Hungarian Section

Energize the CEE Region
Focusing Reliable Energy Security

Workshop

16-17 November 2023, Visegrád

Society of Petroleum Engineers

European and domestic current energy supply situation and challenges in the shadow of current wars

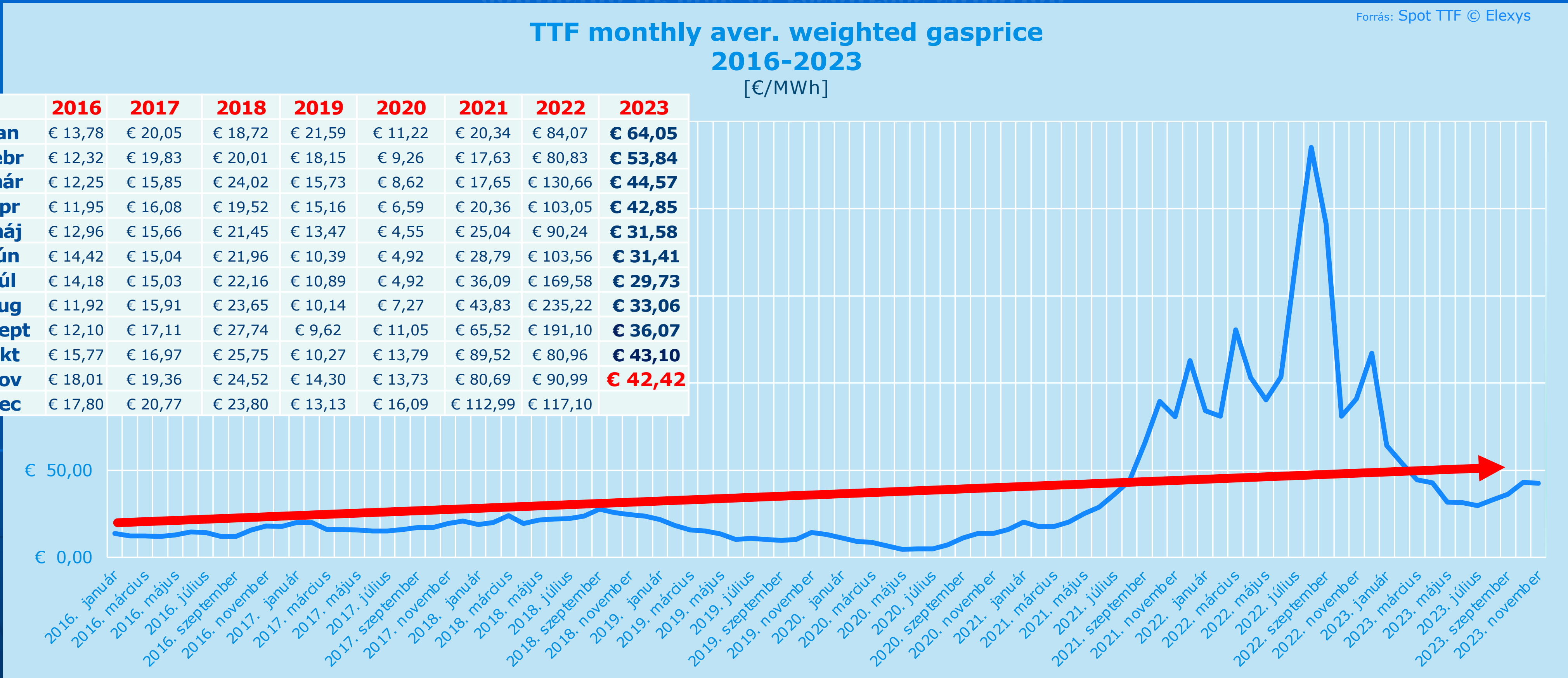
Aurora Energy Kft

Attila Holoda
Managing director

7th October 2023

Present situation:

And the market as usual "loves" to reacts terribly quickly and "prefer" to creates market panic in any confusing or lack of resources situation...



	2016	2017	2018	2019	2020	2021	2022	2023
jan	€ 13,78	€ 20,05	€ 18,72	€ 21,59	€ 11,22	€ 20,34	€ 84,07	**€ 64,05**
febr	€ 12,32	€ 19,83	€ 20,01	€ 18,15	€ 9,26	€ 17,63	€ 80,83	**€ 53,84**
már	€ 12,25	€ 15,85	€ 24,02	€ 15,73	€ 8,62	€ 17,65	€ 130,66	**€ 44,57**
ápr	€ 11,95	€ 16,08	€ 19,52	€ 15,16	€ 6,59	€ 20,36	€ 103,05	**€ 42,85**
máj	€ 12,96	€ 15,66	€ 21,45	€ 13,47	€ 4,55	€ 25,04	€ 90,24	**€ 31,58**
jún	€ 14,42	€ 15,04	€ 21,96	€ 10,39	€ 4,92	€ 28,79	€ 103,56	**€ 31,41**
júl	€ 14,18	€ 15,03	€ 22,16	€ 10,89	€ 4,92	€ 36,09	€ 169,58	**€ 29,73**
aug	€ 11,92	€ 15,91	€ 23,65	€ 10,14	€ 7,27	€ 43,83	€ 235,22	**€ 33,06**
szept	€ 12,10	€ 17,11	€ 27,74	€ 9,62	€ 11,05	€ 65,52	€ 191,10	**€ 36,07**
okt	€ 15,77	€ 16,97	€ 25,75	€ 10,27	€ 13,79	€ 89,52	€ 80,96	**€ 43,10**
nov	€ 18,01	€ 19,36	€ 24,52	€ 14,30	€ 13,73	€ 80,69	€ 90,99	**€ 42,42**
dec	€ 17,80	€ 20,77	€ 23,80	€ 13,13	€ 16,09	€ 112,99	€ 117,10	

Two things in the gas market are highly capable of generating terrible panic: 1) If there is a LOT of gas or 2) if there is NO gas ..., and frankly, the long -term business, unfortunately, are mostly based on daily information, not real forward signals.

Subjective conclusion:

Market reactions are not always necessarily rational, but it is usually causing serious structural changes

	2016	2017	2018	2019	2020	2021	2022	2023
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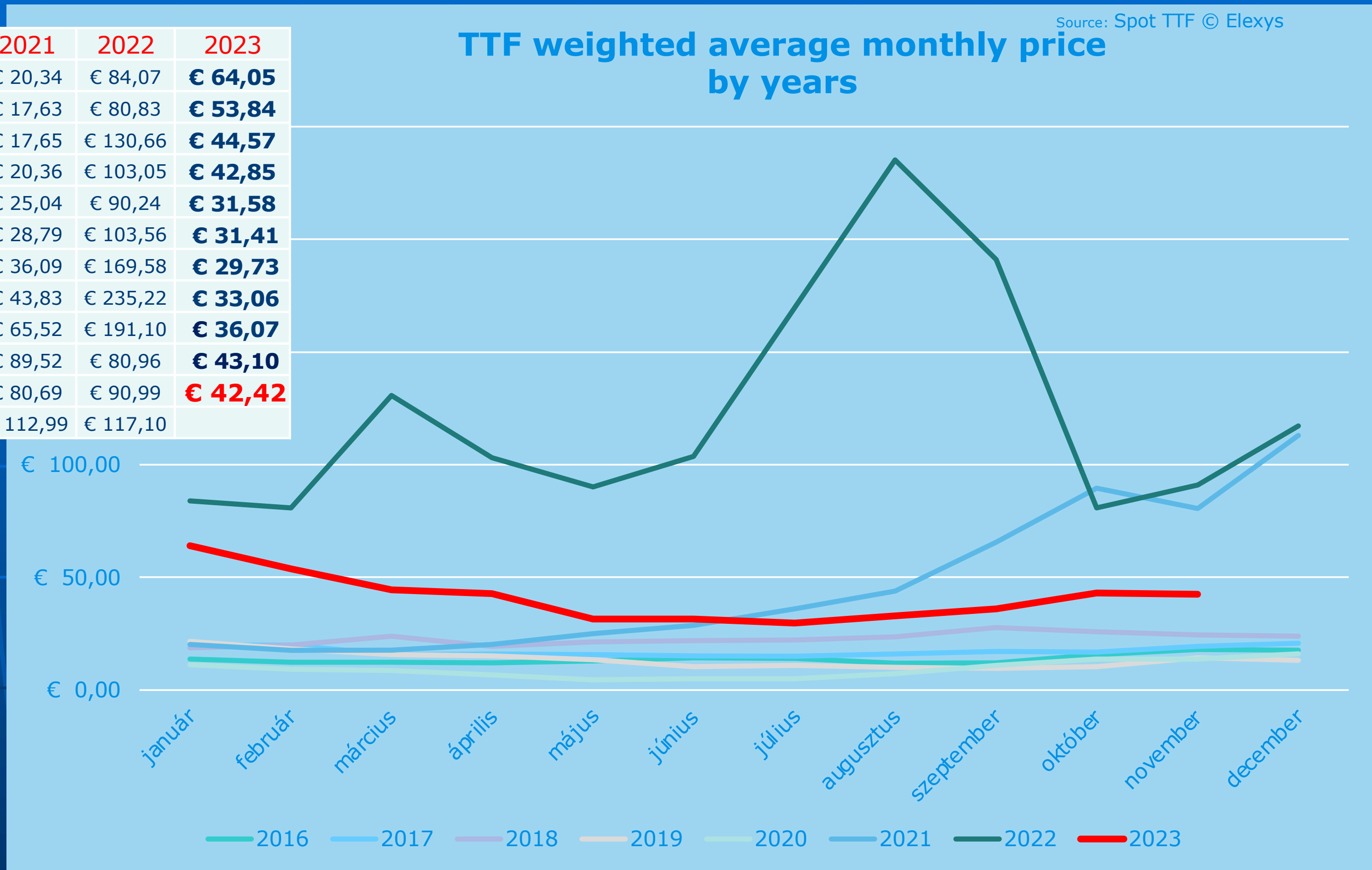
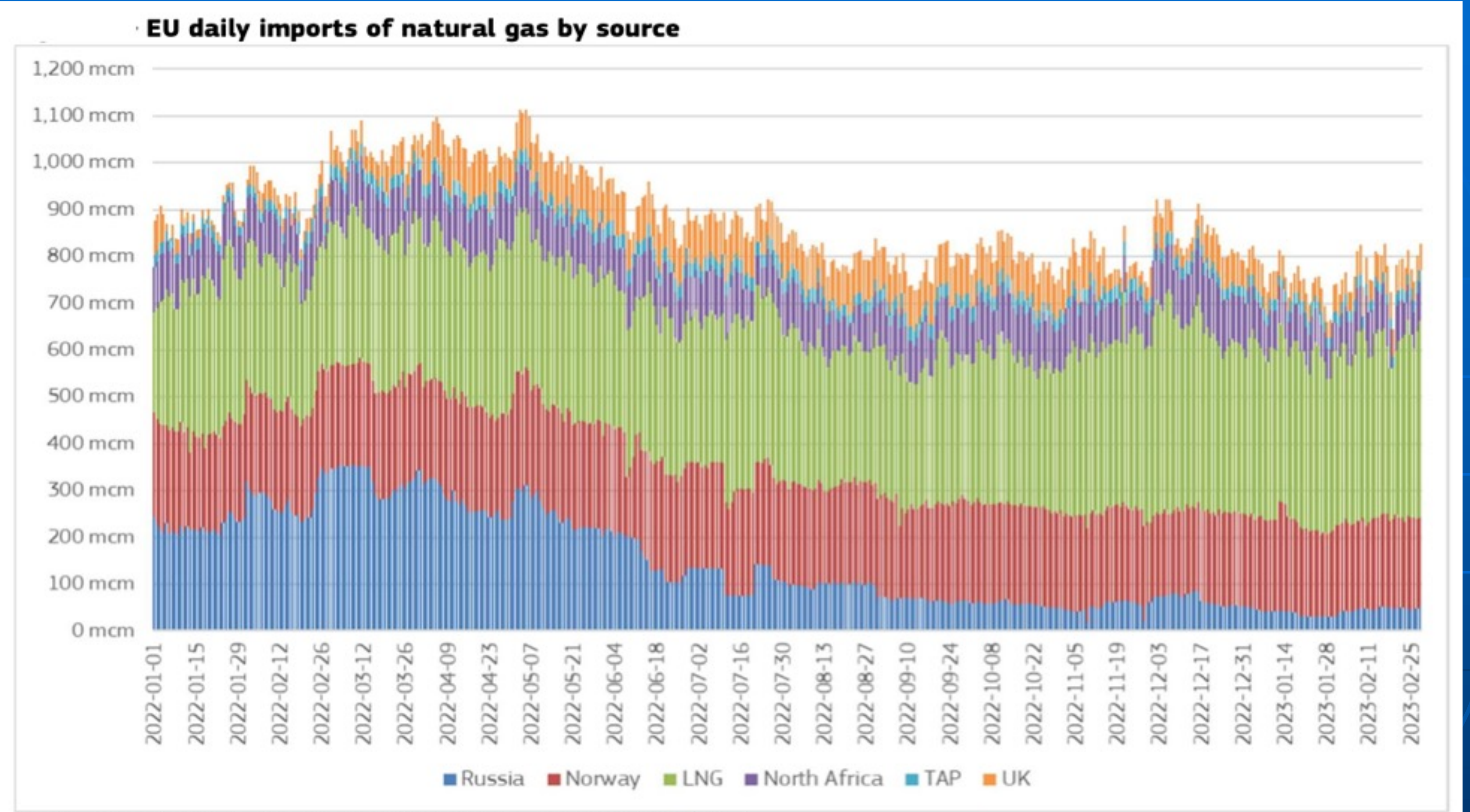


We had a "market panic" of 1.5-2 years, which fundamentally reorganized the diversification of the European gas supply and route diversification.

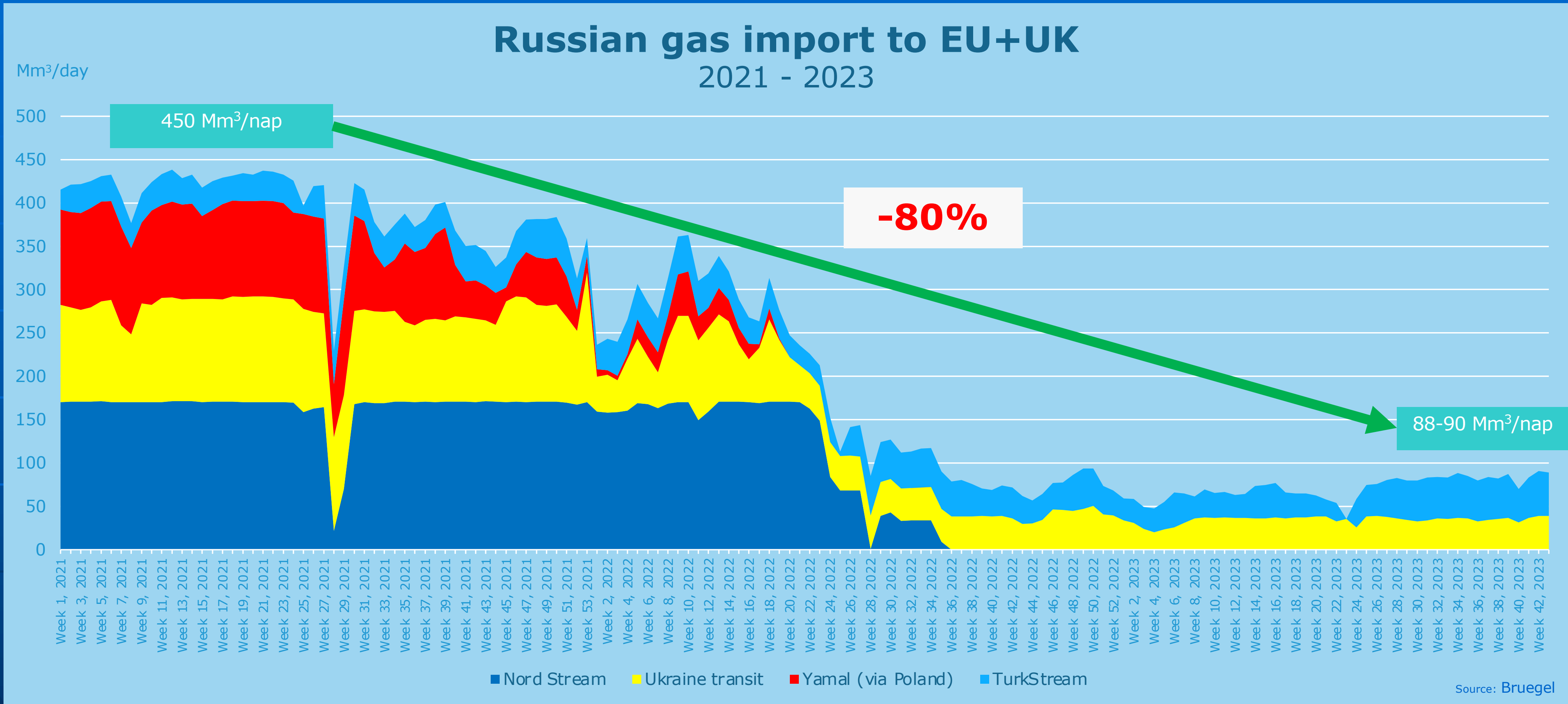
The resource structure of European natural gas imports has been significantly reorganized



Source: Based on data from the ENTSO-G Transparency Platform, 2022.

So, we can now be sure that the 40-42%Russian gas exposure will never come back..., but what is coming?

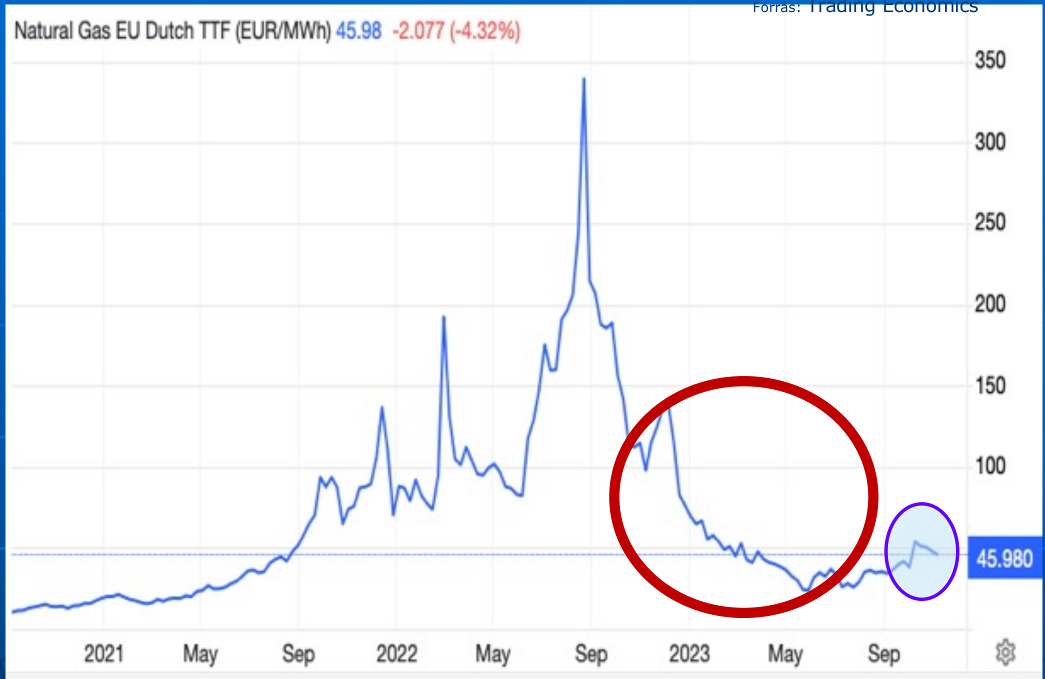
Europe's Russian gas imports are surprisingly shocking and unexpected between 2021-2023...



The Russian gas imports of Europe have fallen to less than sixth, the Russian blackmail potential, which has previously been considered very strong and irreplaceable, has been "melted" in virtually a few months ...

But what is happening in the European gas market now and why?

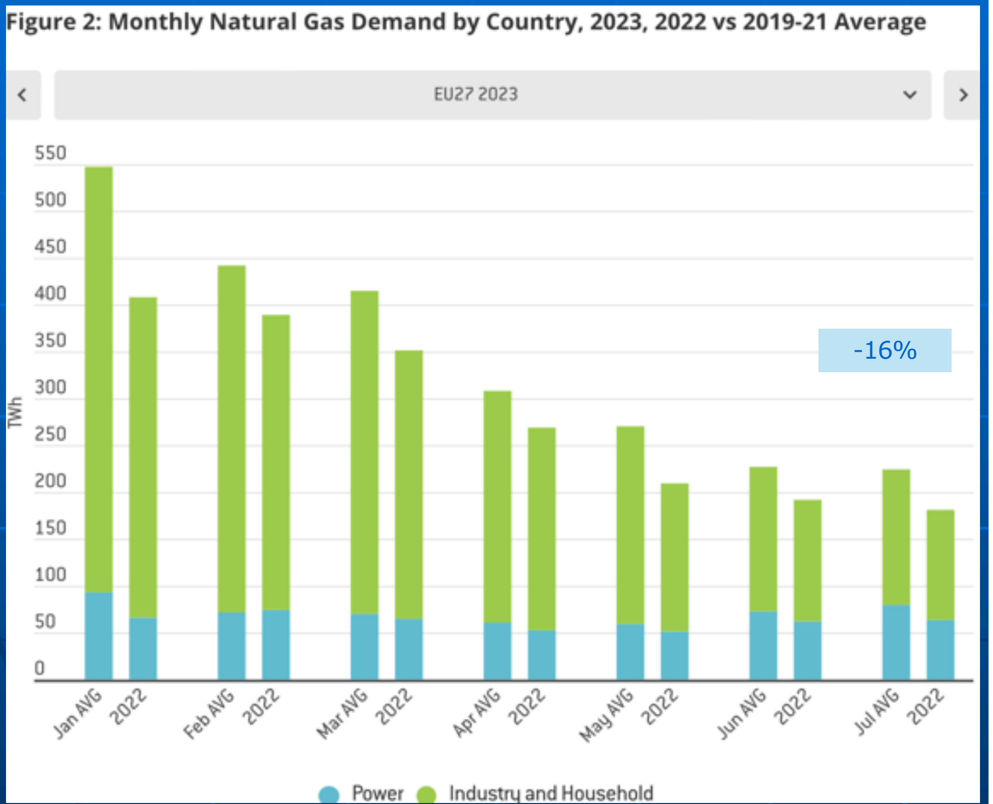
Forrás: Trading Economics

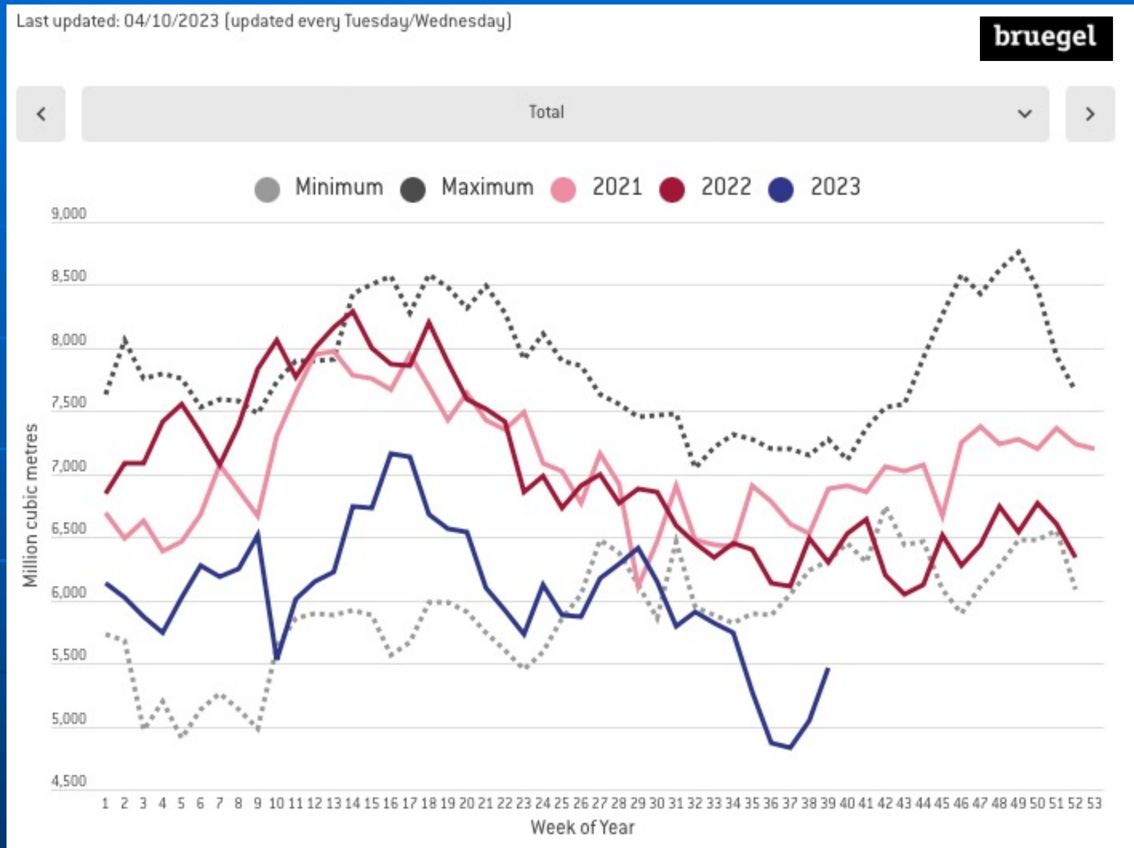


- In 2022/23, unusually mild autumn-winter weather helped to reduce usual consumption level.
- Thus, underground gas storage facilities, even by the end of winter, remained higher than the usual average
- The Chinese economy, which strongly effects on energy demand, continues to struggle with economic uncertainty, which significantly influences the price of energy in the world market.
- Significantly and (in most countries) permanently European natural gas consumption decreased ~ -20%!
- Significant new LNG sources (and LNG regasification capacities) have appeared on the European market, btw that may effect on marketability of Renewable Resources in near future
- There was enforced "austerity" (municipalities, SMEs, industrial companies, public administration), real energy awareness is still waiting for validating...
- High price environment, such natural gas-dependent industries, led to a periodic or final shutdown (metallurgy, fertilizer, building material)
- The Palestinian-Israel War, again, raised uncertainty, but did not even approach the impact of the Russian war in the past.
- *Warning: Price falling due to increased gas supply resources can once again lead to a drastic decrease in fossil extraction because of its worse ROI!*

Putin and his people's targeted announcements have indeed caused instantaneous problems in panic in the Commodity markets, but it has been confirmed again that this is much more market (and geopolitical) speculation than a real gas safety problem.

In 2022 Europe has declined significantly in the consuming of natural gas and also the demand compared to the average level of 2019-2021

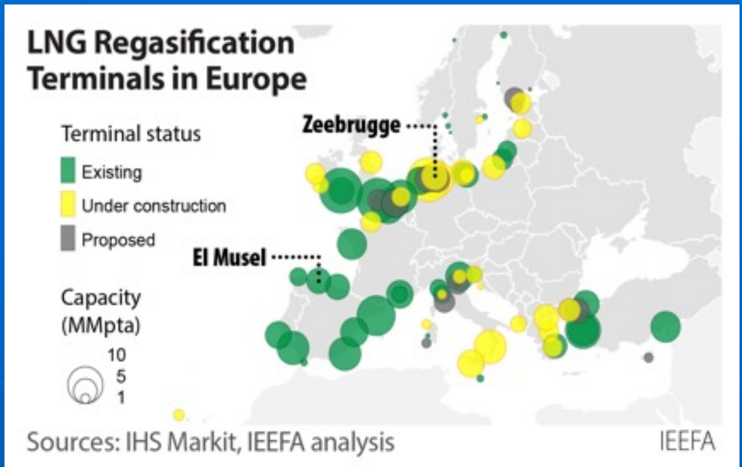


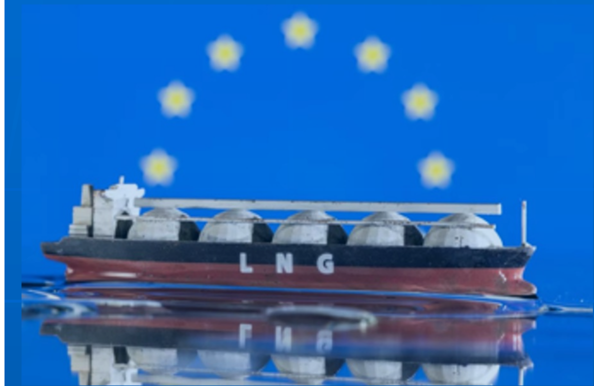


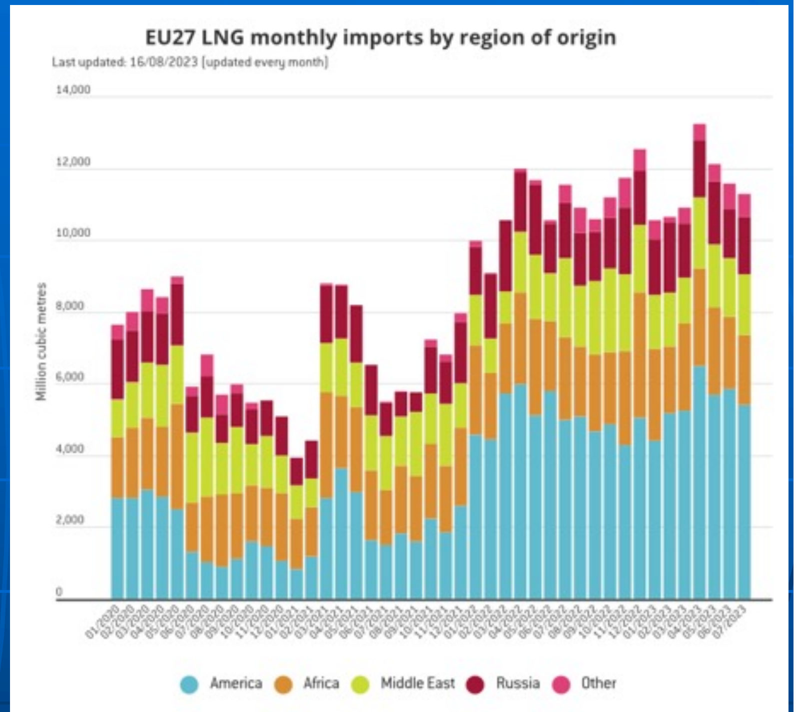
Practically, average natural gas consuming has decreased everywhere.
There are some where this is "just" purely saving, but there are some where real detachment from natural gas ...

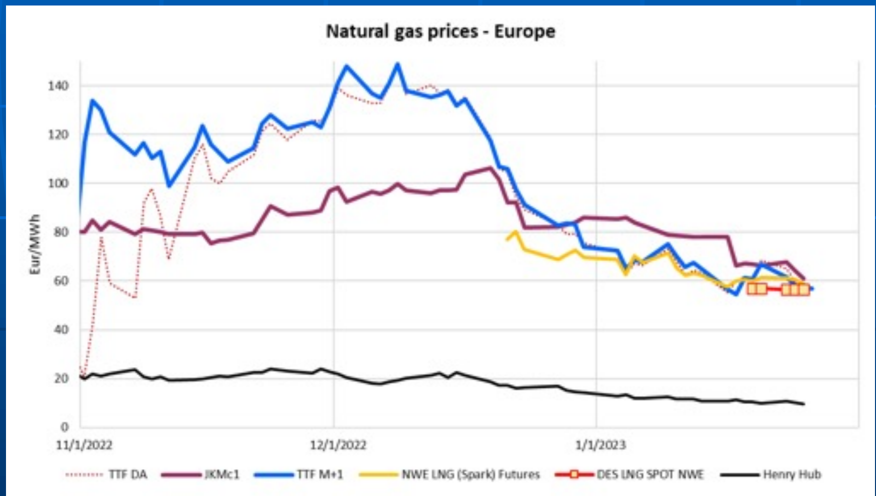
LNG boom…

- LNG: Methane gas (CH_4) cooled to -162ºc liquid
- Volume is reduced to 1/600!
- It transformed the natural gas trading into global



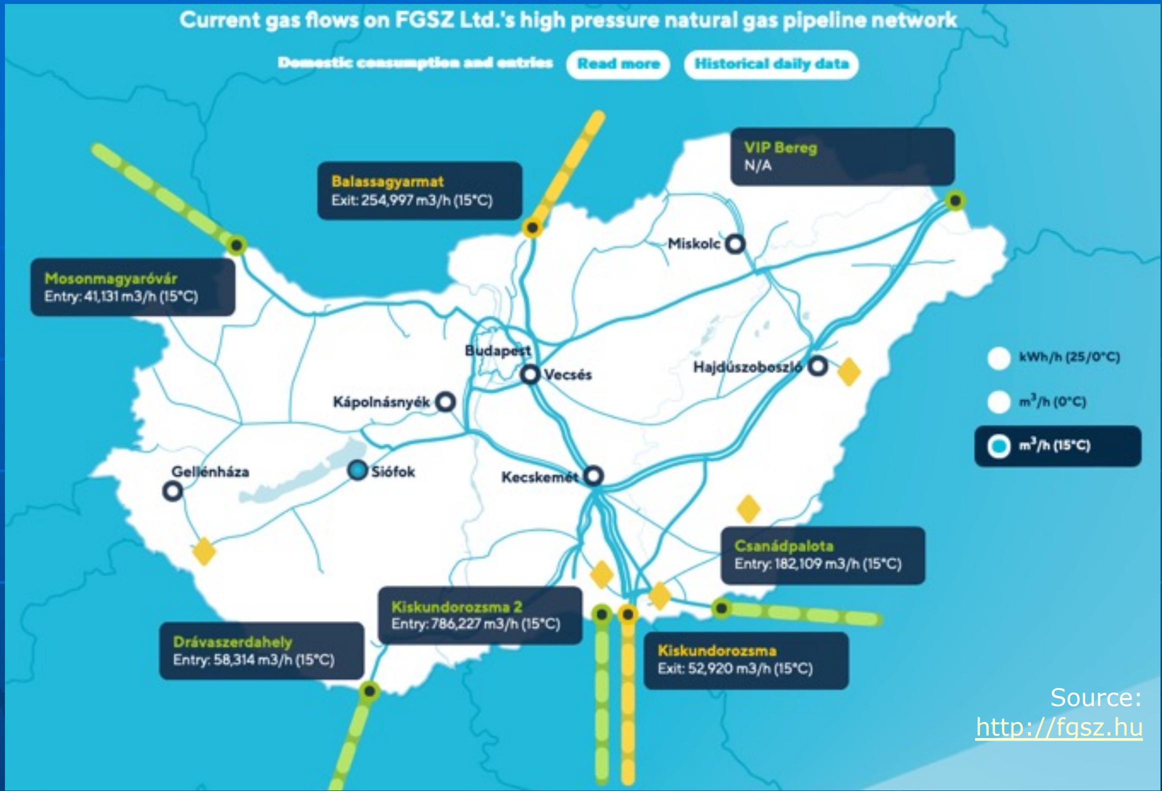




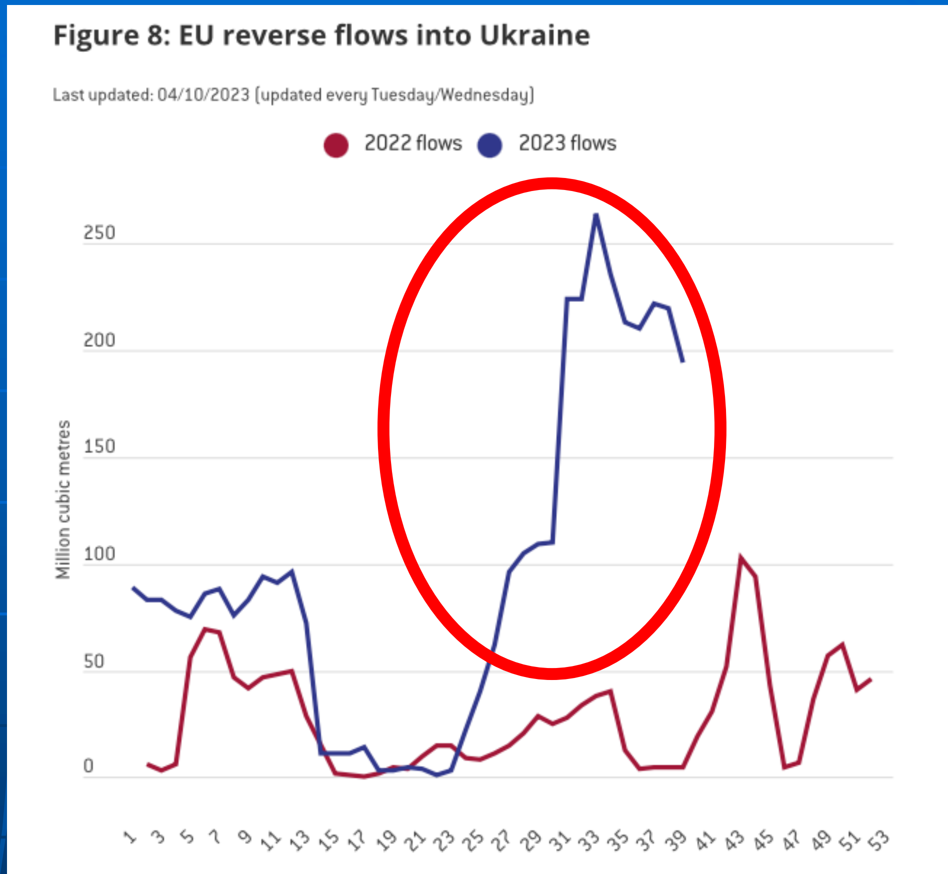


Although LNG does not completely trigger pipeline gas supply channels, it has significantly reduced Russian imports and globalized the gas market.
Stubborn misconception that LNG is more expensive …

Current natural gas transport picture, 09 Nov 2023



Source: http://fgsz.hu

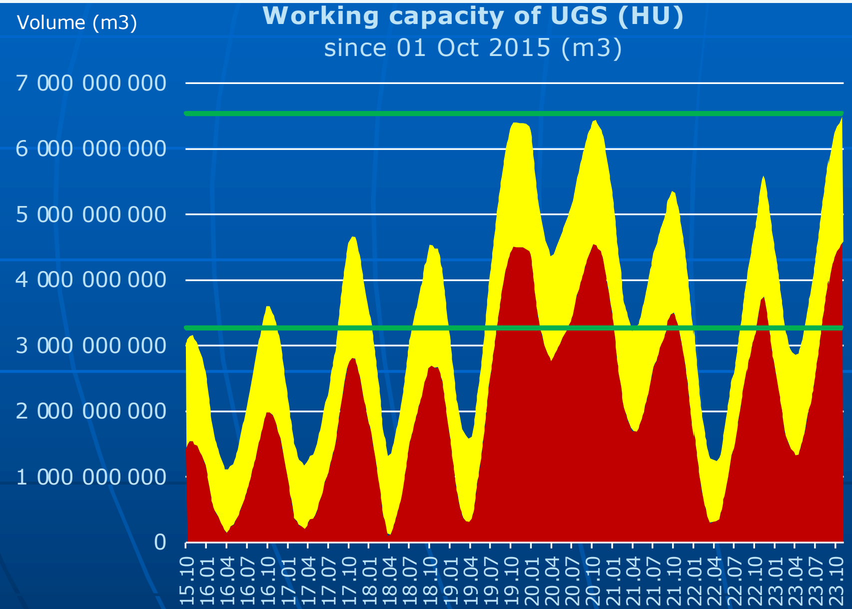


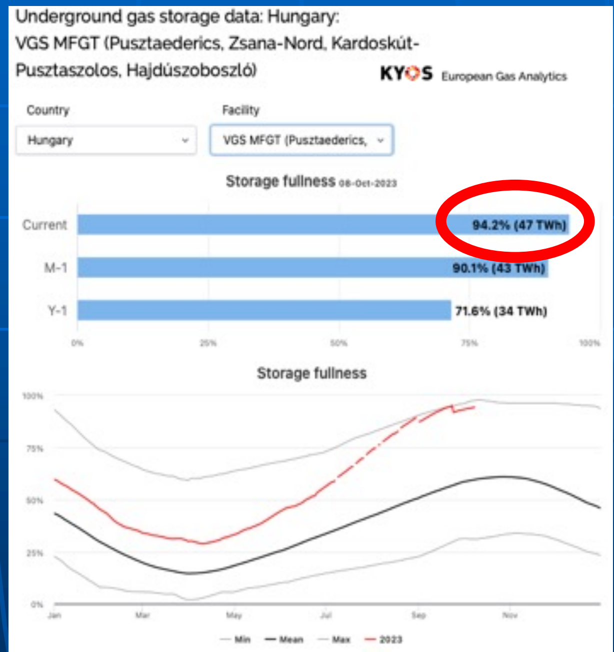
Daily household and industrial gas consumption (11.06.2023): 15-19 MMm3, currently of which 21-23%of the domestic gas production, the storage injection is still underway, but it is quite decreasing rate: 2-3 MMm3/day ,while the gas imports 28-30 MMm3/day, but reexport is 10-13 MMm3/day!

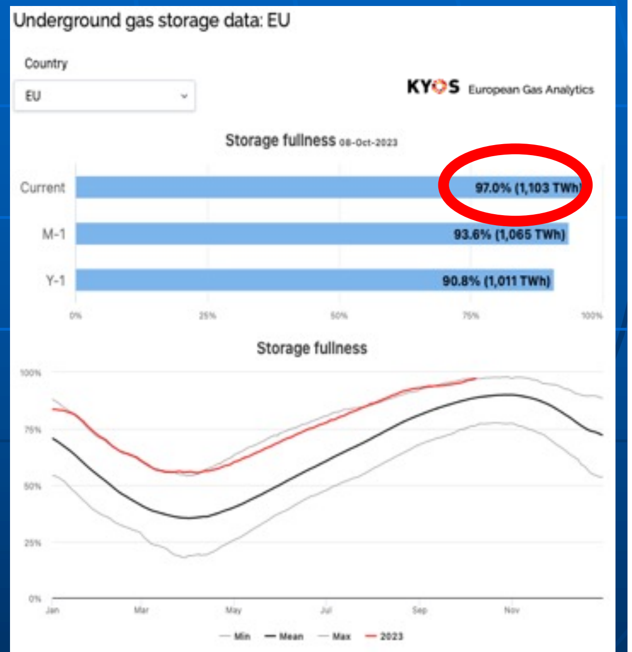
UGS facilities in Hungary

Our UGS facilities are the crown diamonds of the domestic cooperative natural gas system!

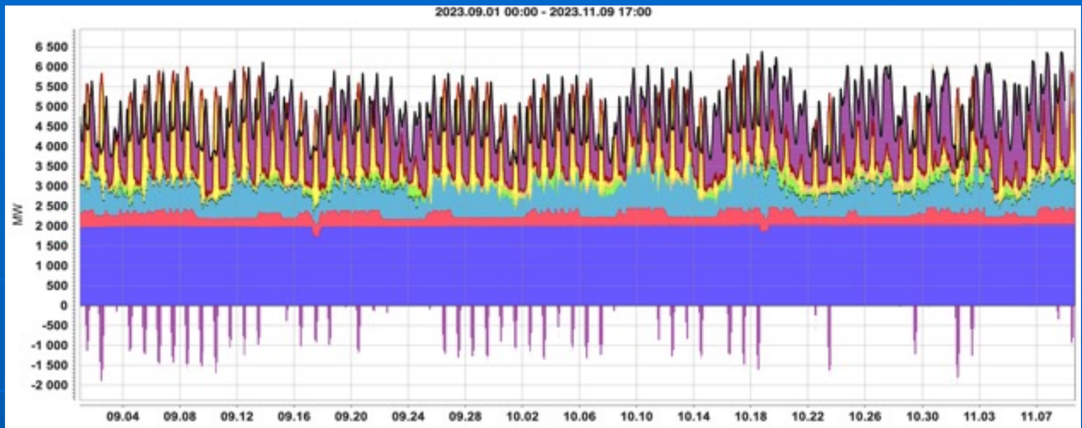
- 2 UGS companies: **Magyar Földgáztároló Zrt**. (MFGT – member of MVM Group, i.e. 100 % state owned) and **HEXUM Földgáz Zrt.** (earlier MMBF), owned by MSZKSZ (Hungarian Hydrocarbon Stockpiling Association),
- Current fullness (*09 Nov 2023*)**: 6,488 bcm 99,2 % 68,5 TWh**
    - **MFGT (commercial volume) – 98,22%** (4.436,4 MMm^3); - financed by MVM!
    - **HEXUM (strategic and particular volume) – 99,84%** (1.896,9 MMm^3) – financed by MSZKSZ!

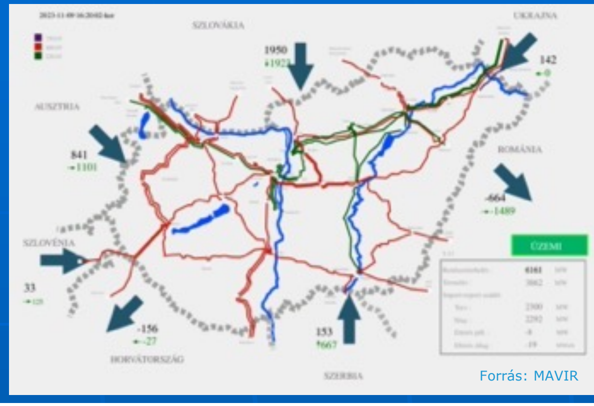


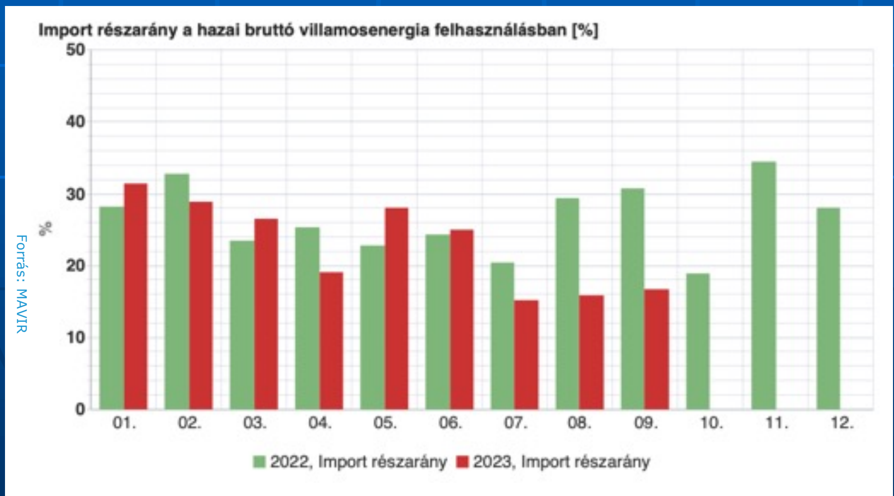


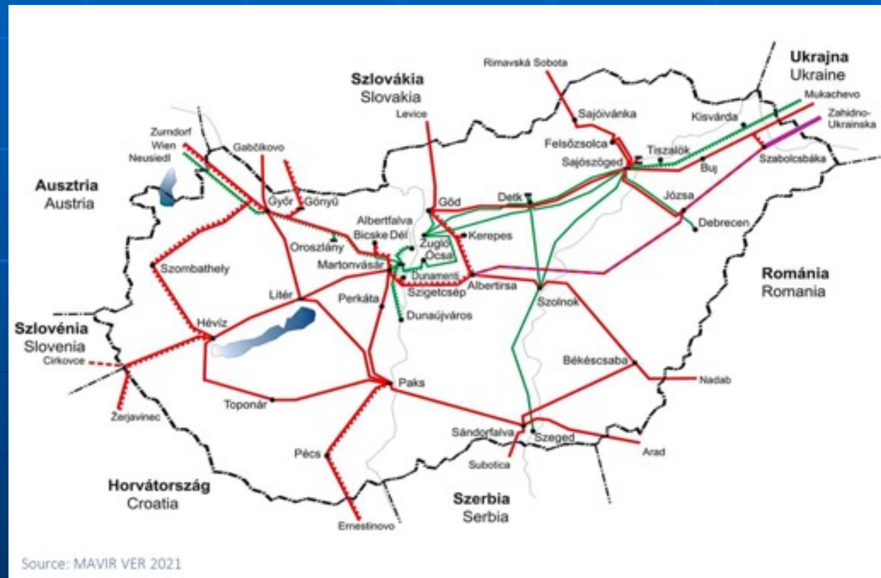


Domestic vs. import electricity consumption in 2023





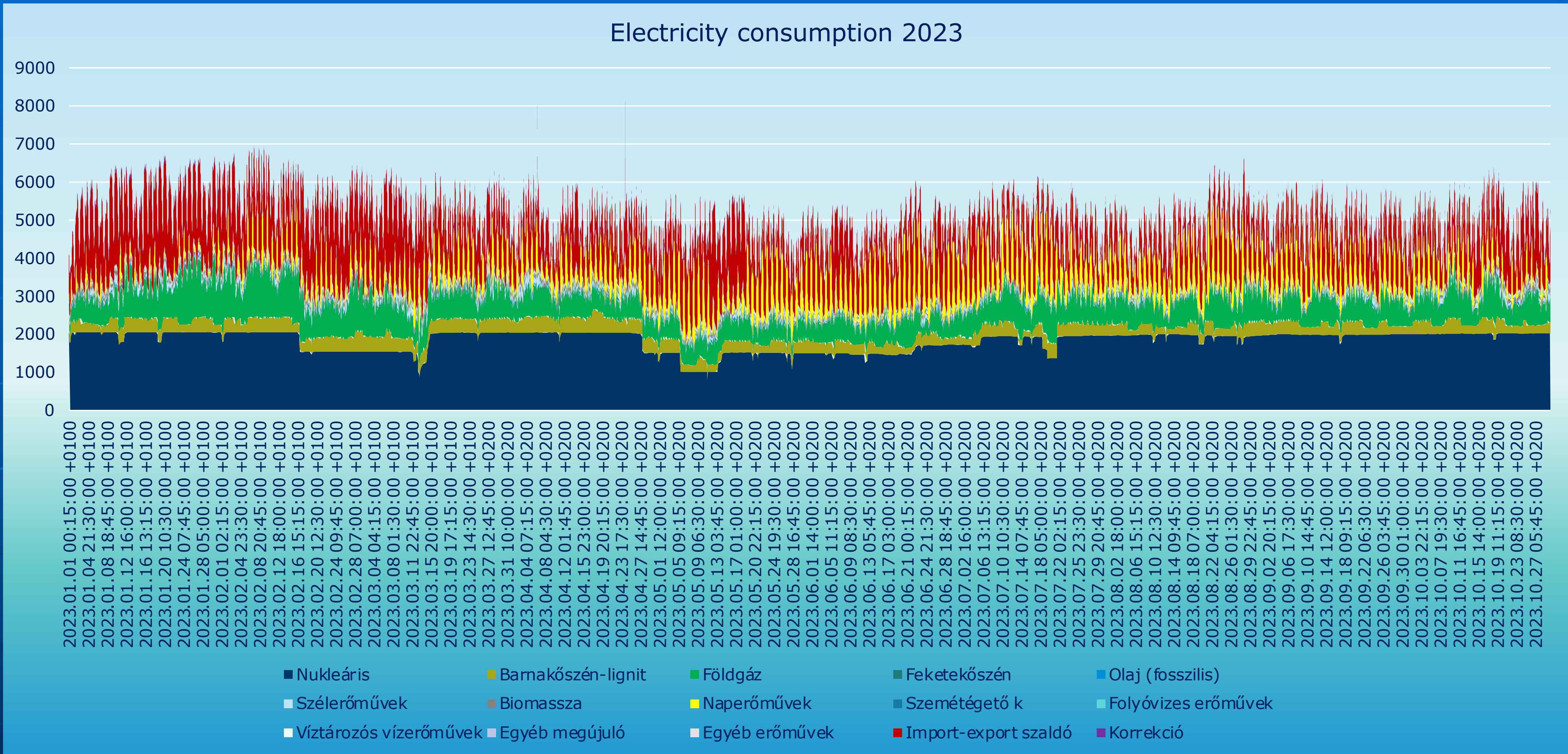




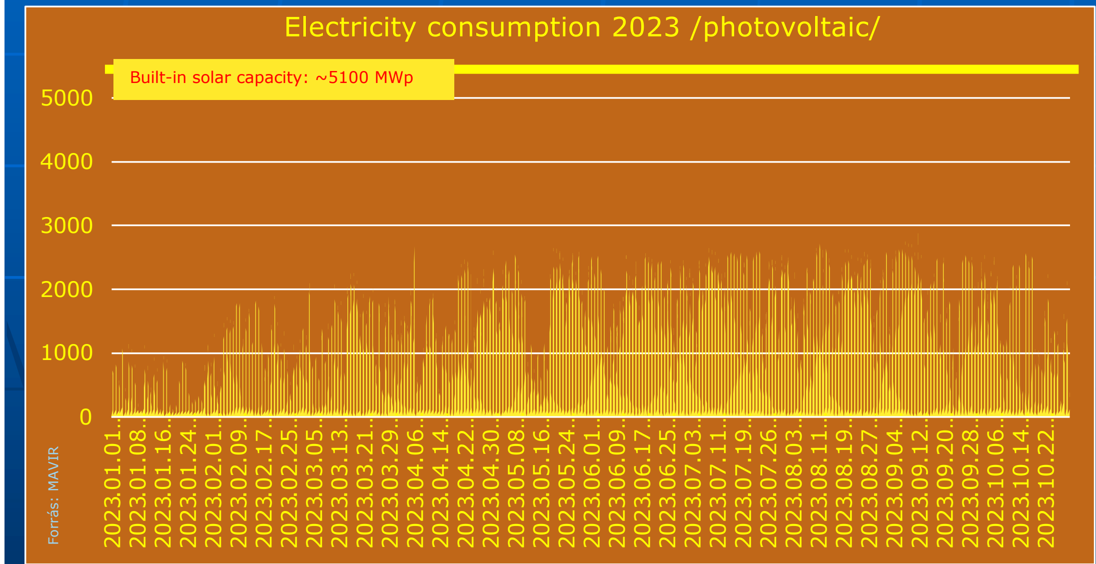
Total system load (until the end of Oct): **35,10 TWh**,
of which Nuclear: 13.32 TWh (37,9%); Gas: 5.33 TWh (15.2%); Solar: 4,08 TWh (11.6%) ; Lignite: 2,30 TWh (6.5%) Wind: 0.45 TWh (1.2%); Export-Import balance: 8,13 TWh (23,0%)

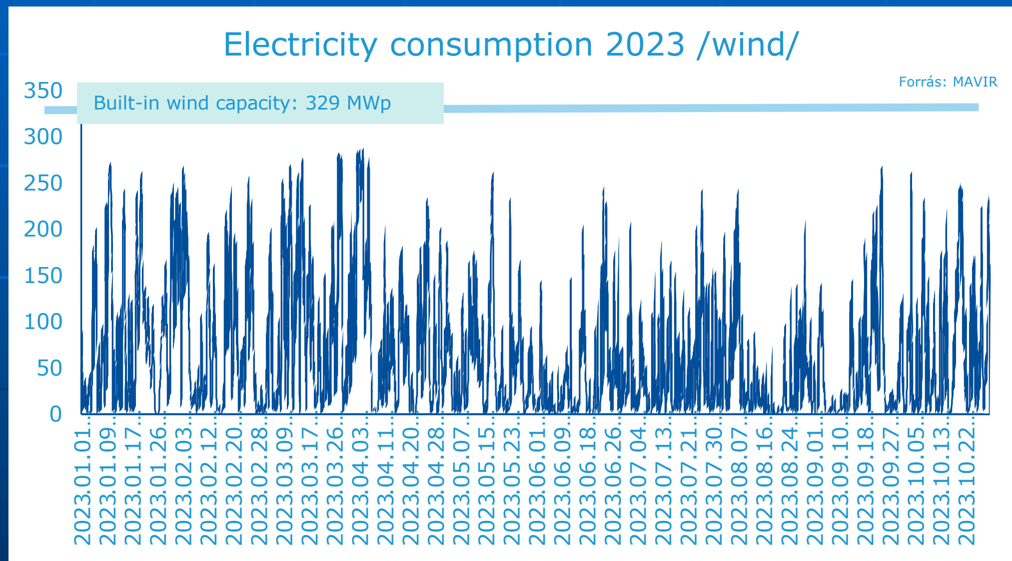
Electrical energy mix (production + import)

01 Jan –31 Oct 2023



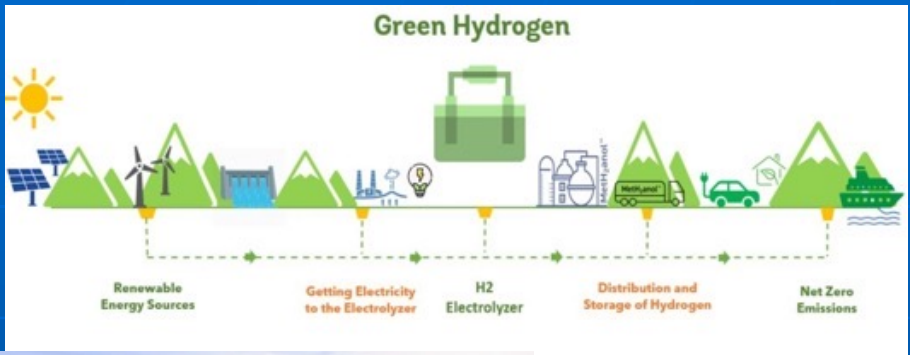
The current reliability and availability of power generation systems is still a key issue!

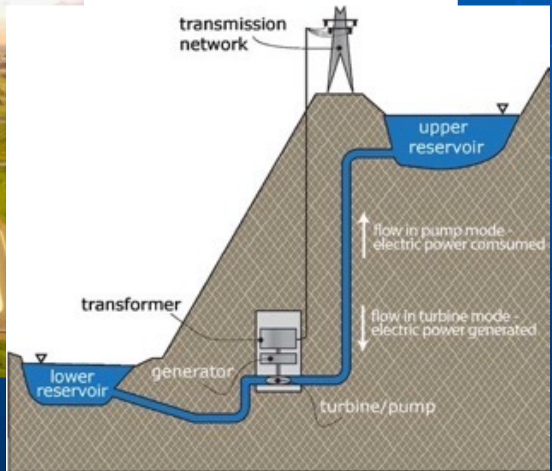


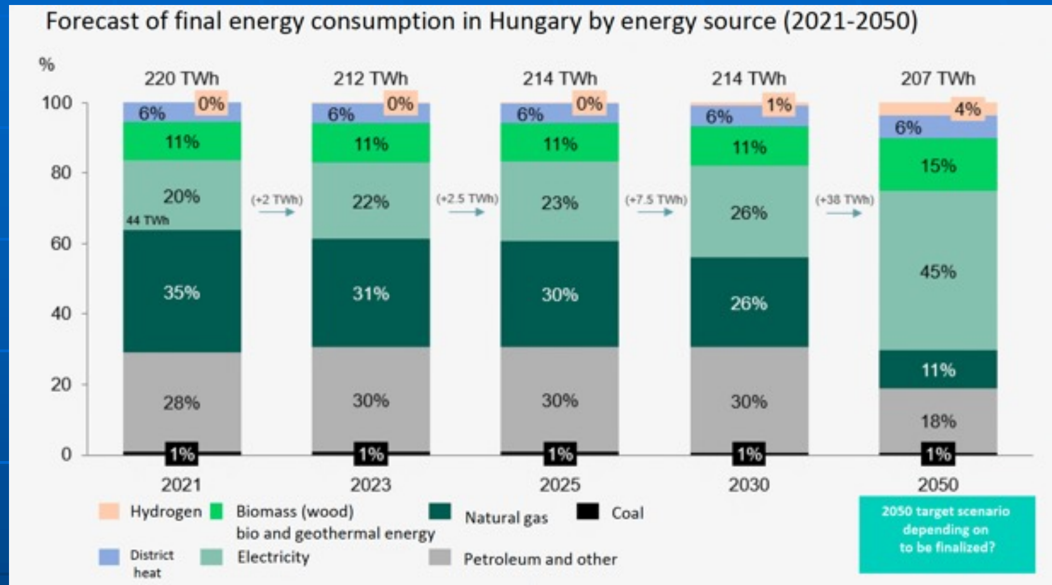


In the case of energy consumption, predictability, stability and security of supply are considering as priority! From this point of view, the price is only secondary, while from the climate protection aspect, the so-called "green approach" is only a tertiary aspect.

The long-term and high-capacity storage of electricity is a key issue for the upcoming period, so that "prosumers" shall really be actively involved in order to achieve ambitious goals.



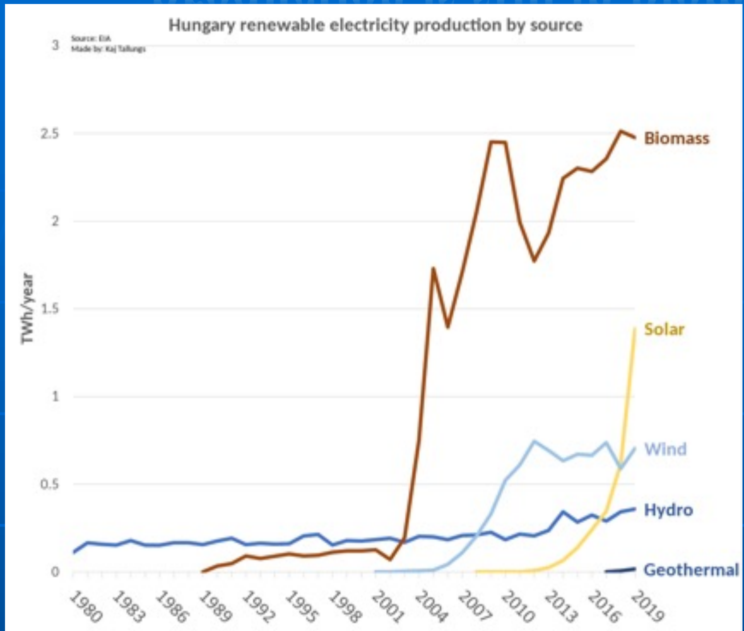


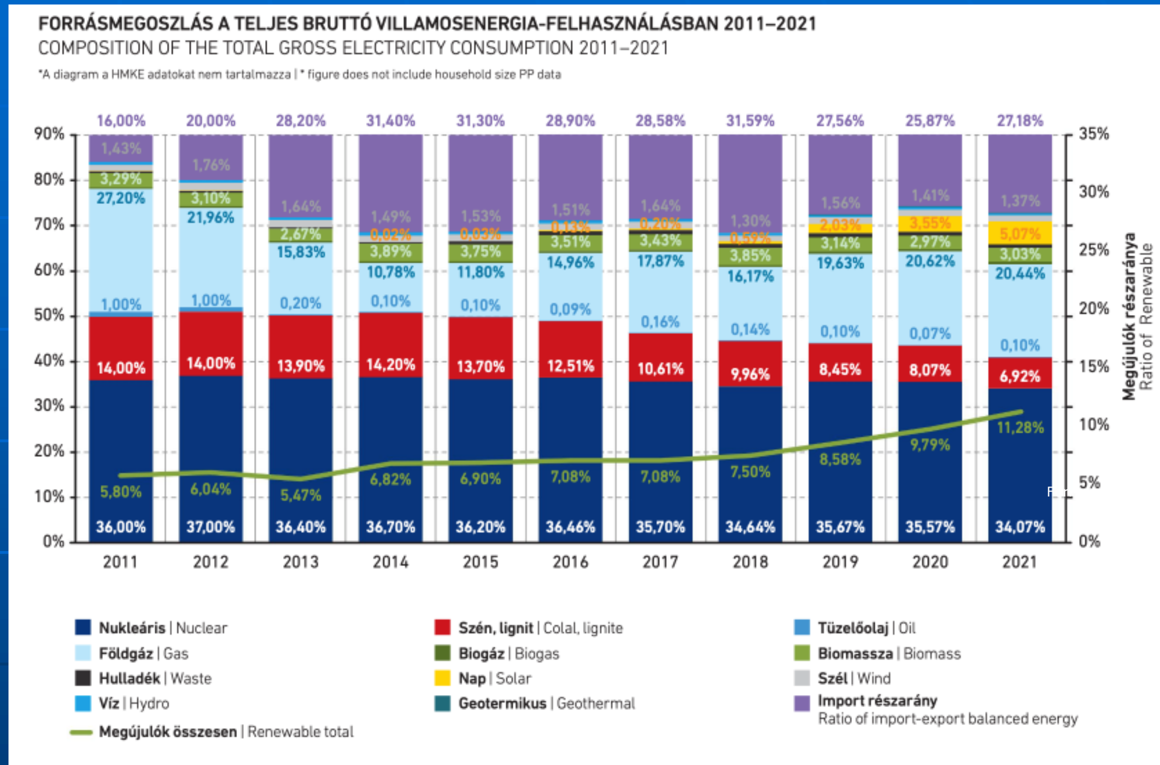


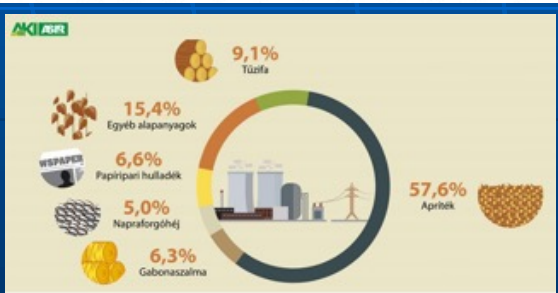
Instead of country-size storage options, **local or regional balancing storage** may be the priority until high-capacity electricity storage is solved...

We should finally give up the all-cost centralization!

In our country, the largest and fastest available renewable potential for our own electricity production is still in biomass, especially in agriculture and forestry!







Our capabilities would predestinate us much more in the direction of less weather-dependent biomass, geothermal, and only secondarly solar/wind, which are strongly seasonal-, day-night-, and weather-dependent, yet almost everyone prefers solar, even investors...

The future of domestic nuclear power plants:

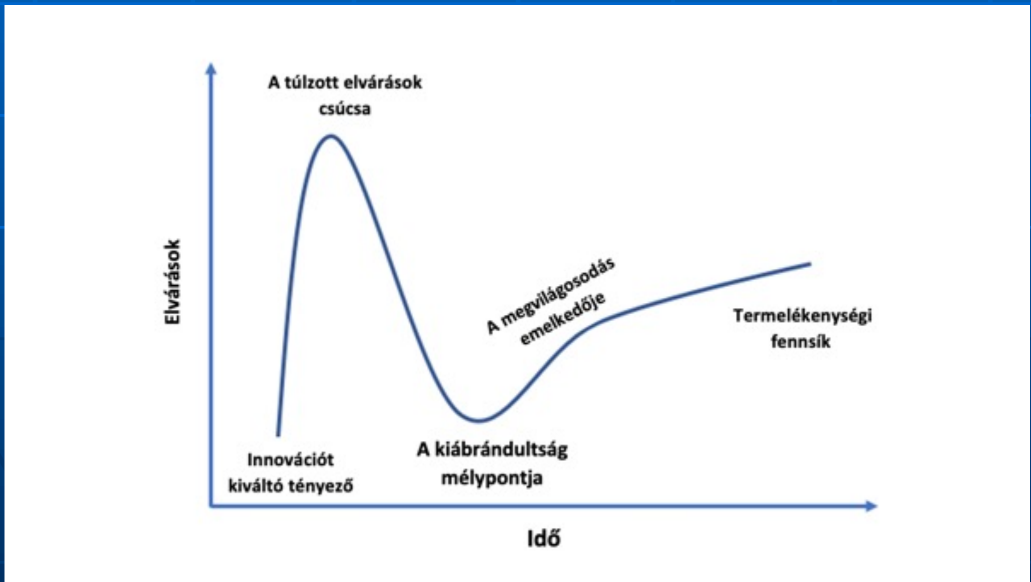
Paks1 operating time extension is already underway, but despite the promises, will **Paks2** be Russian and should it be Russian? Will there be/should there be a **3rd nuclear power plant**?

"I absolutely do not understand how Russia wants to implement nuclear power plant projects in any country in the future, if it does not currently respect basic international agreements and rules?
What was the "master plan", how did they think that the population of any country would accept a Russian-built nuclear power plant project in the future?"
/dr.prof. Attila Aszódi/

- The Paks 2 contract was signed in 2014 (almost 10 years ago!).
- According to the initial plans, first reactorblock should have been commissioned in 2026, and the second one in 2027
- Currently, only the construction of the service facilities and the "pit" is underway... (Looks, we are very active in "pit-digging")
- They are preparing to extend the operating time of Paks 1 (but at the same time all we should be aware, that it means each blocks should suspend production for one year!)
- In Europe, several countries hope the zero carbon future in the implementation of new nuclear power plants, e.g. after 18 years (!) of investment, the Finns put into operation the largest power plant block in the EU (1600 MW - Olkiluoto 3)
- At the same time, the current Hungarian government economic development plans forecast plus 50-52% increase in electricity demand.
- The majority of the country's electricity demand will permanently come from nuclear energy production, but this will still be little particularly if import avaibility might be limited...

„ Strategy does not mean planning what we will do when something happens, but **rather calculating in advance what will happen as a result of what we do...**

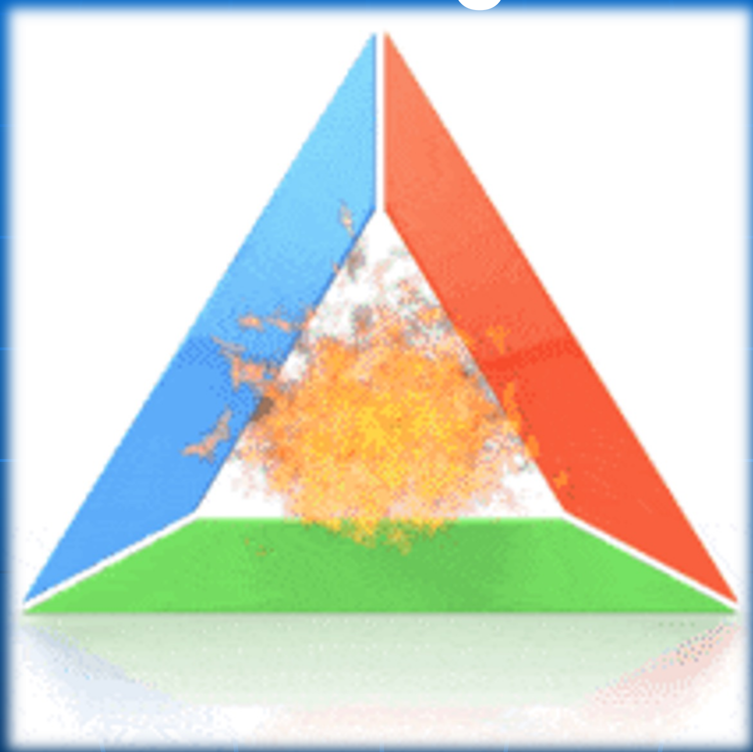
- */ Garri Kaszparov/*



„A mind is like a parachute. It doesn't work if it is not open"
/Frank Zappa/

BUT after such many negative omens that have been said, trust us that the outcome of **even basically negative things can be positive** in the end **if we are optimistic** and **arrange things in the right order**...

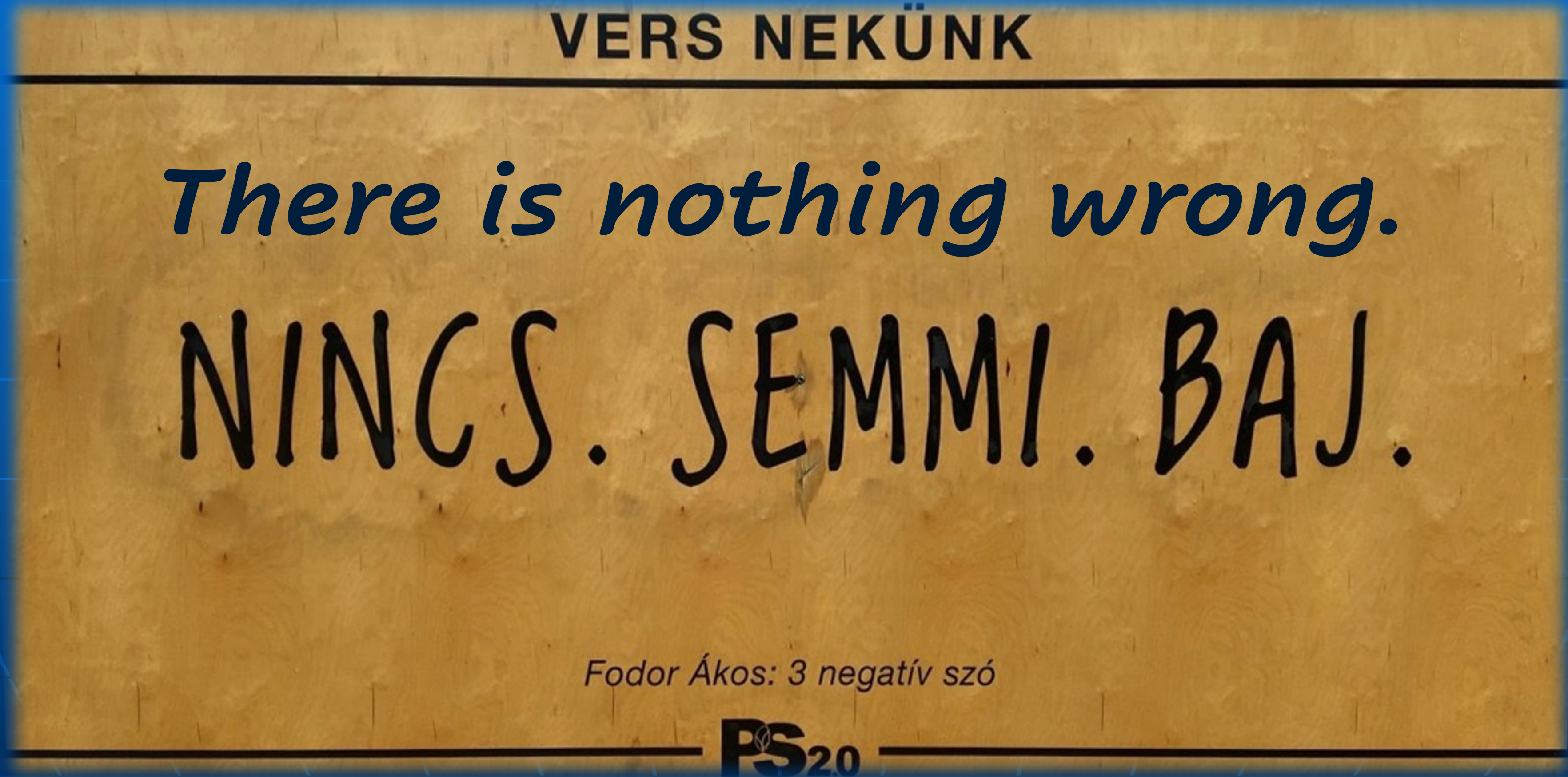
Wrong.



Nothing.

There isn't.

BUT after such many negative omens that have been said, trust us that the outcome of **even basically negative things can be positive** in the end **if we are optimistic** and **arrange things in the right order**...



„Everything will be alright in the end. If not, it's not the end yet... /John Lennon/

Thanks for your kind attention!

„Knowledge isn't free. You have to pay attention...”

aholoda@auroraenergy.hu
http://www.auroraenergy.hu