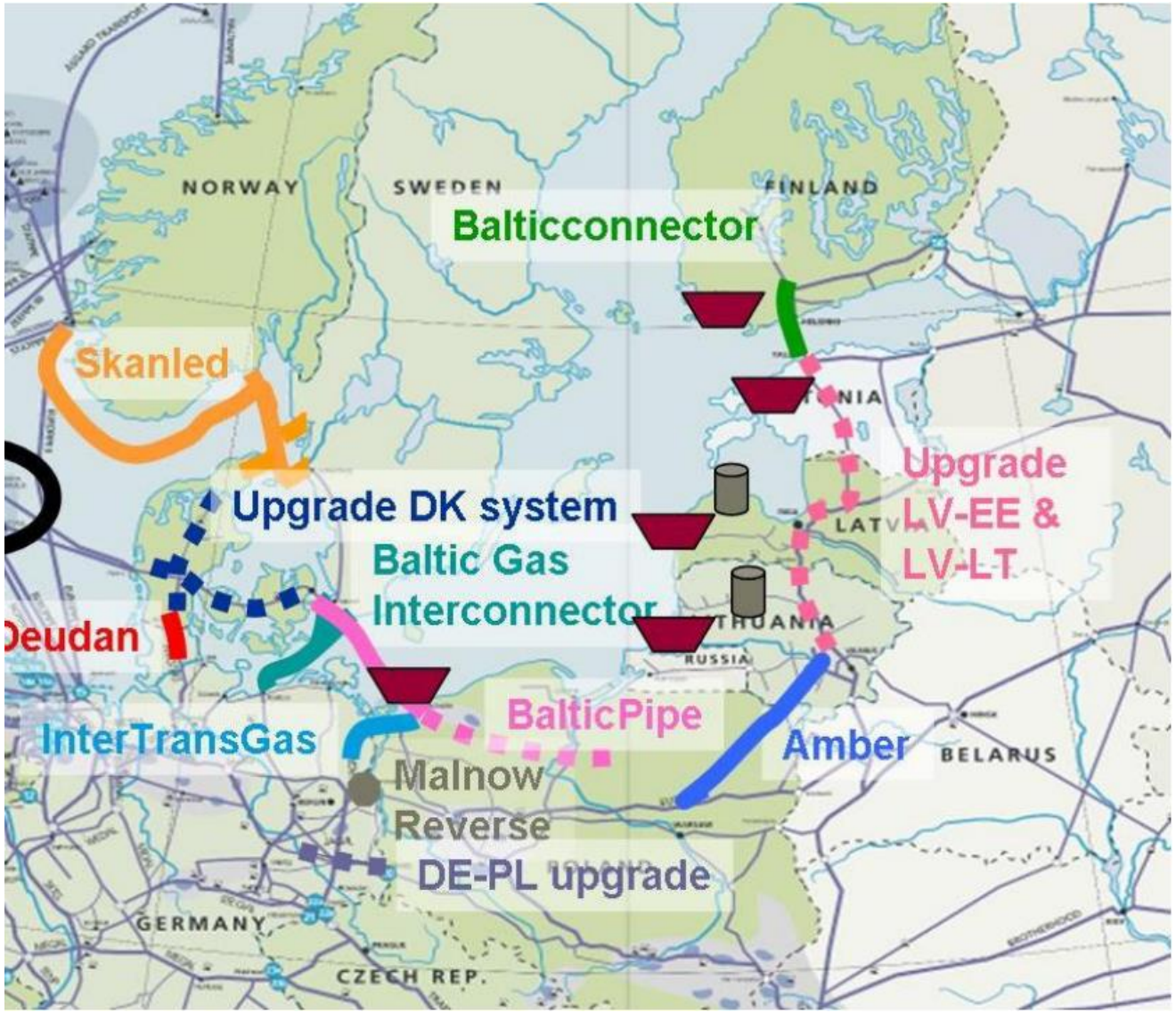


The main projects in the gas sector are:

- Interconnection Poland-Lithuania (GIPL), which will connect the two countries' natural gas transmission systems and is expected to be operational at the end of 2021;
- Balticconnector, a bidirectional natural gas pipeline between Estonia and Finland that entered commercial use this year in 2020.

Gas interconnections projects in the Baltic Sea region

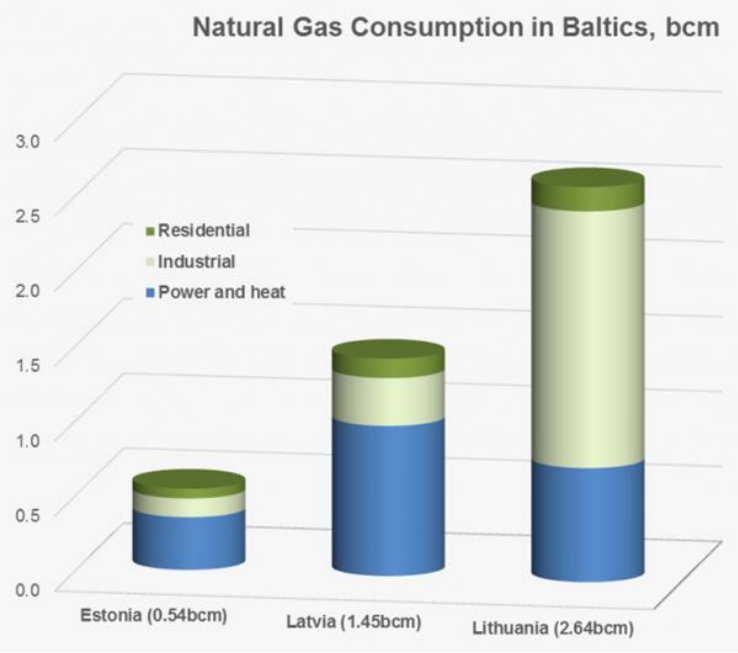
- **FI-EE** interconnection Baltic Interconnector
- Enhancement of **LT-LV** interconnection
- **PL - LT** interconnection GIPL



Gas market in the Baltic Countries

Shrinking of gas market – (Latvia, Lithuania, Estonia, MCM)

- The Baltic gas supply infrastructure has been developed around the **Inčukalns underground gas storage** (UGS) facility as a central element of the grid. **Inčukalns UGS of 2.3 bcm capacity** has a role of balancing supply and demand volumes in the Baltics and NW Russia.



- the Baltic States are today among the best interconnected regions in Europe with an interconnection level of 23 percent—a very positive result as compared with, for instance, the 6 percent of the Iberian peninsula. This seems to prove that the priority to diversify supply away from Russia set in the post-2014 European Energy Strategy has been satisfied. Nonetheless, it is still far off from accomplishing the process of energy integration of the Baltics with the European energy network: an essential condition for a truly integrated regional gas and electricity market.

- The Baltic States do not present a unified front on gas and electricity issues due to the lack of inter-regional agreements between key actors. As the 2019 Baltic Security Strategy report shows, “Regional cooperation is also limited by the domination of the self-help principle and the lack of trust among the states.”
- Arguments often arise about either the actual methods of implementing the synchronization of the Baltic electricity grid with the Continental European network (CEN)—the sense of extreme urgency that prevails in Lithuania over the issue does not figure in the other two countries —or where to allocate regional strategic projects such as LNG terminals.
- Moreover, “despite their strategic significance, become hostages to small-gain policies, which prolongs their implementation and extends the period of energy insecurity for all the actors involved.”

Lithuania's new LNG import terminal

With the first deliveries to Lithuania's new LNG import terminal in December 2014, the Baltic States will finally have an alternative natural gas supply route to Russian pipelines.

Photo source: flickr.com/photos/lens_envy

Electricity prices in Baltic States in 2021 June

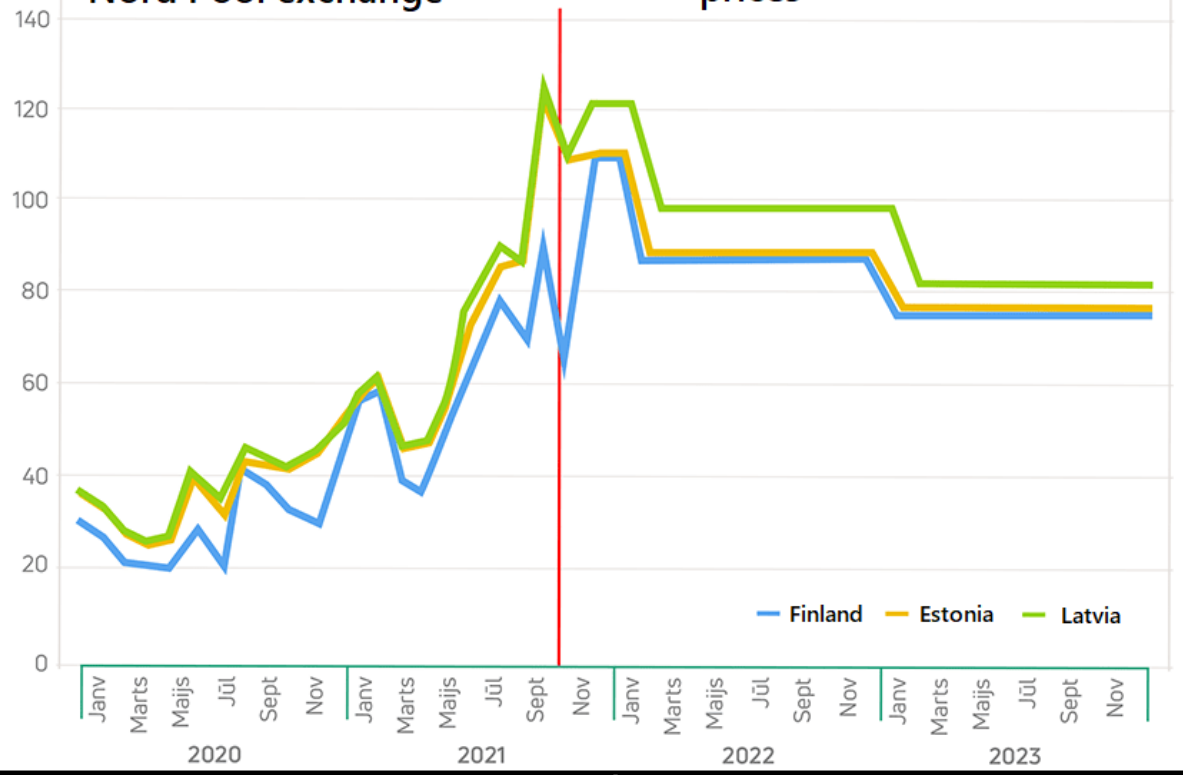
REGIONAL DAY-AHEAD PRICES (NORD POOL)

Price area	Average monthly price EUR/MWh	Relative change compared with previous month	Previous year (June 2020), MWh	Lowest fixed hour price EUR/MWh	Highest fixed hour price EUR/MWh	Lowest fixed daily price EUR/MWh	Highest fixed daily price EUR/MWh
NP Finland	56,16	22%	20,21	1,00	174,76	15,99	85,06
NP Estonia	71,68	48,0%	30,10	1,00	255,00	21,40	98,03
NP Latvia	76,23	57,4%	31,80	1,00	255,00	21,40	98,03
NP Lithuania	77,74	54,4%	31,70	1,00	255,00	22,98	98,03
NP Sweden (SE4)	73,05	53%	22,86	1,00	139,72	21,85	95,11

https://www.ast.lv/en/electricity-market-review

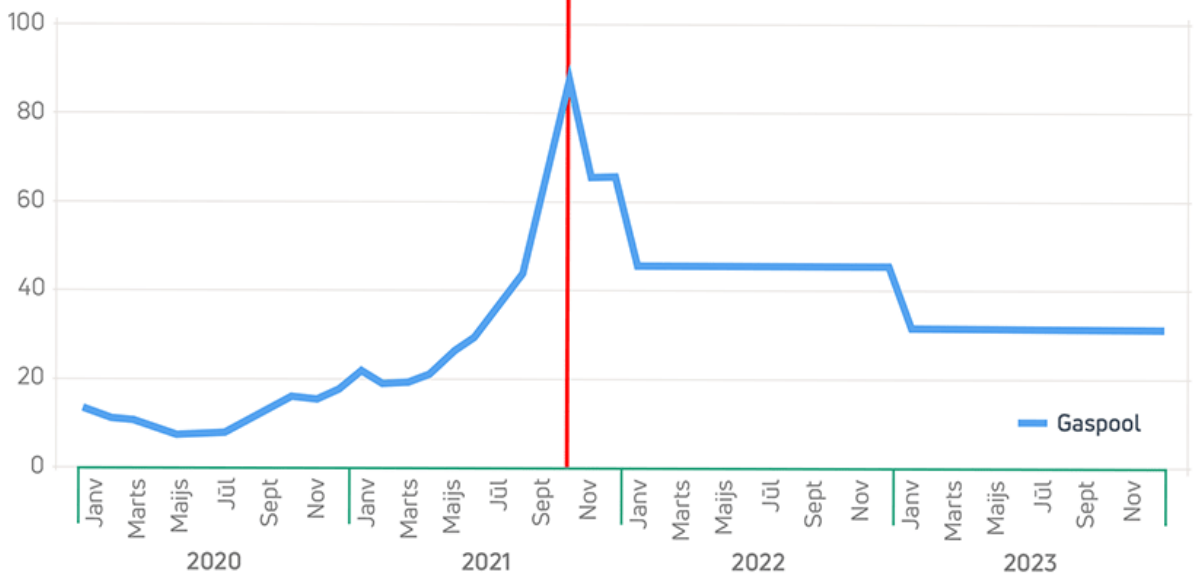
Wholesale prices on the Nord Pool exchange

Indicative futures prices



Gaspool wholesale prices

Indicative future Gaspool contract prices



Nordic hydropower balance

- 8,73 TWh

+ 12,22 TWh

compared to September

Price of CO2 quotas in the energy market

59,45 EUR/t

- 2,95%

compared to September

Crude oil price

83,75 USD/bbl

+ 11,85%

Compared to September

EUR/USD

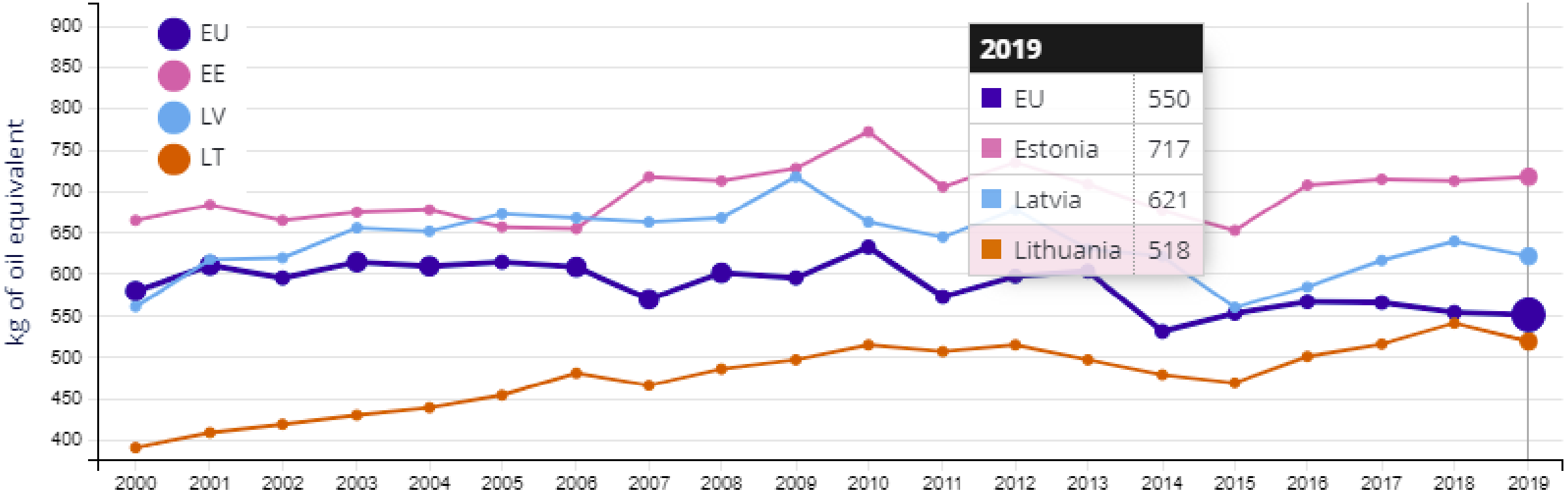
€/$

1,16

- 1,41%

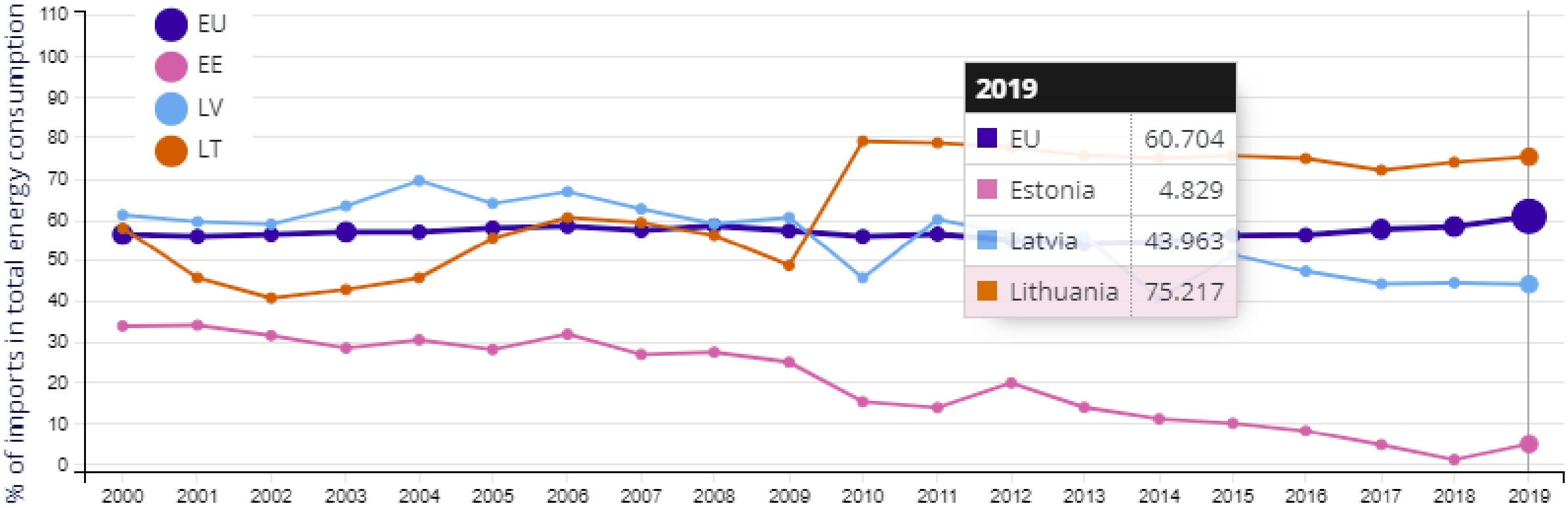
Compared to September

Final energy consumption in households per capita (in kg of oil equivalent)



Sustainable Development Goals (SDGs) and me - 2021 edition (europa.eu)

Energy dependency
(as % of imports in total energy consumption)



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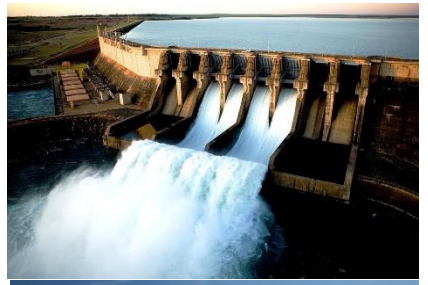
Current RES situation in the Baltic countries

- The most used RES in **Latvia** are hydro and wood resources; besides, the wind energy and energy from waste.
- The most used RES in **Lithuania** are wind energy, hydro resources, then biofuel and solar energy.
- The most used RES in **Estonia** are wind energy and biofuel, then hydro and solar energy.
- Oil-shale, a fossil fuel similar to coal, but with lower heating value, is mined in north-eastern **Estonia** and across the Estonian border in Russia. Coal and oil-shale are used directly for heating or for electricity production in power plants.



Current RES situation in the Baltic countries

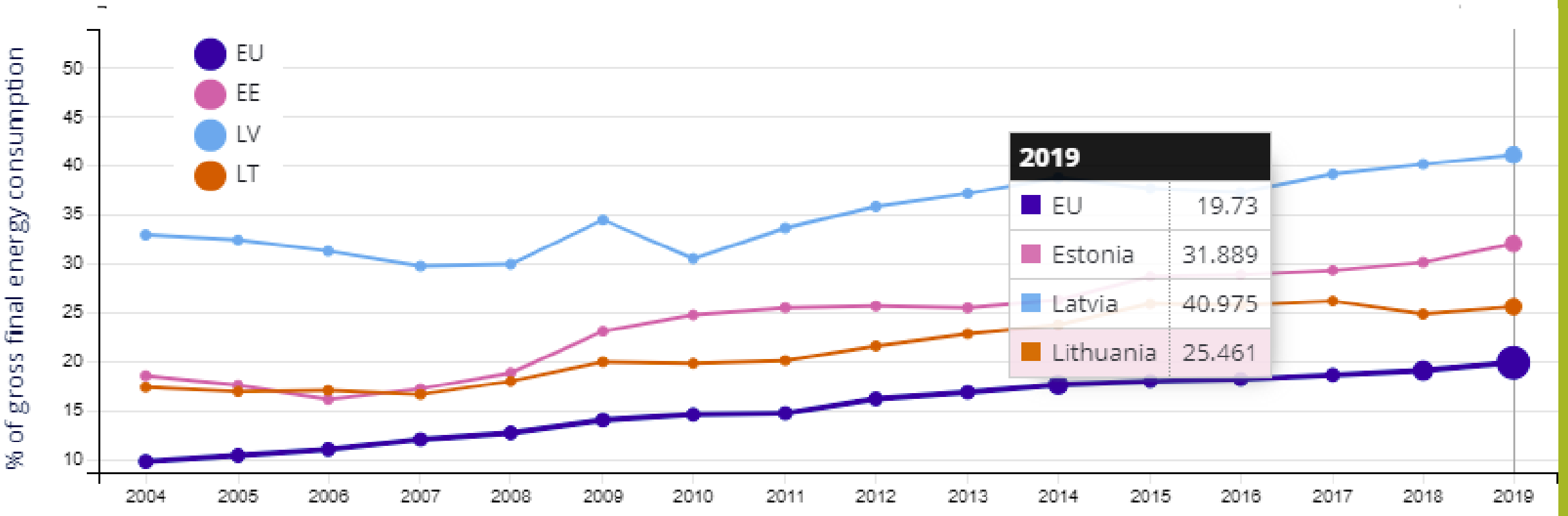
Despite quite similar climatic conditions and natural resources for electricity production from renewable energy sources in three Baltic States (Estonia, Latvia and Lithuania), significant differences exist in these countries as to the RES capacity volume.

Comparing RES capacities in the three Baltic countries, it is noted that major part of

- **hydropower** is located in **Latvia**,
- **solar capacity energy** is the fastest-evolving in **Lithuania**,
- **wind power** is more attractive in **Estonia** and **Lithuania**,
- **biofuel** is more spread in **Estonia** and **Latvia.**

Share of renewable energy
(as % of gross final energy consumption)

Renewable energy

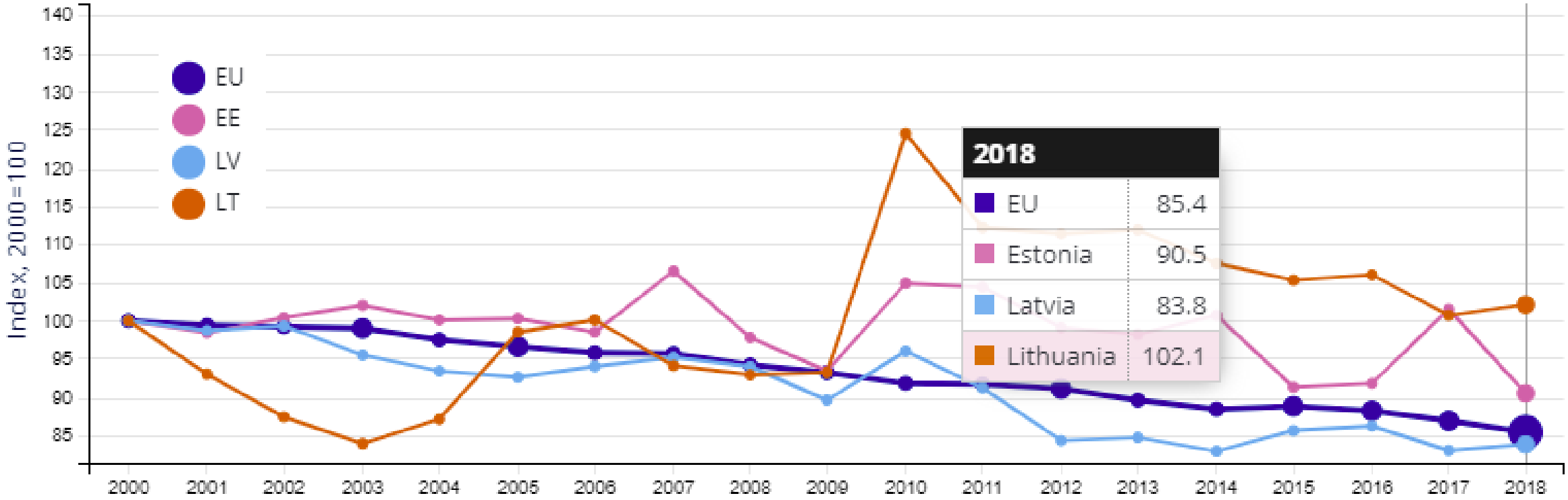


Source: Sustainable Development Goals (SDGs) and me - 2020 edition (europa.eu)

RES in Latvia

- Data compiled by the Central Statistical Bureau (CSB) and published September 6 show that last year **Latvia had the EU's third-highest share of renewable energy sources (RES) in its energy consumption mix.**
- The target set for Latvia for the share of energy produced from RES in the gross final energy consumption in 2020 is 40 %. In 2019, Latvia had the third highest share of RES (40.97 %) in energy consumption in the European Union (EU) after Sweden (56.4 %) and Finland (43.1 %). The average in the EU was 19.7 %.

Greenhouse gas emissions intensity of energy consumption (Index, 2000=100), source: EEA and Eurostat



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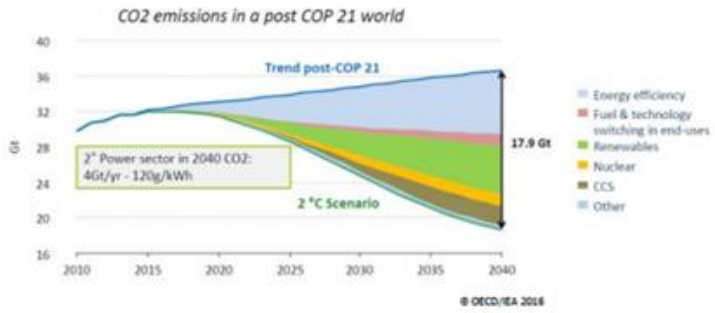
Digitization : a key pillar of the new energy landscape

Decarbonization

Energy Efficiency & Renewable
= 2 pillars of the energy transition

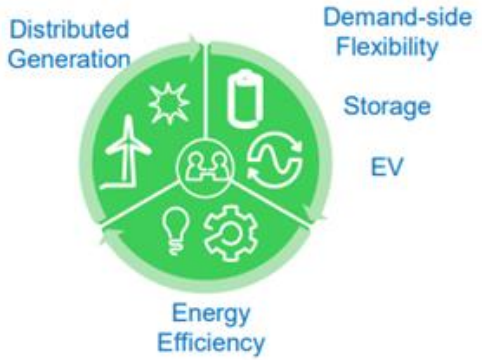
The bulk of CO2 emissions comes from EE & RE



Decentralization

in "Paradigm " shift

Prosumer & DER first



Connected to a smart and flexible distribution grid

Double flow of energy & information
More real time operation
New design & planning

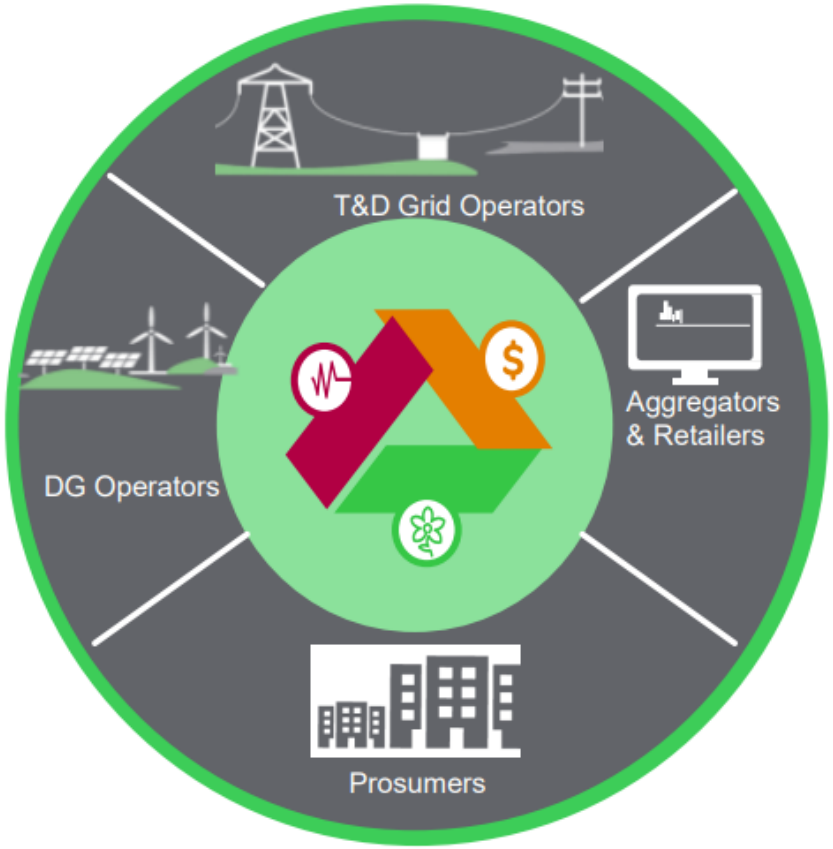
Digitization

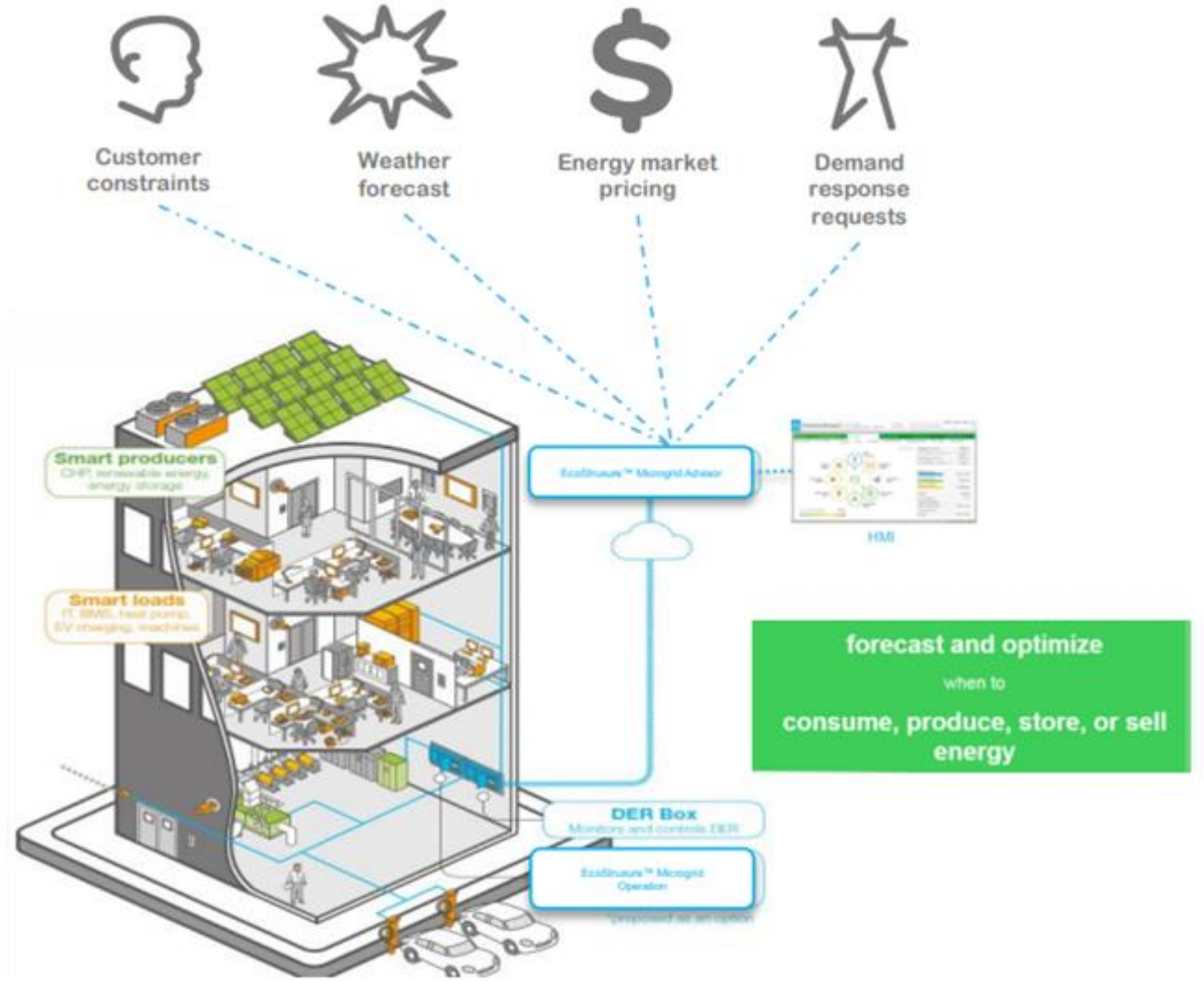
Enabled by Digitization

Of an energy system more safe –reliable-efficient-sustainable – connected

With more *Real time* and *open integration* over the *full life cycle*

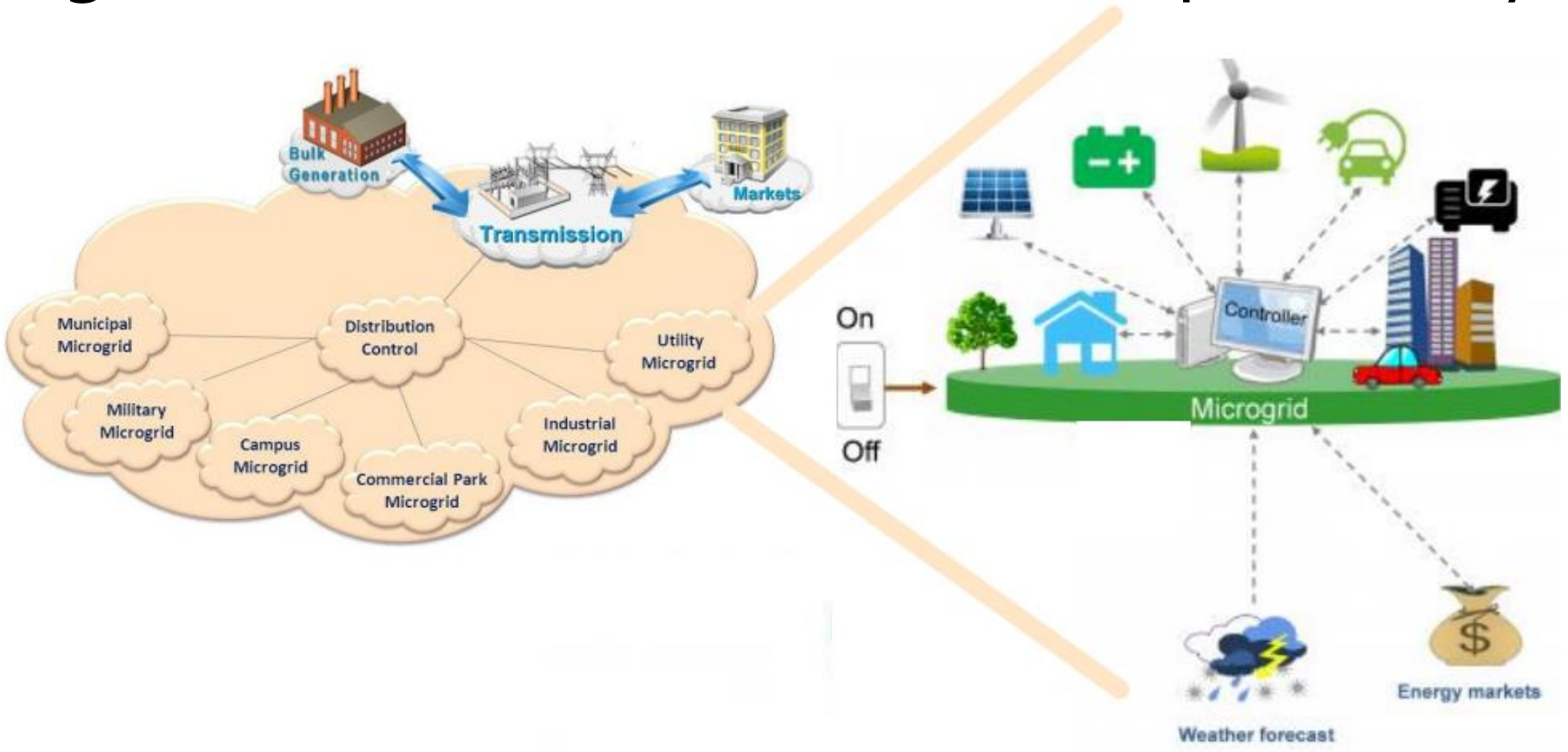
Digitization brings benefits to all value chain actors and opens a strong paradigm change at demand side





Microgrid

- A small network of electricity users with a local source of supply that is usually attached to a centralized national grid but is able to function independently.



Microgrid components

- Distributed Energy resources
- Storage
- Distribution & Controller
- Software

Policies and regulations shall foster a favourable environment

- Need **for trust** , acceptance and adoption by stakeholders
- **Cybersecurity** and **data privacy** are key issues
- Need for common **standards** and **interoperability**
- New **skills** and **competencies** to be built
- Strong **business case** to be encouraged with **new actors** development

Areas where improvements are necessary include:

- **data analysis and policy coordination** (Current regional security coordination among Transmission System Operators (TSOs) is framed by the Baltic Regional Security Coordination Agreement);
- **information sharing**;
- **common training .**

Conclusions

- All 3 Baltic countries have access to energy, but they are still heavily dependent on their neighbors and therefore must create a system that will allow countries to provide energy as much as possible independently.
- Regional energy integration in the Baltics may well help develop a more diversified and resilient energy market, thus reducing the dependency of these states on imported sources.
- Despite positive results, the initiative still lacks coordination with national energy strategies and does not guarantee a coherent energy development roadmap at either member state or EU level.

Reading

- https://www.ponarseurasia.org/the-baltic-states-and-energy-security-how-else-can-the-eu-foster-their-energy-resilience-in-the-face-of-russian-pressure/
- https://ec.europa.eu/energy/sites/ener/files/documents/latvia_draftnecp_en.pdf
- https://www.liia.lv/site/docs/Energy_Brief_2014_web_1.pdf
- https://investinlatvia.org/en/key-sectors/sectors/green-technology

Thank you for your attention!

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