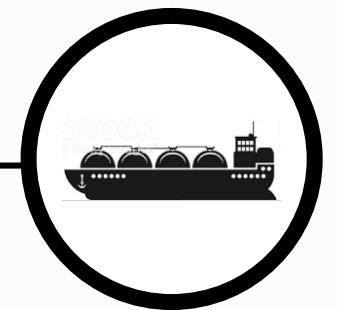


Global & Regional Market Analysis

Natural Gas

October 2021

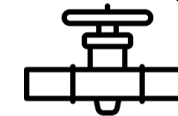
03/11/2021





Stories of the recent weeks

Aggregated gas storage level in Europe was at 77% by the end of October, well below the 5-year average, thus the continent entered the heating season with severely depleted stocks.



Results of capacity auctions suggest lower Russian exports to Europe via Ukraine, but Gazprom will start injecting to European storage sites from 8 November.



Serbia is negotiating a new gas deal with Russia as the current one expires this year, elsewhere according to German government left the certification of Nord Stream 2 decision up to the country's regulator.



Moldova was in a state of emergency, then agreed with Russia on a new gas deal, meanwhile Romania and Croatia introduced temporary price caps, and so far a dozens of UK and one Czech energy suppliers defaulted.

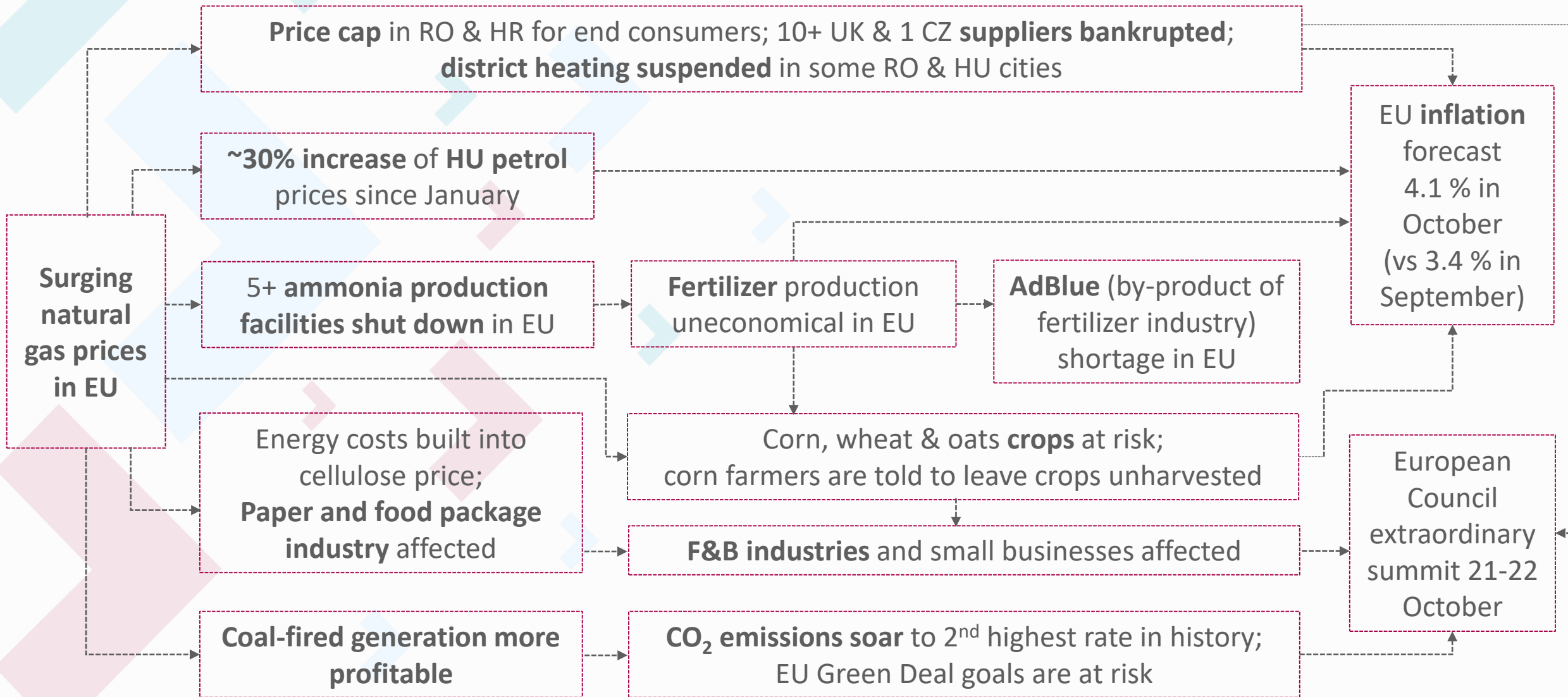


As a reflection to European energy crisis, the European Commission released the EU toolbox, which offers short term and mid term proposals to mitigate the effects without endangering green transition goals (e.g. voluntary joint gas purchase).



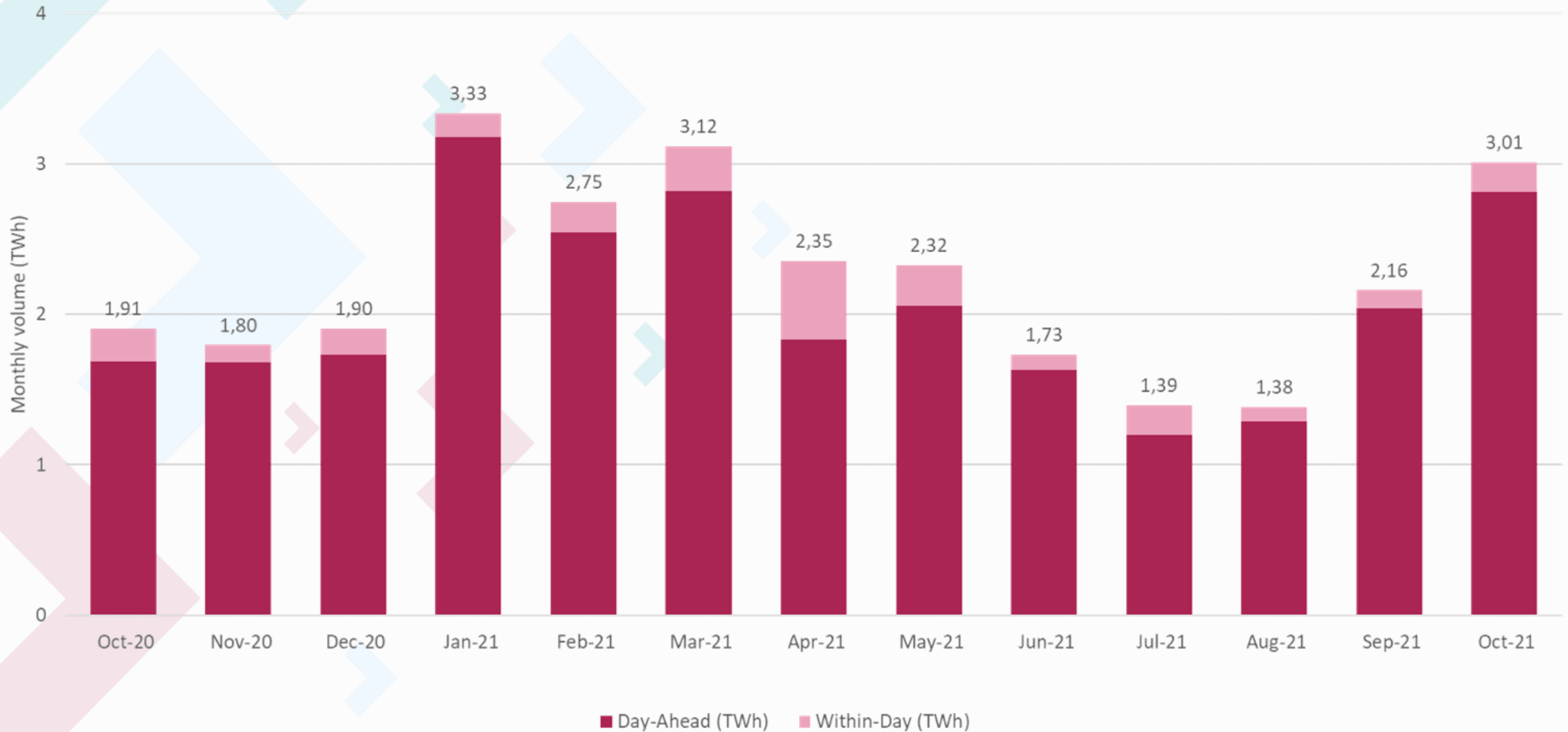
Effects of the energy crisis

Sources: Balkan Energy, Bloomberg, EC, enmacc, Euractiv, euronews, G7, HVG, ICIS, NAV, oilprice, Platts, Portfolio, VG



CEEGEX monthly traded volumes

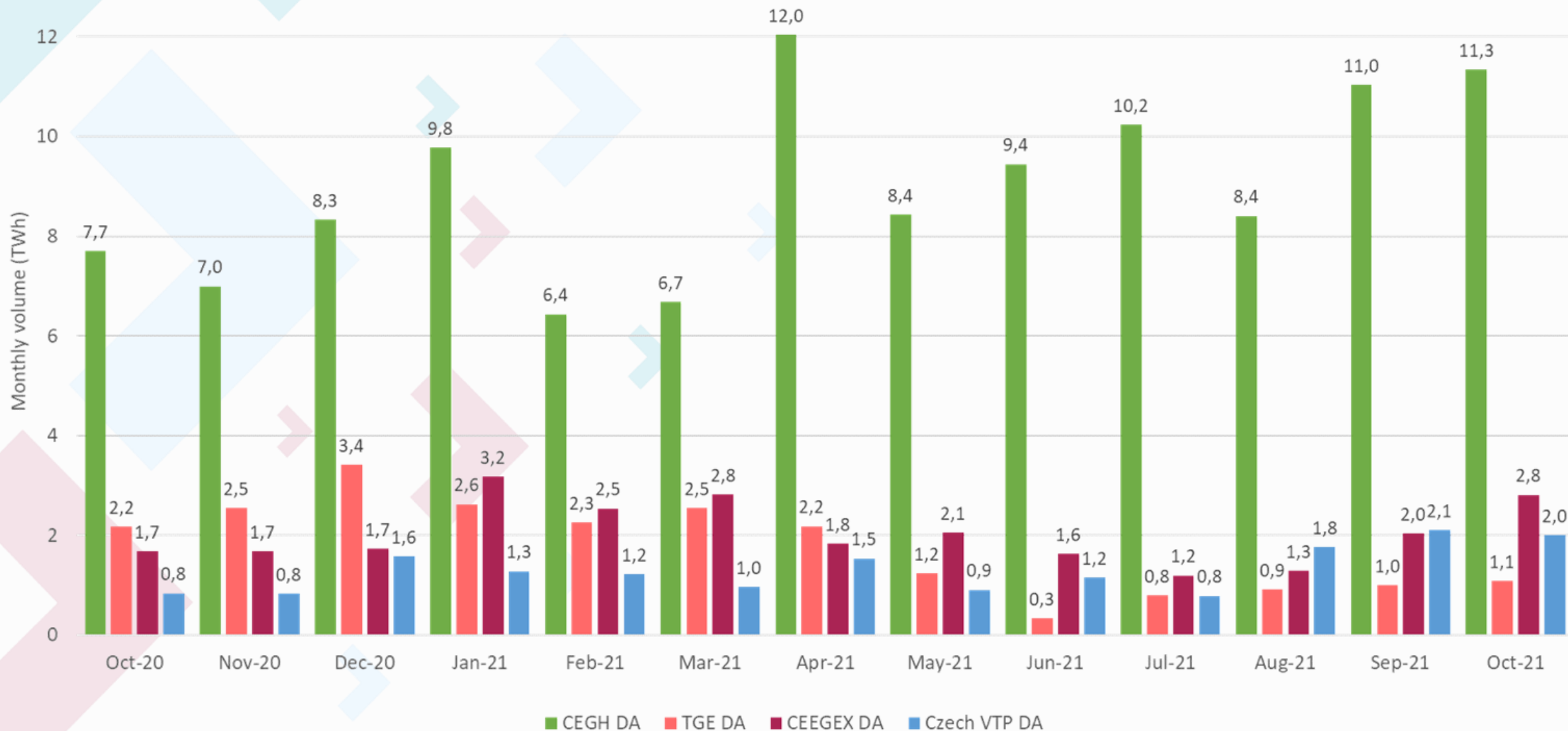
Source: CEEGEX



Disclaimer: This document contains analyst opinions, which don't necessarily represent the official views of HUPX Group or any of its subsidiaries.

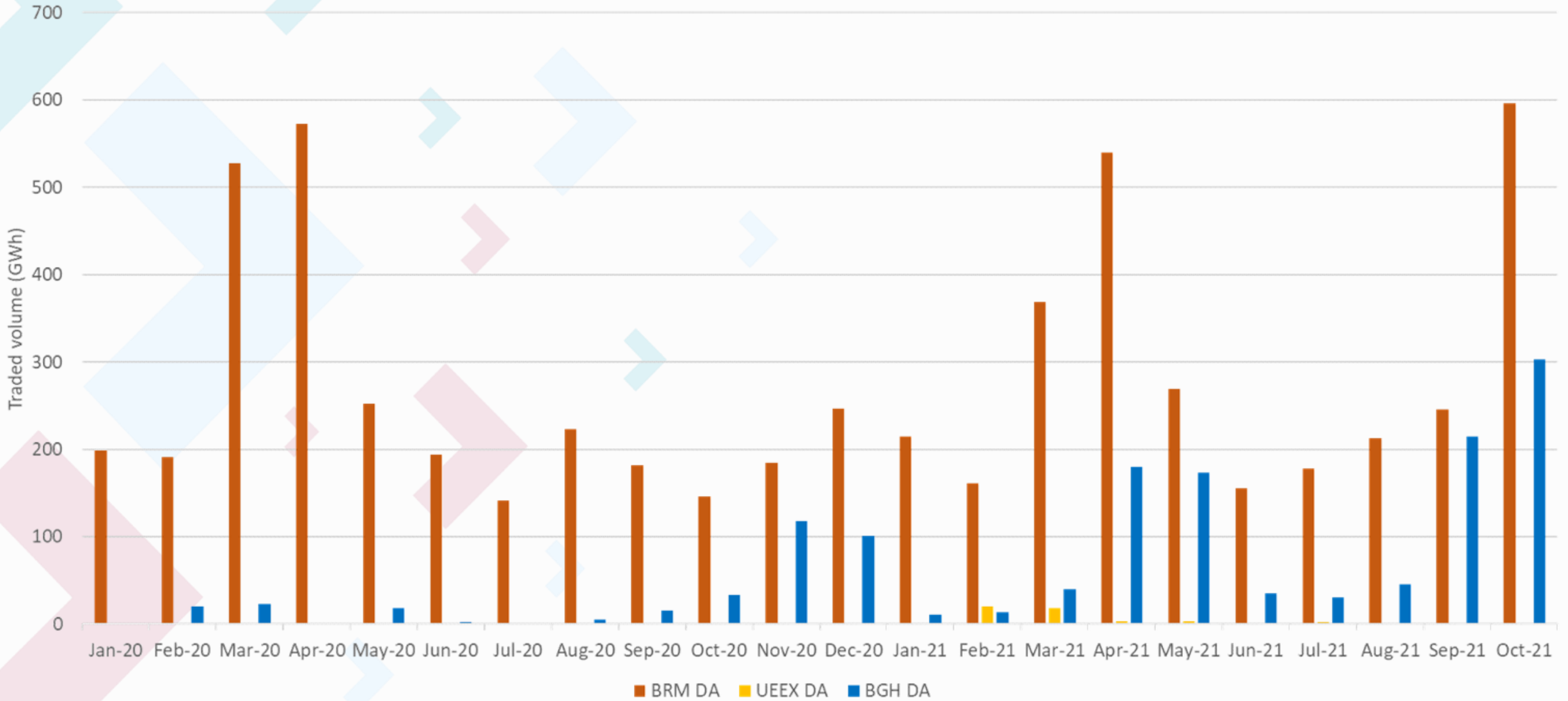
Regional Day-Ahead traded volumes

Source: CEEGEX, EEX, TGE



Eastern Europe Day-Ahead traded volumes

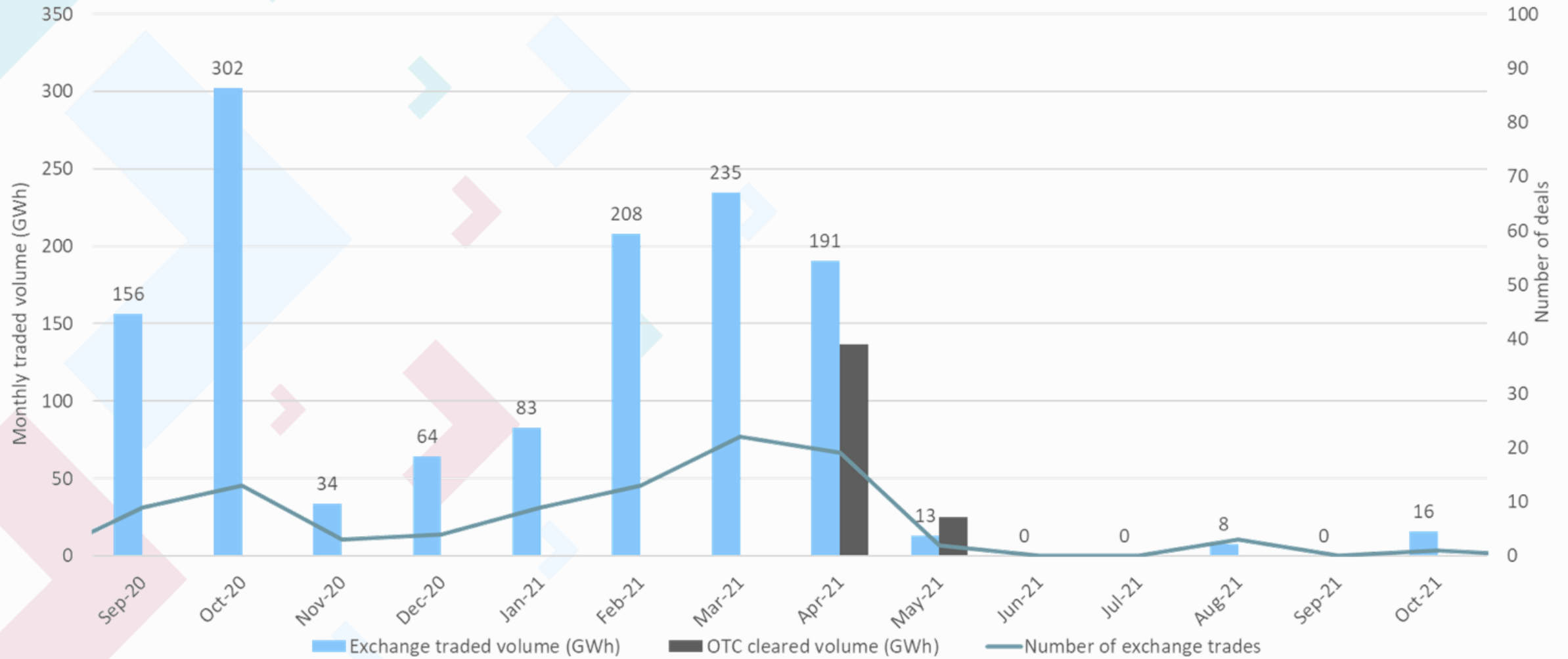
Source: BRM, UEEX, BGH



Disclaimer: This document contains analyst opinions, which don't necessarily represent the official views of HUPX Group or any of its subsidiaries.

HUDEX Natural Gas Segment

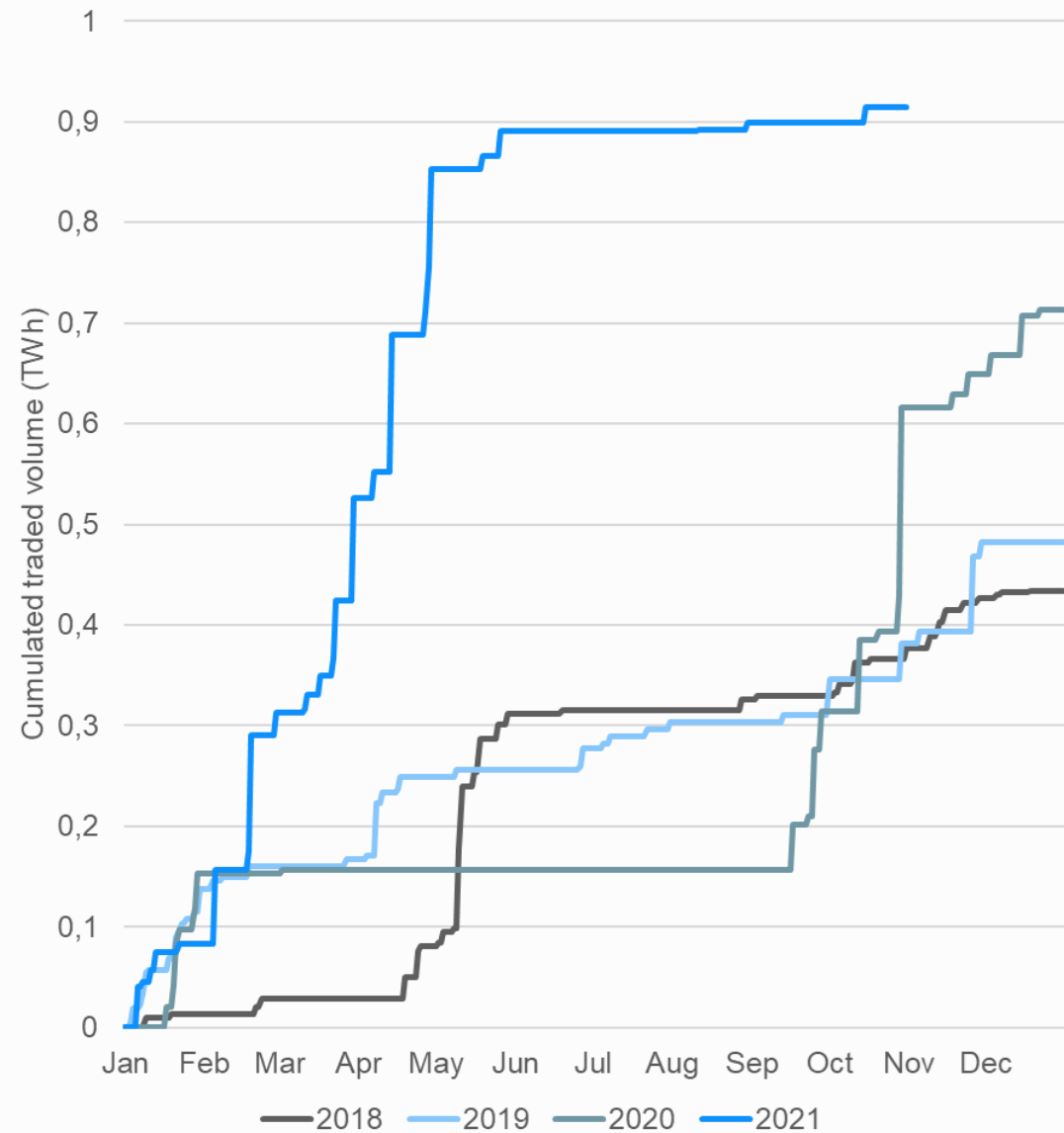
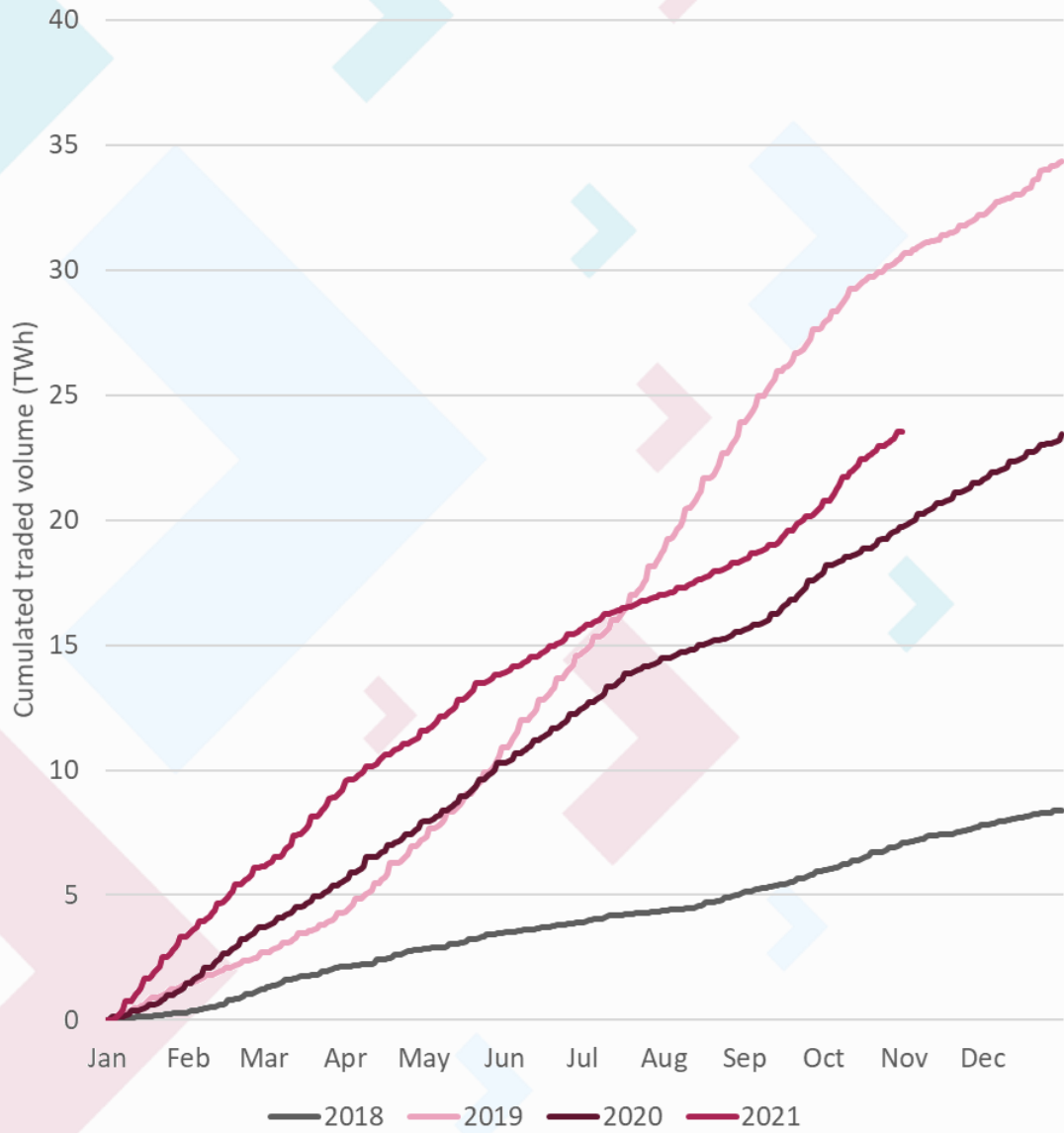
Source: HUDEX



Disclaimer: This document contains analyst opinions, which don't necessarily represent the official views of HUPX Group or any of its subsidiaries.

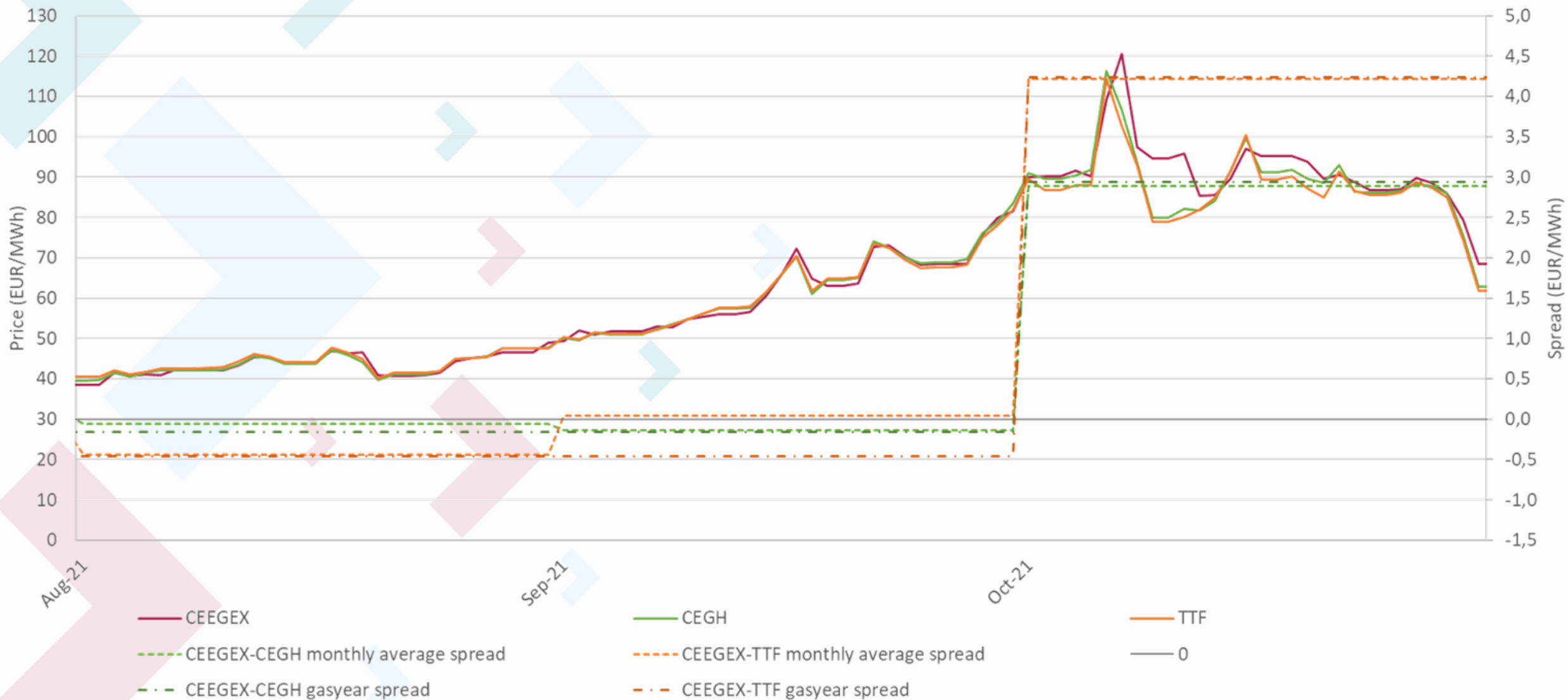
CEEGEX and HUDEX Natural Gas cumulative annual volumes

Source: CEEGEX, HUDEX



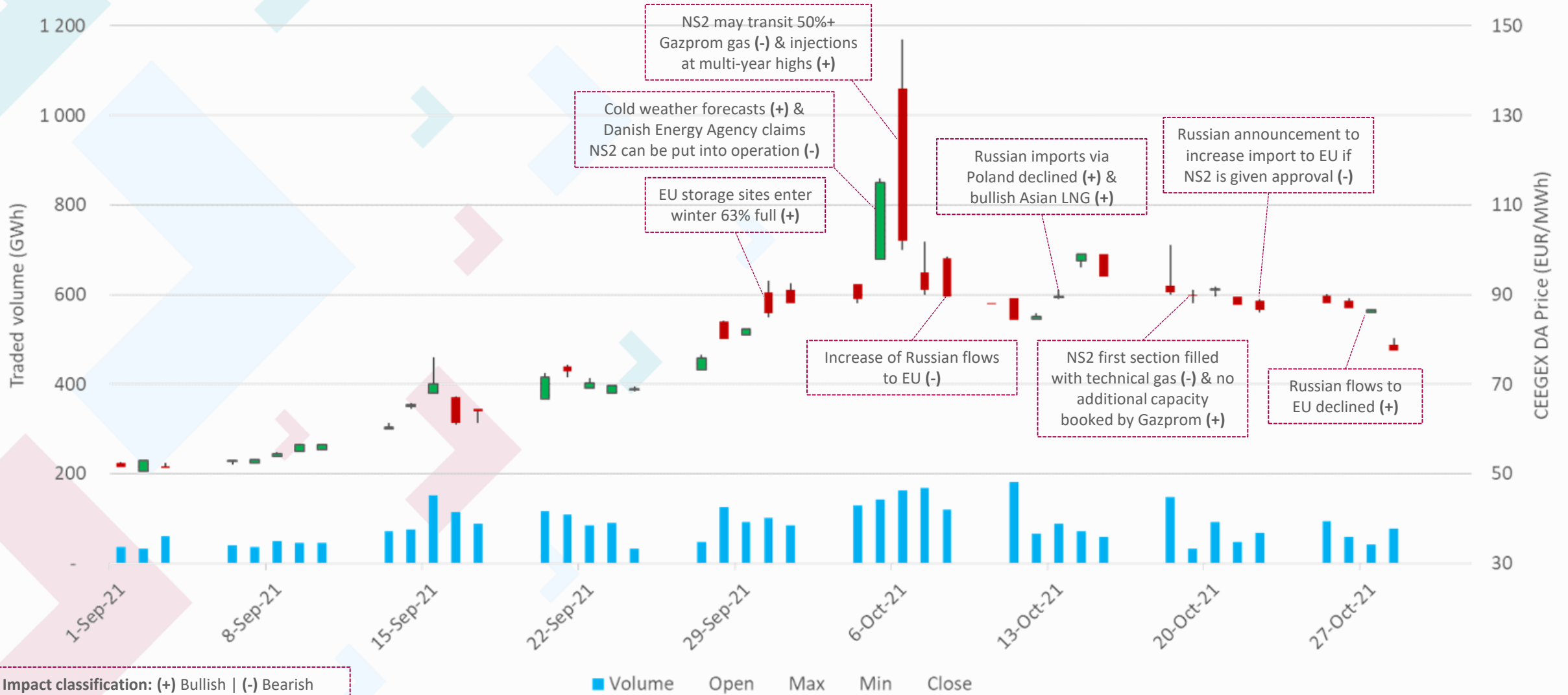
Reference price movements in the last 3 months

Source: CEEGEX, EEX



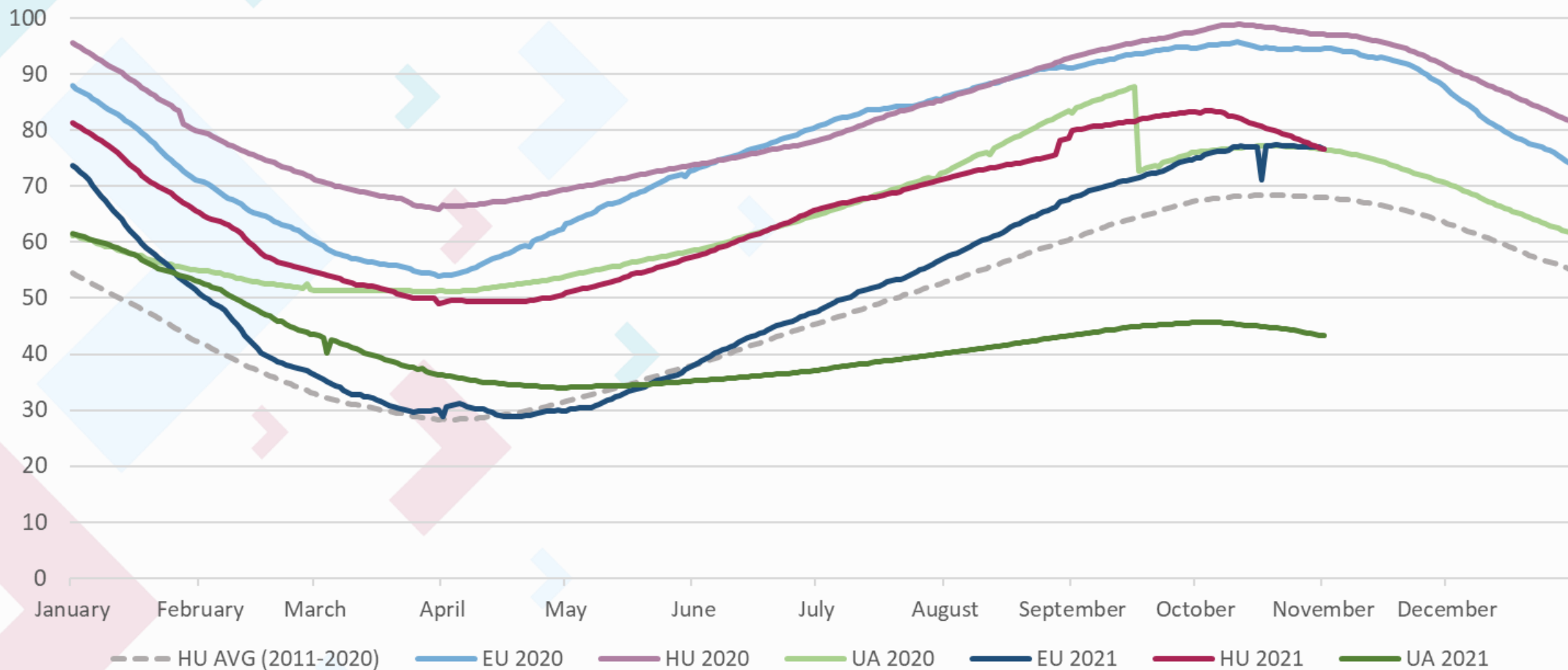
Japanese candles and possibly related news

Source: CEEGEX, ICIS, Argus



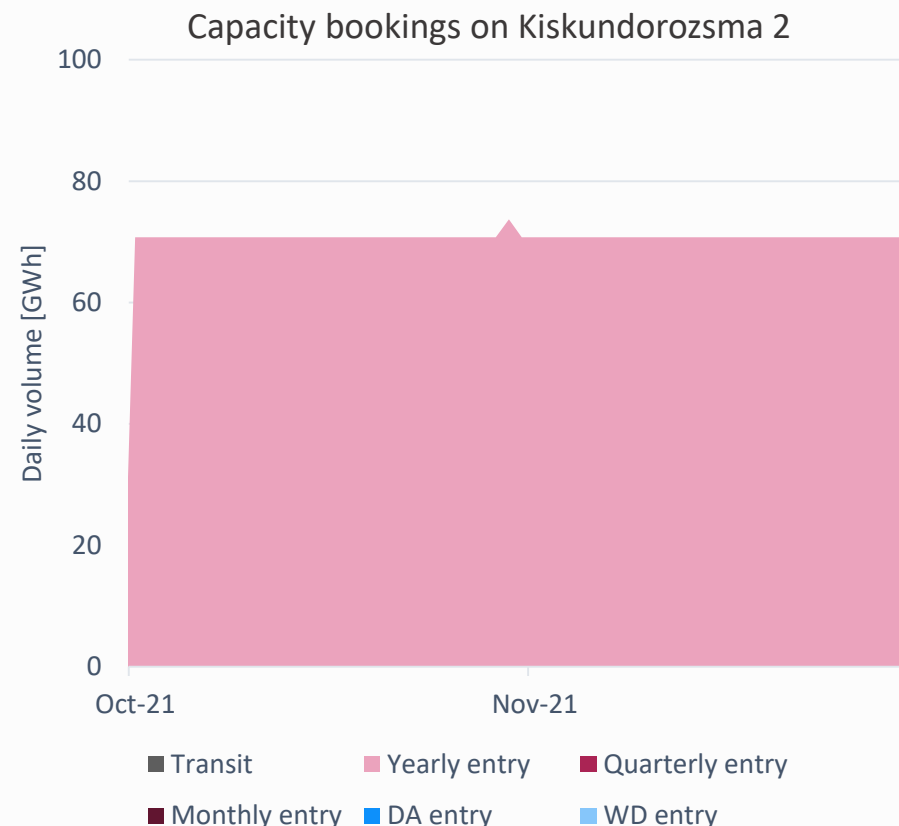
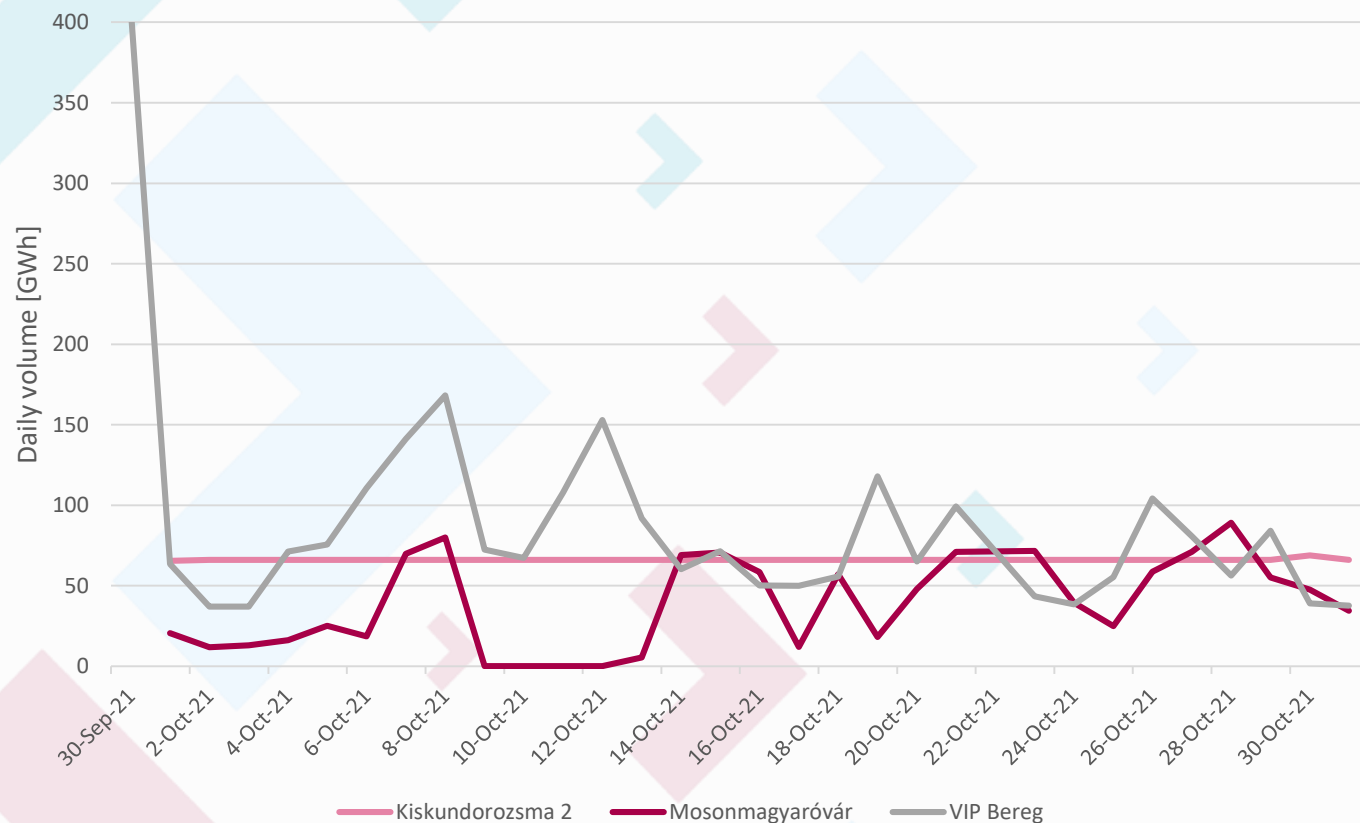
Regional storage levels

Source: AGSI



1st month of the new Hungarian-Russian gas deal

Source: FGSZ, RBP



After the new agreement came into force, the volumes delivered via VIP Bereg were immediately reduced and Kiskundorozsma 2 started to operate. From the southern route Hungary is receiving a relatively stable flow with daily 66 GWh. This means that currently 2.26 bcm is booked of the 3.5 bcm annual southern volumes. From this volume we can guess the minimum take-or-pay volume of the deal, however this is likely to be even less as Croatia also buys 1 bcm of gas per year from Russia via Hungary, which presumably comes also via this route. It is not yet clear whether the remaining volumes will be delivered through short-term capacity bookings.

Nord Stream 2 pipeline capacity

Source: CEEGEX, NS2 AG, EEX

From the news: Filling the first of the two lines of Nord Stream 2 has begun (and then completed)

Question: How much gas is necessary to reach the operational pressure?

MAIN PARAMETERS OF THE PIPELINE



1200 km



1.153 m



10 °C



Start: 220 bar

End: 106 bar

Average: 163 bar

Volume

UNIVERSAL PARAMETERS

- Gas constant
- Mass of 1 mole in case of methane

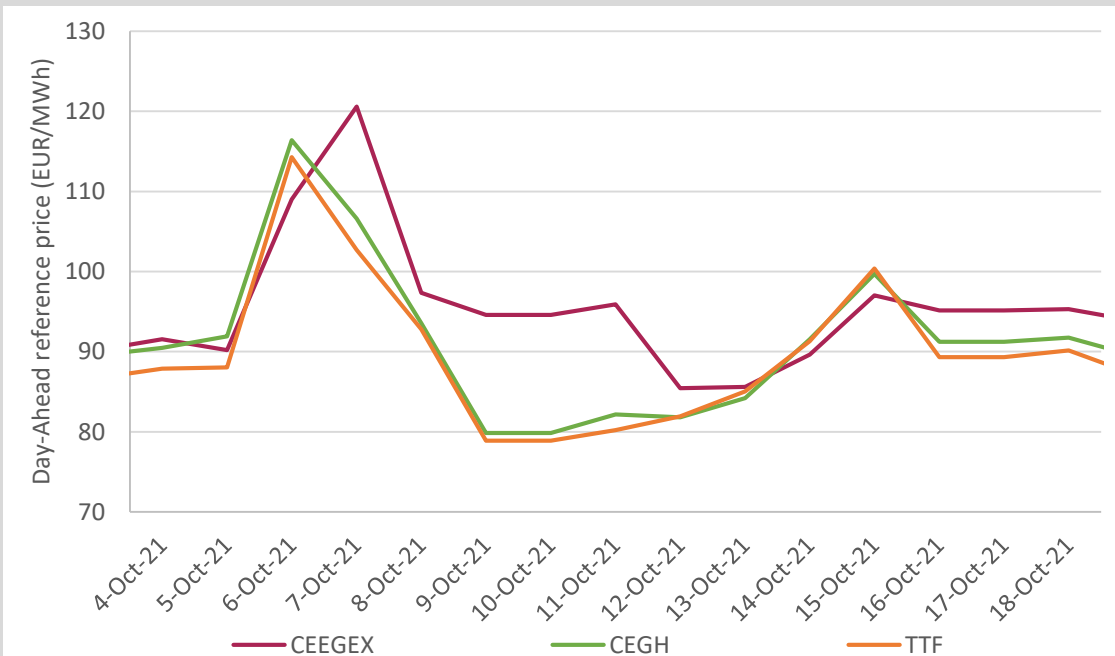
IDEAL GAS EQUATION

$$p \cdot V = n \cdot R \cdot T$$

pressure — p — volume — V — gas constant — R — number of moles — n — temperature — T

RESULT 202 mcm, 2 TWh

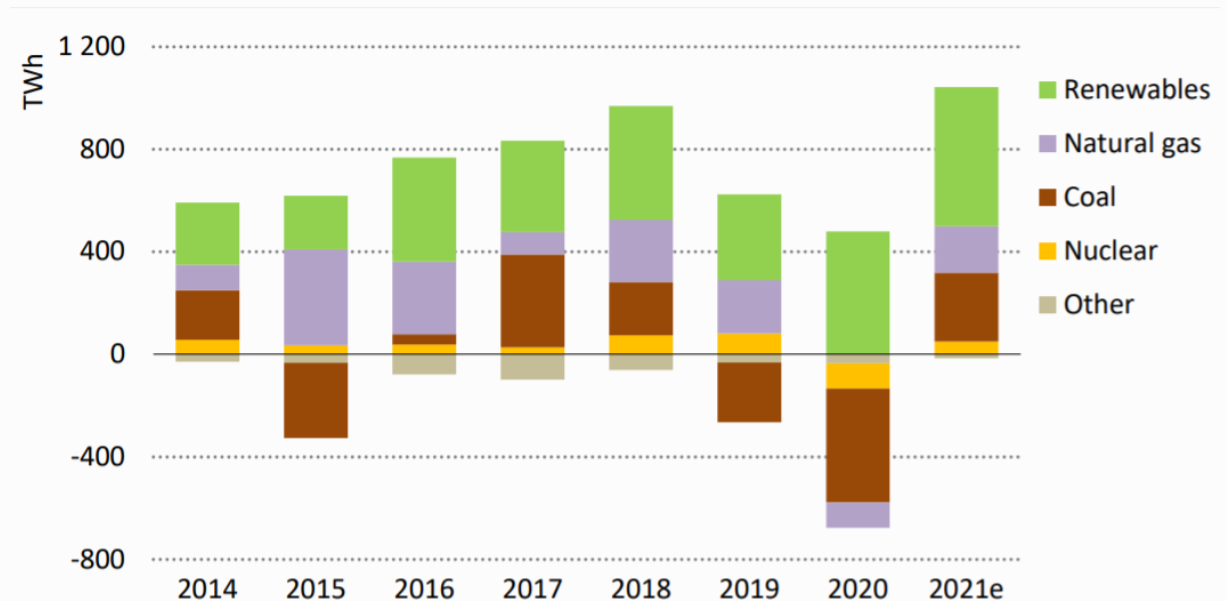
Affect on markets – filling period: 4-18 October



Natural gas demand and supply changes in 2020-2021

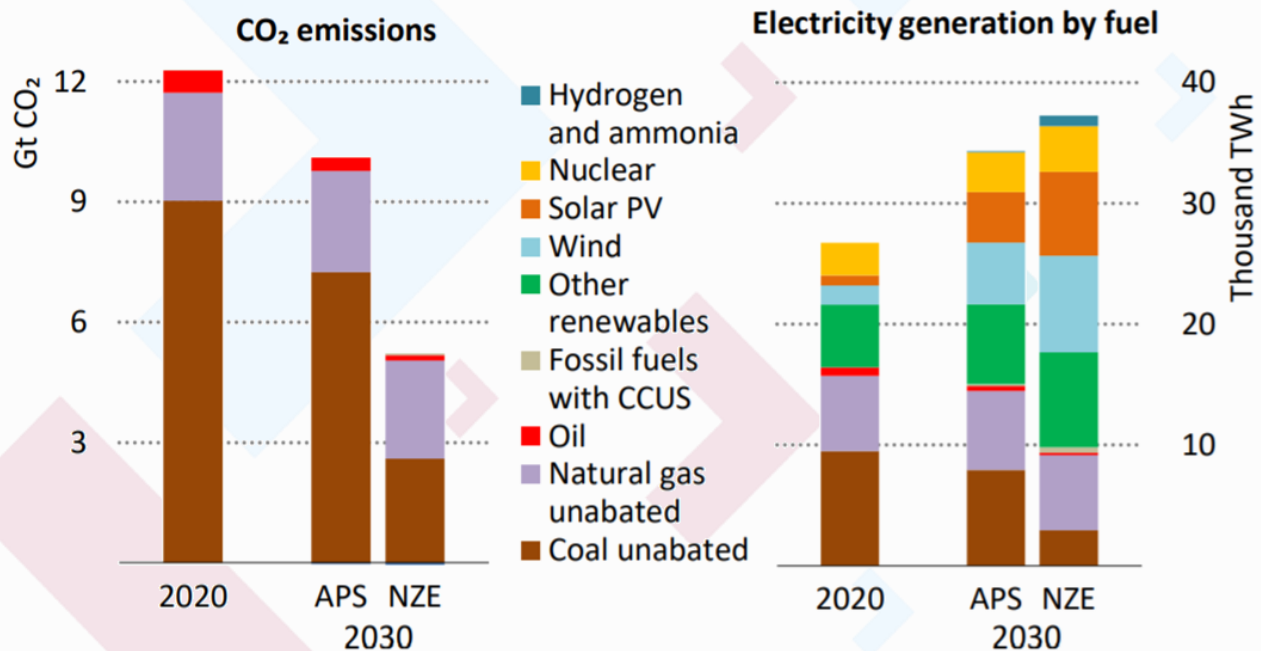
- **Natural gas demand** in 2021 is rising well above pre-pandemic levels.
- Contributing to a spike in gas prices in Q3 2021 fed into **higher wholesale electricity prices**.
- Weather-related factors: **extended heating season** and **low wind generation** in Europe, **limited hydropower** production in Brazil and **heatwaves** in Asia
- **Exporters in Russia and Central Asia** bore the brunt of the demand slump in 2020 and are capturing some of the rebound in 2021, mostly via increased pipeline deliveries.
- **LNG supply** saw less downside in 2020 and continues to see a steady **increase**.
- **Asian countries** now account for **nearly three-quarters** of global **LNG imports**.

Change in global electricity generation, 2014-2021



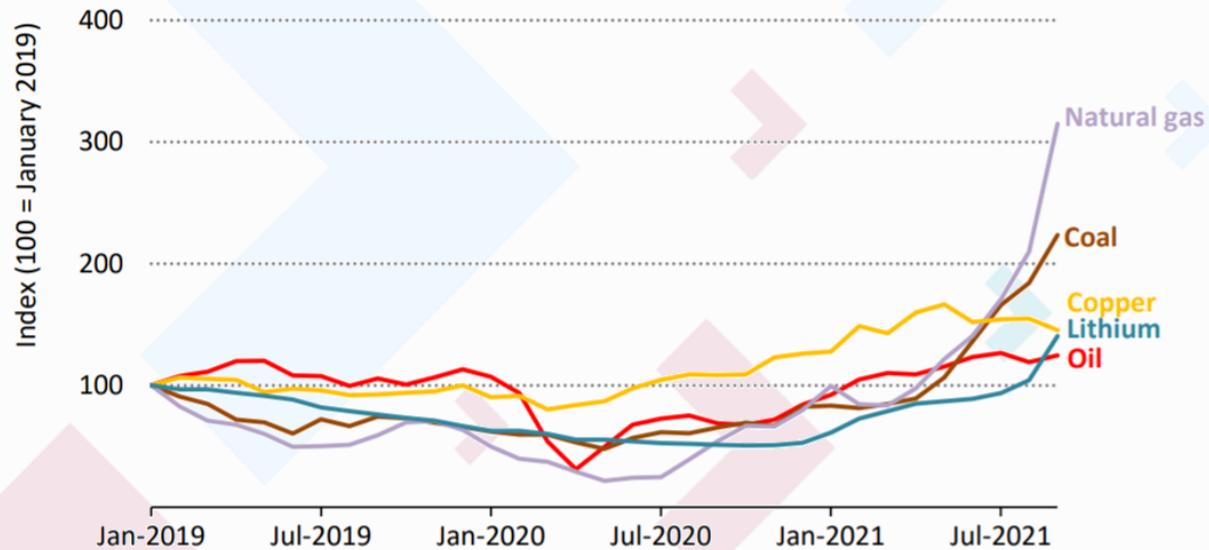
Carbon emission scenarios 2020-2030

Global electricity sector CO₂ emissions and generation by source in the Announced Pledges and Net Zero Emissions by 2030 scenarios



- **Global CO₂ emissions** from electricity generation increased by **9% over** the last decade.
- The **electricity sector** was responsible for **12.3 Gt CO₂ emissions** in 2020.
- **Natural gas was the second largest source** of both electricity and CO₂ emissions in the sector.
- Clean electricity transitions accelerate in the APS, though **unabated fossil fuels** are only **cut by 10%** to 2030, leaving a 5 Gt emissions gap with the NZE.
- The growth of renewables in the APS drives down emissions in part by **reducing natural gas-fired** generation by **20%** from 2020 to 2030, this is 30% reduction in the NZE.
- In emerging market and developing economies, unabated **natural gas-fired** generation **increases by about one-third** to 2030 in both the APS and NZE.

Monthly price indicators for selected commodities



- The **economic recovery** in 2021 has tightened commodity markets and put sharp **upward** pressure on **prices**.
- The IEA has highlighted the importance of **copper, lithium, nickel, cobalt** and rare earth elements to a secure and rapid transformation of the global energy sector, pointed to a looming **mismatch between** the world's strengthened **climate ambitions** and the **availability of critical minerals**.
- The impact of changes in the energy sector on **consumers** is naturally a matter of **political concern**, especially when it comes to **lower income households** and certain energy-intensive industries and level of **carbon pricing**.
- Natural gas: in **Europe**, near-term prices are buoyed somewhat by headwinds **facing competing sources**, with the **retirement of coal and nuclear plants**.