

European Gas & Electricity Market Volatility

National Association of Regulatory
Utility Commissioners (NARUC)

Natural Gas & International Relations
Committees

January 24, 2022

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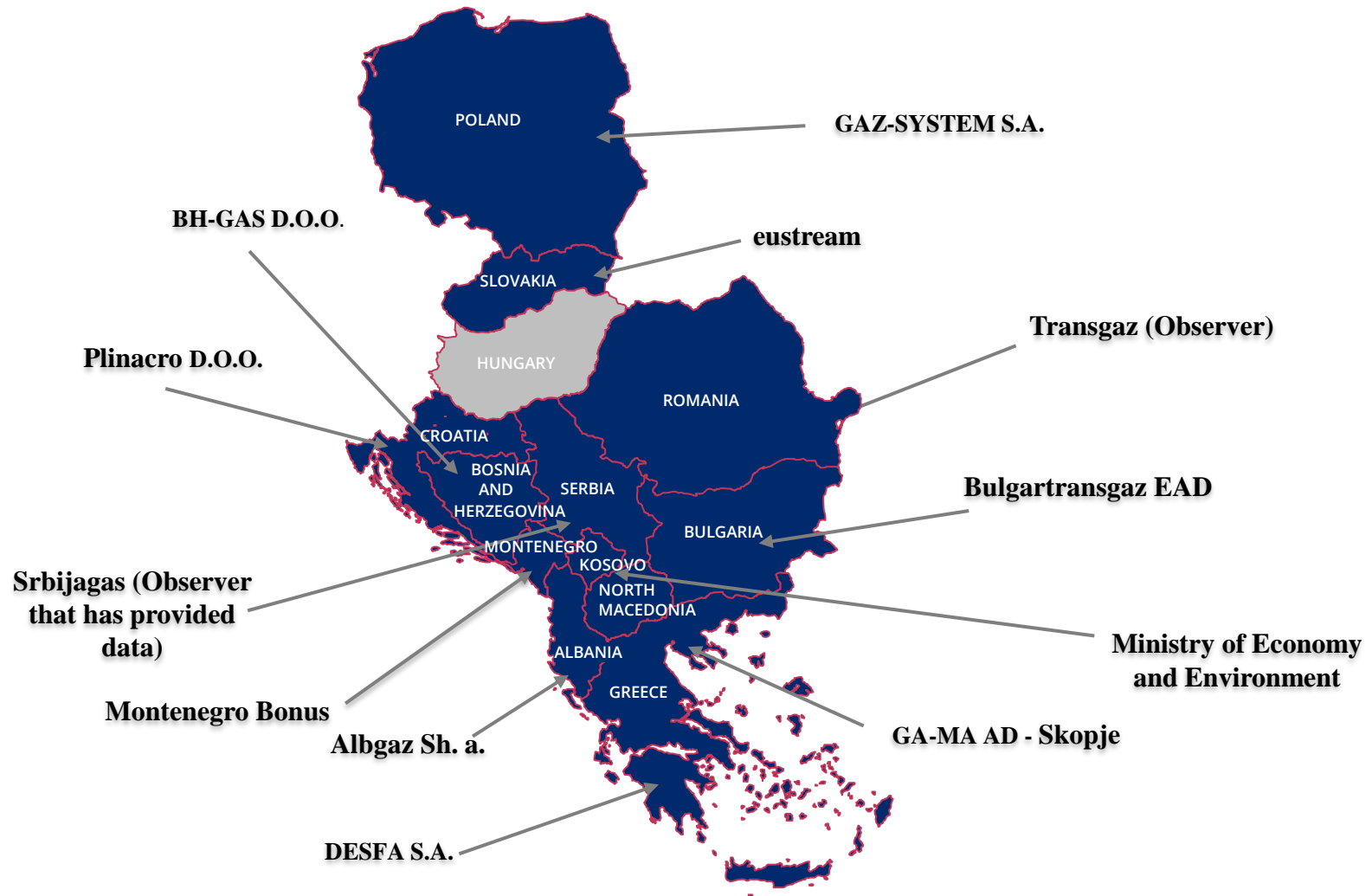
USEA's mission has two pillars of equal importance:

USEA serves as a resource, by convening energy stakeholders to share policy, scientific, and technological information to foster the advancement of the entire energy sector.

Internationally, USEA promotes energy development by expanding access to safe, affordable, sustainable, and environmentally acceptable energy in partnership with the U.S. Government.



Eastern Europe Natural Gas Partnership Members





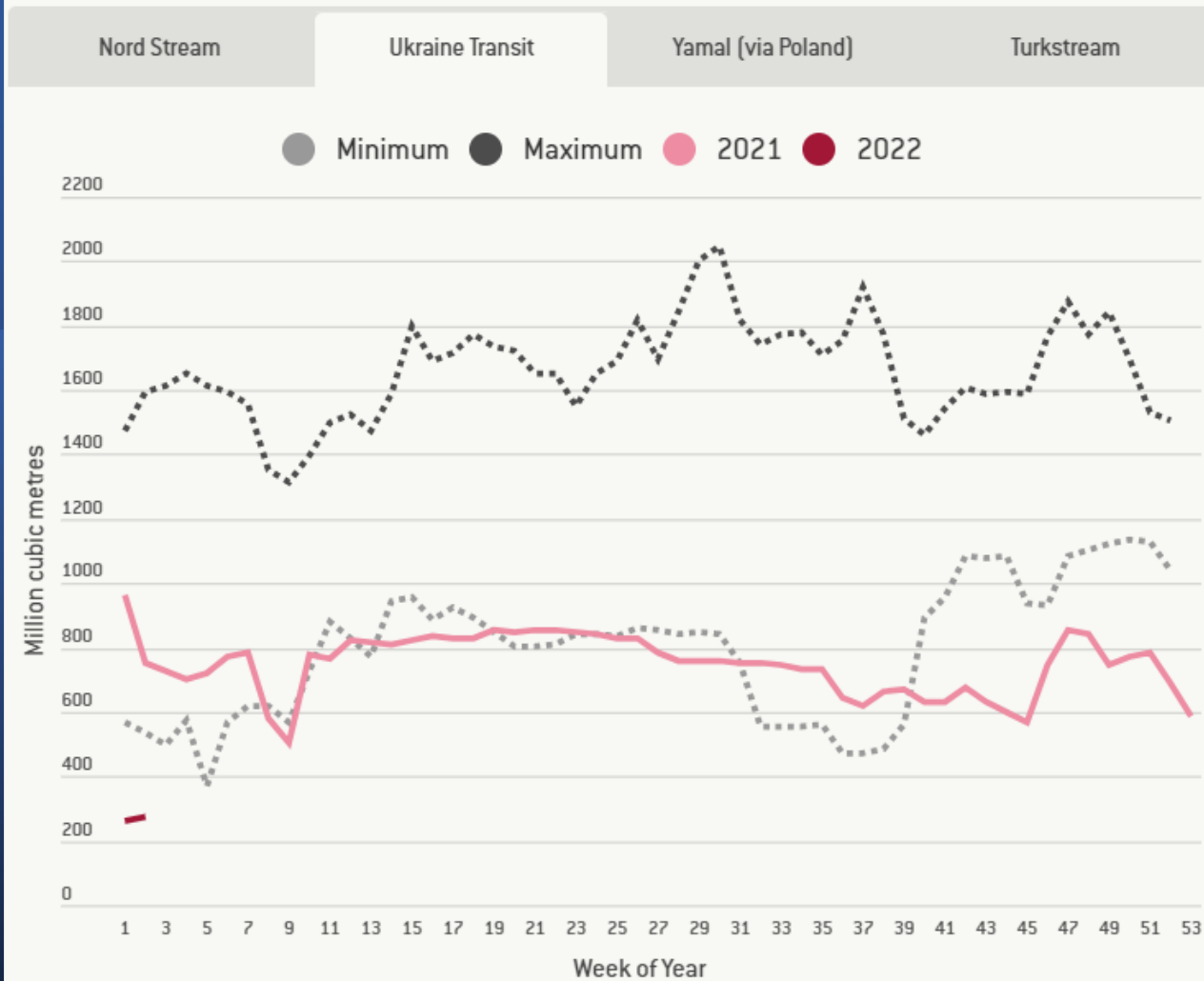
What is Driving Volatility?

- Higher energy demand
- European wind drought
- Reduced base load capacity
- Planned and unplanned generation outages
- Strong Asian natural gas demand
- Natural gas market manipulation

European Gas Import Routes

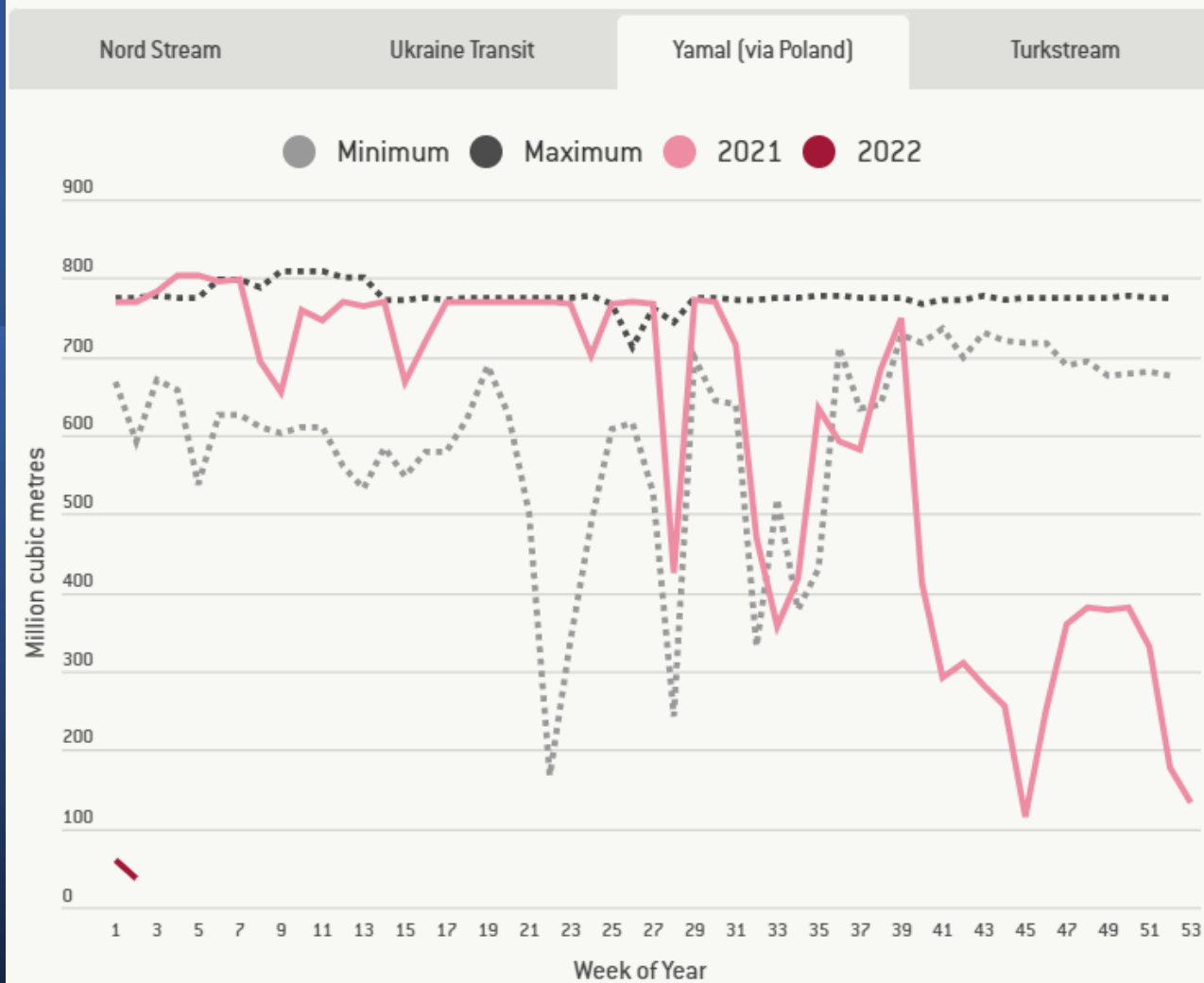


Ukraine Transit to Europe



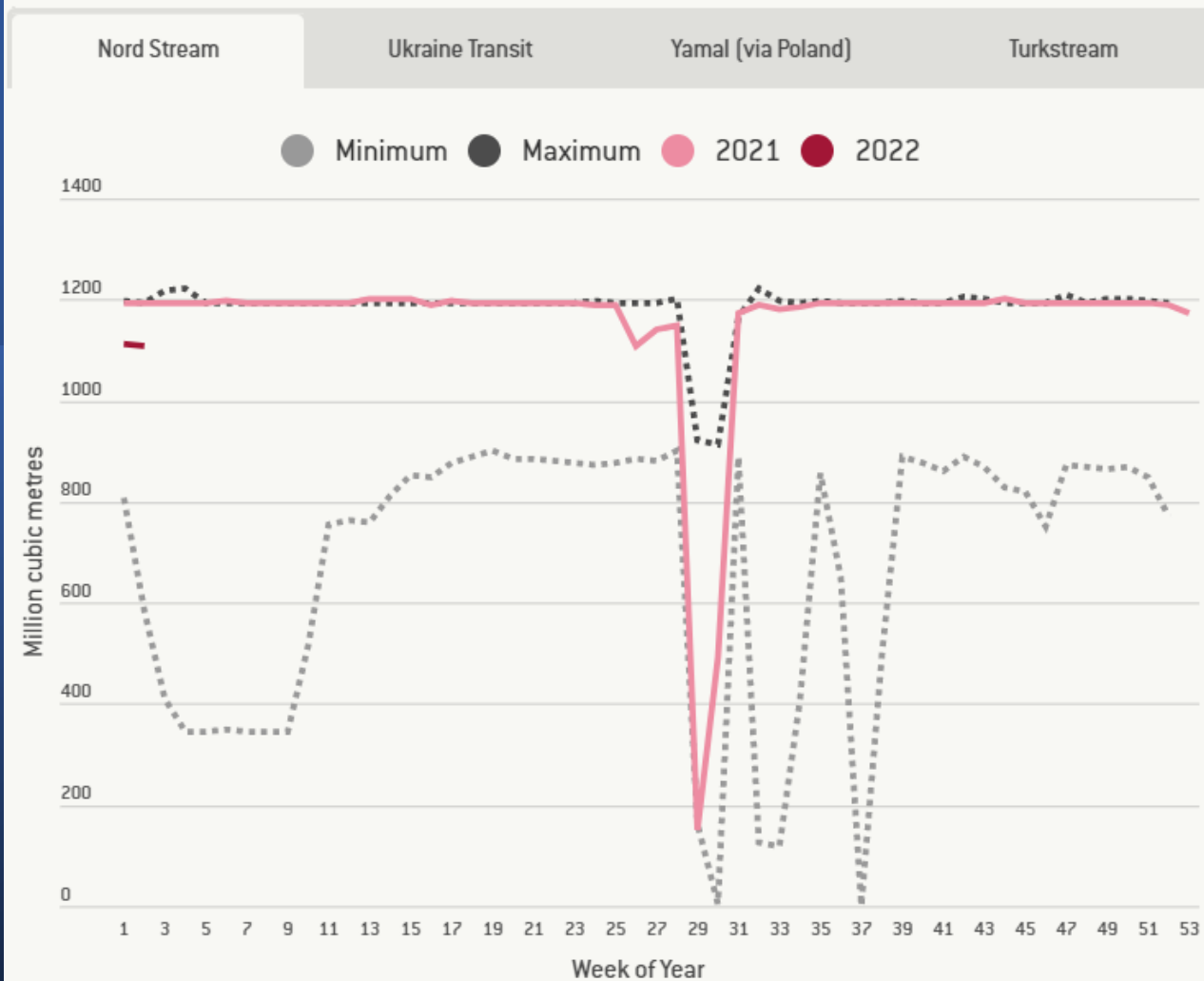
Source: ENTSO-G

Yamal (Poland) Transit to Europe

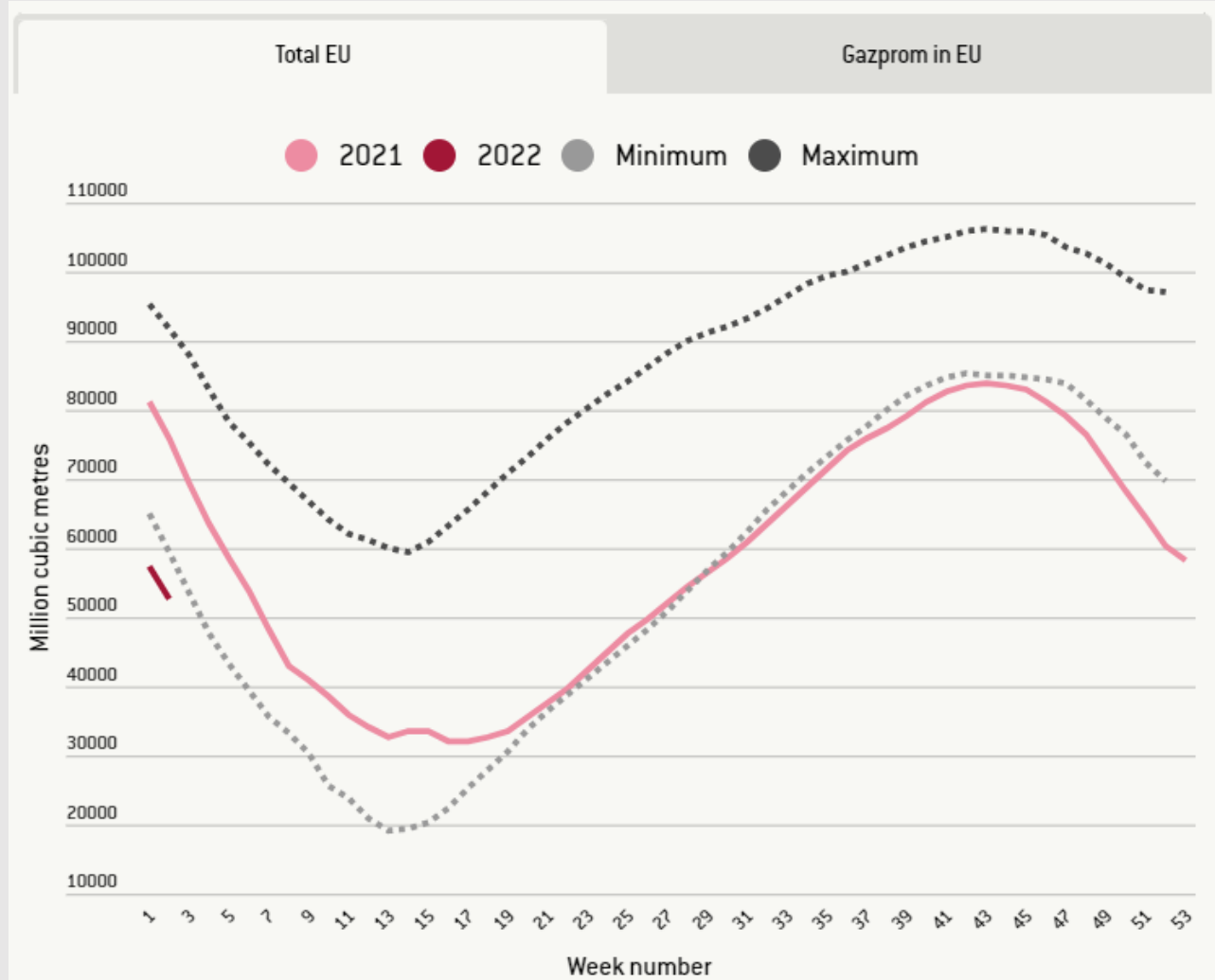


Source: ENTSO-G

Nordstream I Transit

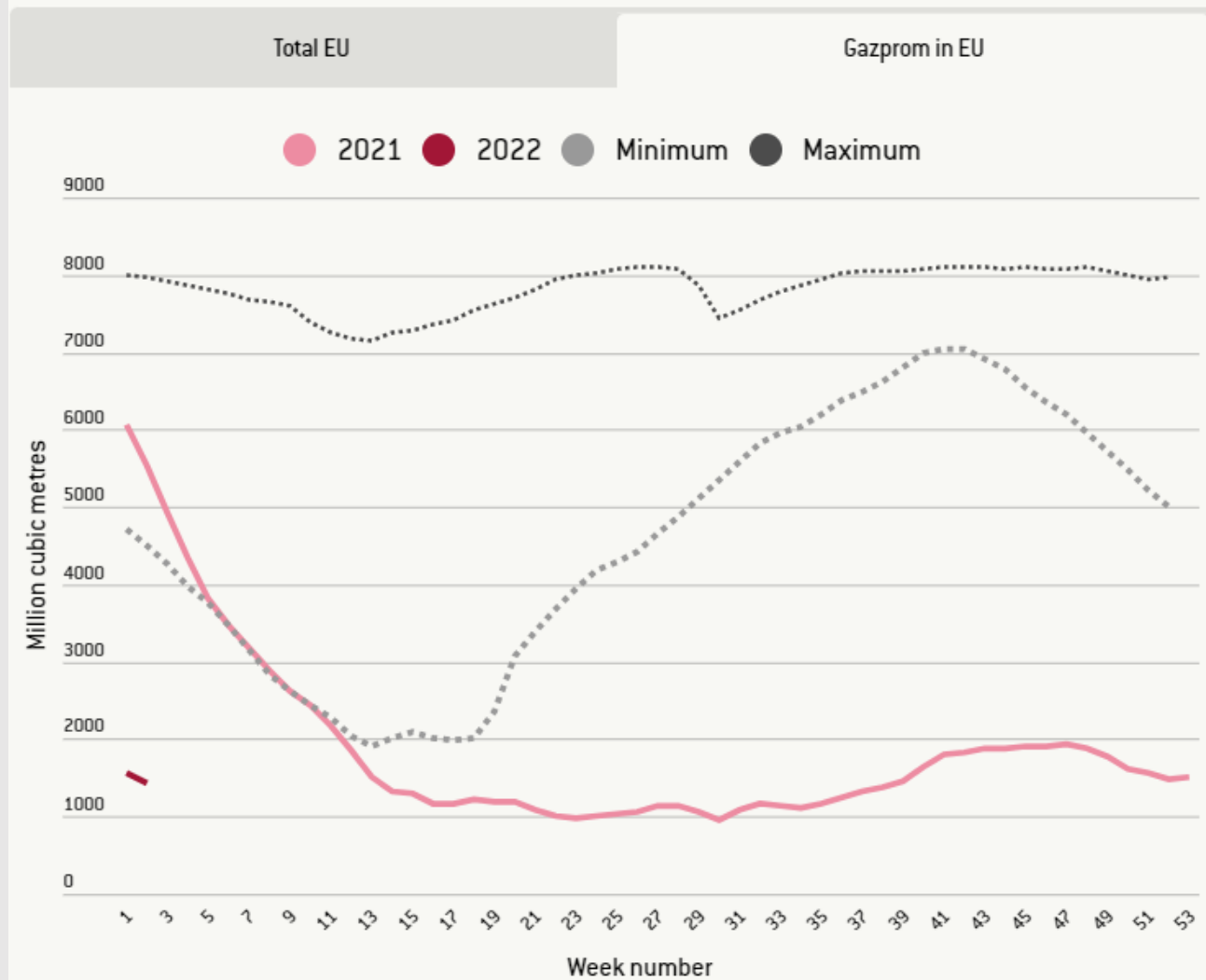


Source: ENTSO-G



Source: Bruegel

Total EU Gas Storage



Source: Bruegel

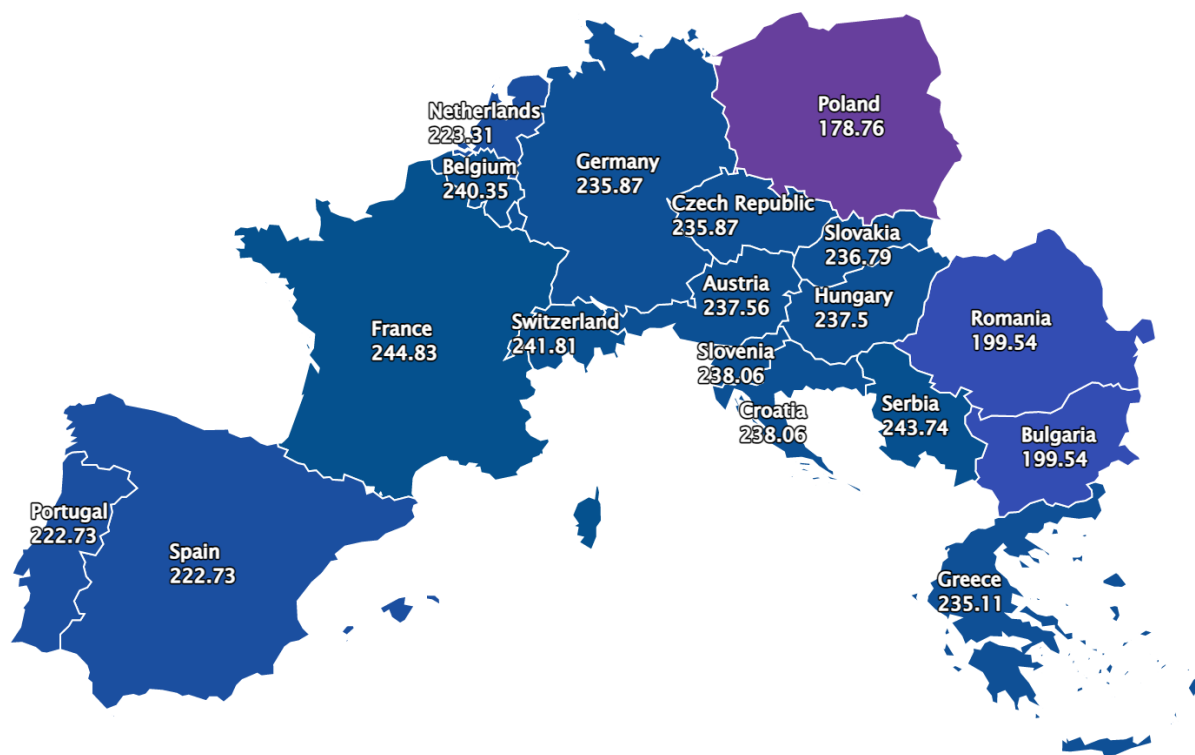
Total EU Gas Storage Supplied by Gazprom

Dutch TTF Natural Gas Trading Price (€/MWH)



Day Ahead Electricity Prices (€/MWh)

Day-ahead average prices for 2022-01-18



EUR/MWh



UK Price Caps More than Double



20 Jan 2022. Chart by Martin Wheatcroft FCA, design by Sunday.

Sources: Ofgem, 'Average annual energy price cap: typical household on direct debit'; Industry forecasts and speculation. Price caps vary by region and are higher for prepayment meters and for credit customers.

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UK Supplier Bankruptcies 2021-2022

When	Old supplier	Customer base	New supplier
18 January 2022	Together Energy Retail Ltd	<ul style="list-style-type: none"> • 176,000 domestic • 1 non-domestic 	TBA
1 December 2021	Zog Energy Limited	<ul style="list-style-type: none"> • 11,700 domestic 	<u>EDF</u> from 4 December 2021
25 November 2021	Entice Energy	<ul style="list-style-type: none"> • 5,400 domestic 	<u>Scottish Power</u> from 1 December 2021
25 November 2021	Orbit Energy Limited	<ul style="list-style-type: none"> • 65,000 domestic 	<u>Scottish Power</u> from 1 December 2021
16 November 2021	Neon Reef Limited	<ul style="list-style-type: none"> • 30,000 domestic 	<u>British Gas</u> from 21 November 2021
16 November 2021	Social Energy Supply Ltd	<ul style="list-style-type: none"> • 5,500 domestic 	<u>British Gas</u> from 21 November 2021
16 November 2021	Social Energy Supply Ltd	<ul style="list-style-type: none"> • 5,500 domestic 	<u>British Gas</u> from 21 November 2021
3 November 2021	CNG Energy Limited	<ul style="list-style-type: none"> • 41,000 non-domestic 	<u>Positive Energy</u> from 7 November 2021
2 November 2021	Omni Energy Limited	<ul style="list-style-type: none"> • c 6,000 domestic 	<u>Utilita</u> from 7 November 2021
2 November 2021	MA Energy Limited	<ul style="list-style-type: none"> • c 300 non-domestic 	<u>SmartestEnergy</u> from 7 November 2021
2 November 2021	Zebra Power Limited	<ul style="list-style-type: none"> • c 14,800 domestic 	<u>British Gas</u> from 7 November 2021
2 November 2021	Ampoweruk Ltd	<ul style="list-style-type: none"> • c 600 domestic • c 2,000 non-domestic 	<u>Yü Energy</u> from 7 November 2021
1 November 2021	Bluegreen Energy Services Limited	<ul style="list-style-type: none"> • c 5,900 domestic • non-domestic 	<u>British Gas</u> from 7 November 2021

When	Old supplier	Customer base	New supplier
18 October	GOTO Energy	<ul style="list-style-type: none"> • c22,000 domestic 	<u>Shell Energy</u> from 21 October 2021
14 October	Daligas	<ul style="list-style-type: none"> • c9,000 domestic and non-domestic 	<u>Shell Energy</u> from 17 October 2021
13 October	Pure Planet	<ul style="list-style-type: none"> • c235,000 domestic 	<u>Shell Energy</u> from 17 October 2021
13 October	Colorado Energy	<ul style="list-style-type: none"> • C15,000 domestic 	<u>Shell Energy</u> from 17 October 2021
29 September	ENSTROGA	<ul style="list-style-type: none"> • c6,000 domestic 	<u>E.ON Next</u> from 3 October 2021
29 September	Igloo Energy	<ul style="list-style-type: none"> • c179,000 domestic 	<u>E.ON Next</u> from 3 October 2021
29 September	Symbio Energy	<ul style="list-style-type: none"> • c48,000 domestic • non-domestic 	<u>E.ON Next</u> from 3 October 2021
22 September	Avro Energy	<ul style="list-style-type: none"> • c580,000 domestic 	<u>Octopus Energy</u> from 26 September 2021
22 September	Green Supplier Limited ('Green.')	<ul style="list-style-type: none"> • c255,000 domestic • non-domestic 	<u>Shell Energy</u> from 27 September 2021
14 September	People's Energy	<ul style="list-style-type: none"> • c350,000 domestic • c1,000 non-domestic 	<u>British Gas</u> from 19 September 2021
14 September	Utility Point	<ul style="list-style-type: none"> • c220,000 domestic 	<u>EDF</u> from 18 September 2021
7 September	PFP Energy	<ul style="list-style-type: none"> • 82,000 domestic • 5,600 non-domestic 	<u>British Gas</u> from 11 September 2021
7 September	MoneyPlus Energy	<ul style="list-style-type: none"> • c9,000 domestic 	<u>British Gas</u> from 11 September 2021

Alcoa to curb aluminium output in Spain as energy costs soar

Romanian coalition holds more talks on energy prices

Electricity Prices Skyrocket in Greece, Europe as Winter Sets In

UK households struggling with energy bills set to triple - think tank

Energy Crunch Hammers French Nuclear Giant EDF

Spain's rising energy poverty: A cautionary tale for Europe

Natural-Gas Crisis Pushes German Utilities Into Dash for Cash
Energy giant Uniper arranged more than \$11 billion in credit lines to weather the biggest surge in gas prices in a generation

Bulgarian greenhouses shutting down due to high gas prices

Italy industry may not restart in January amid energy crisis

Greece Grants \$452 Million in Energy Financial Relief



Early Responses

- Poland budgeted EUR 1.1bn for 2022 to help vulnerable pensioners and families
- Estonia allocated EUR 75 million to reduce the electricity bill for all consumers and EUR 20 million to help 72,000 vulnerable families
- France will freeze gas prices until the end of 2022 and will limit electricity price increase to 4% -- paid by EDF
- Germany has reduced its tax on renewables by almost 50%
- Czech government eliminated the VAT tax for gas and electricity through 2022, pending EU approval
- Italy provided EUR 3 billion support to persons already benefitting from social aid
- Belgium extended the social energy tariff for vulnerable households through March 2022 and sent an 'energy cheque' of EUR 80 to one million families

Energy Security

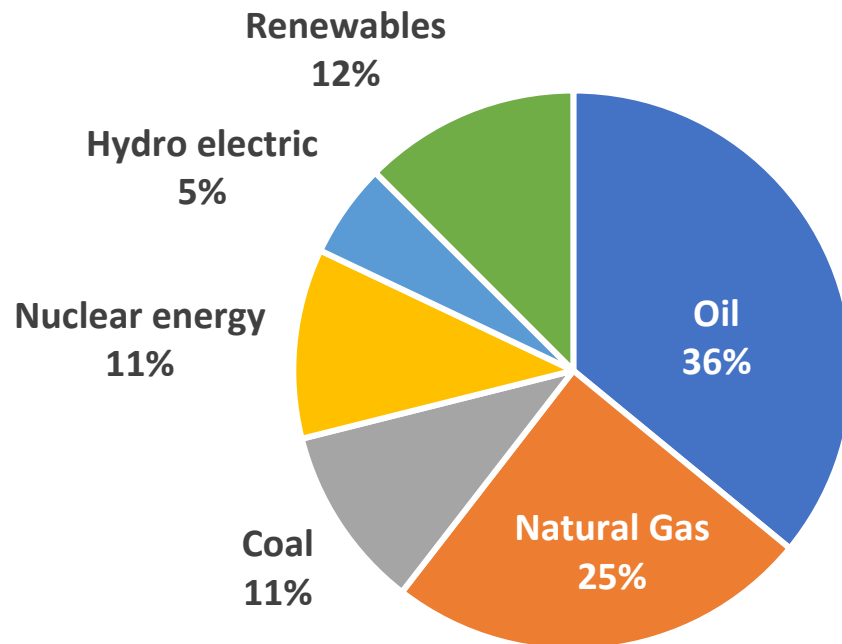
Lessons of the European Energy Crisis

National Association of Regulatory Utility Commissioners

January 24, 2022

Europe's Energy More Seasonal Renewables, On-Demand Natural Gas

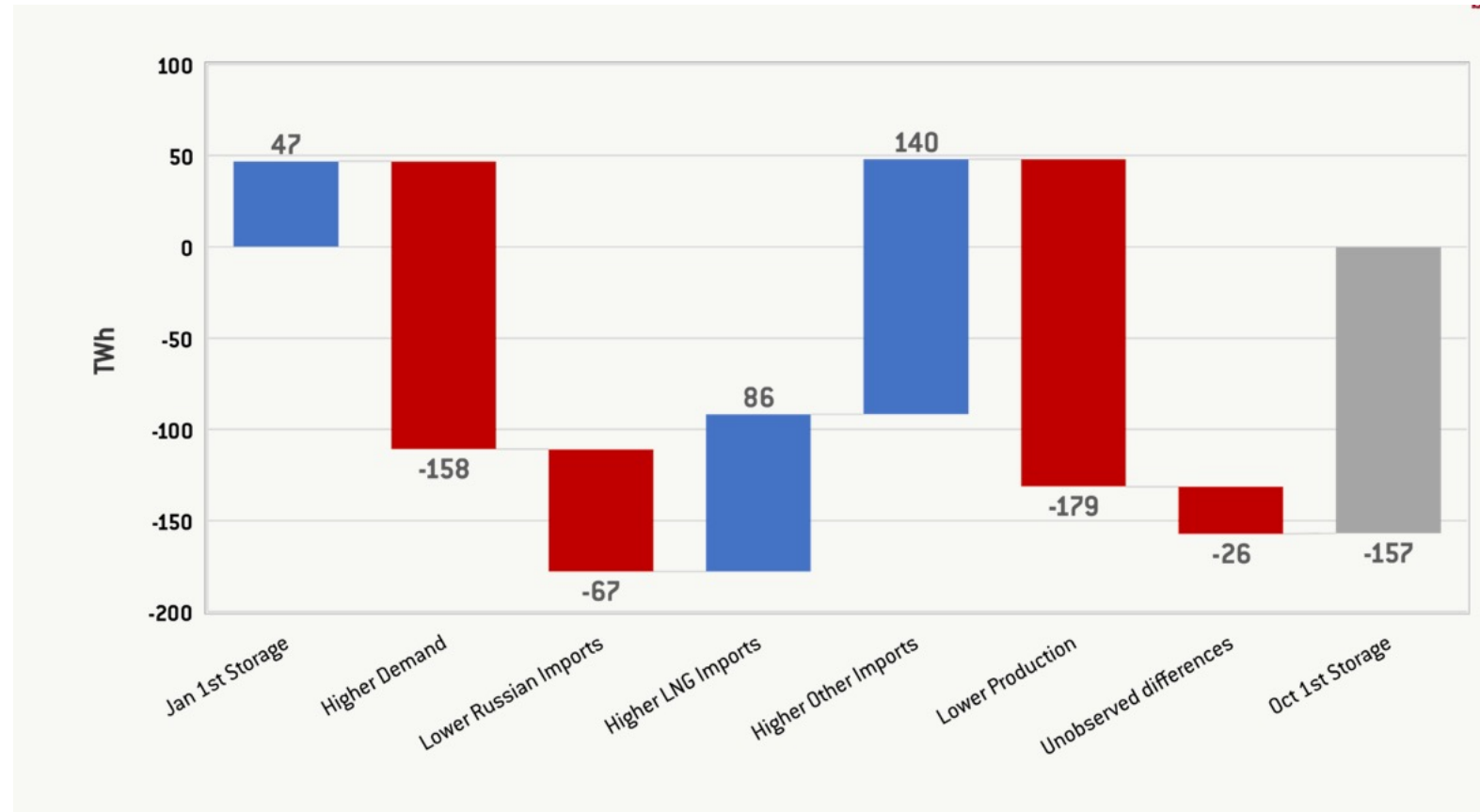
2020 Europe Primary Energy Mix



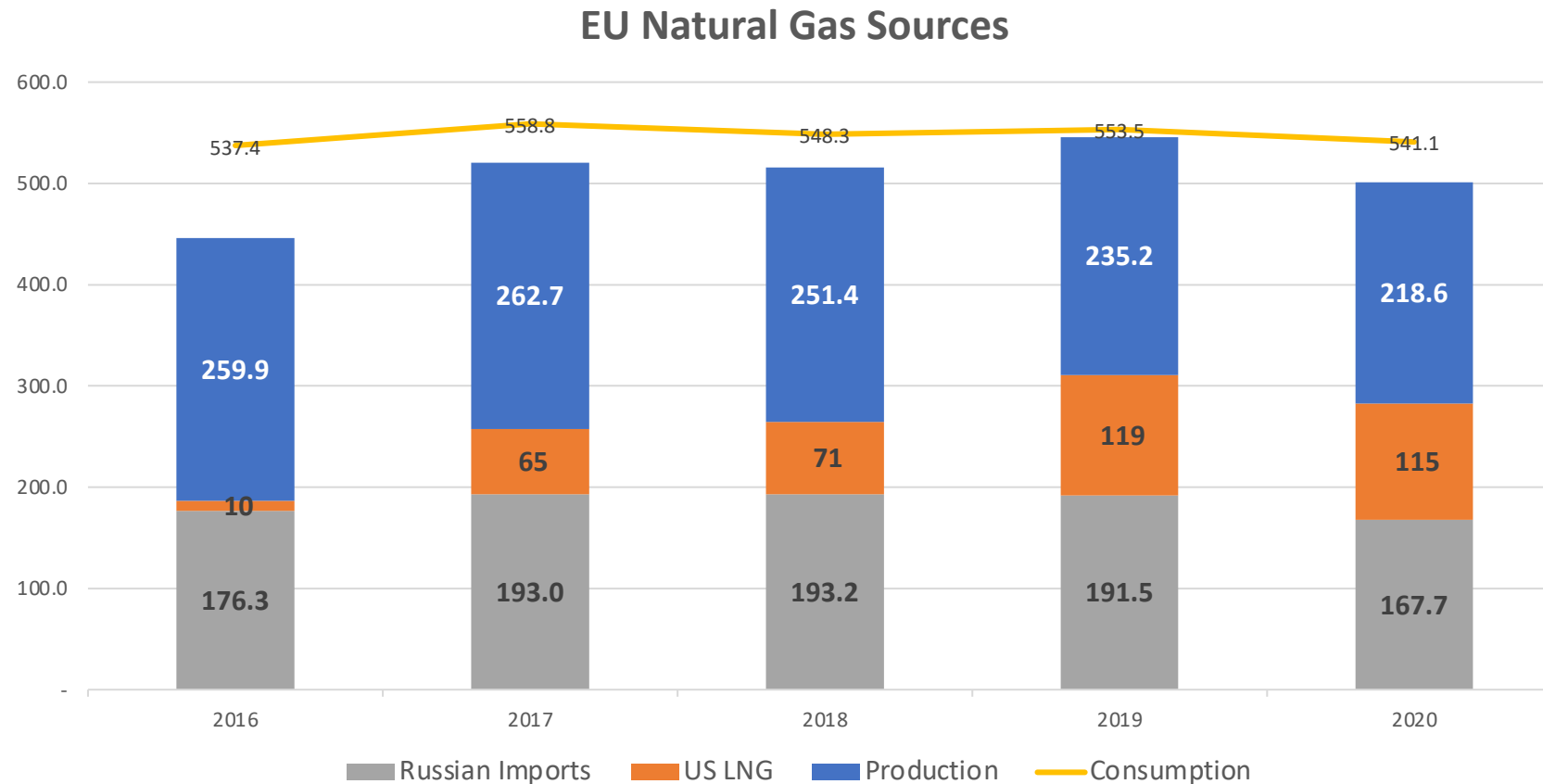
EU Energy Supply 2009-2019

- Renewables 173% or 10.6% CAGR
- Natural Gas Consumption (0.5%) or (0.1%)
- EU Nuclear generation (7.2%) or (0.7%) CAGR
- Coal Consumption (30.3%) or (3.5%) CAGR

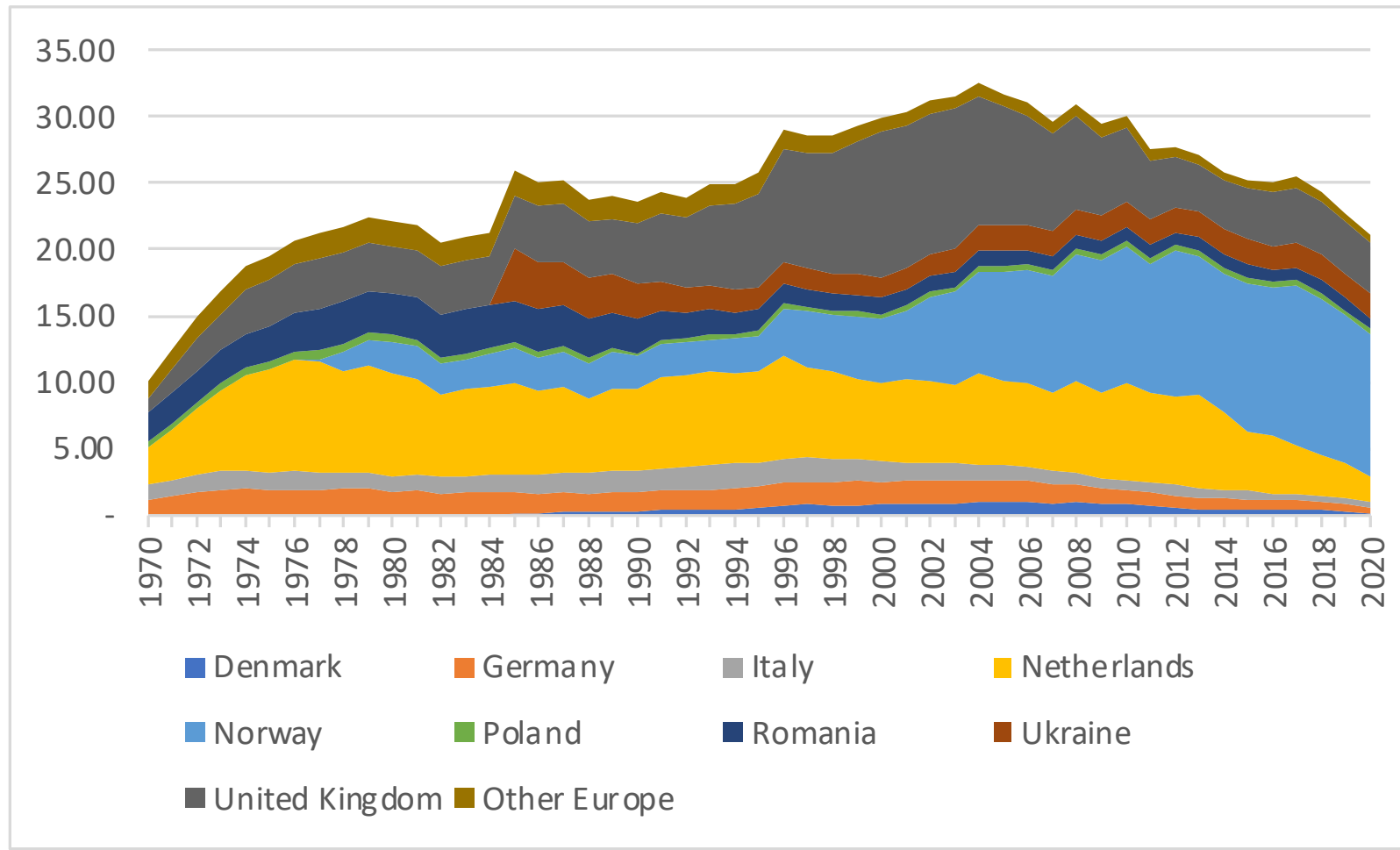
European Storage at 52% of Capacity at Oct 1



US LNG Imports Replace Declining Production



Europe's Declining Natural Gas Production

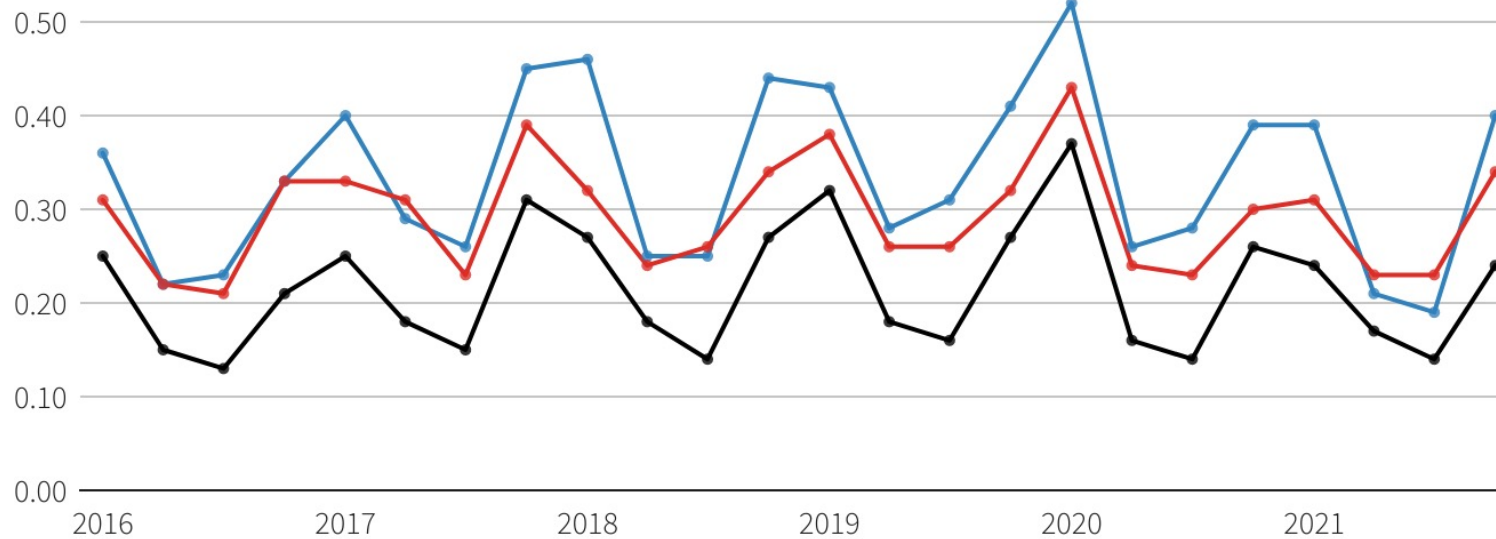


Seasonal Storage Solutions are Needed for Reliable Electricity

Capacity Factors Wind

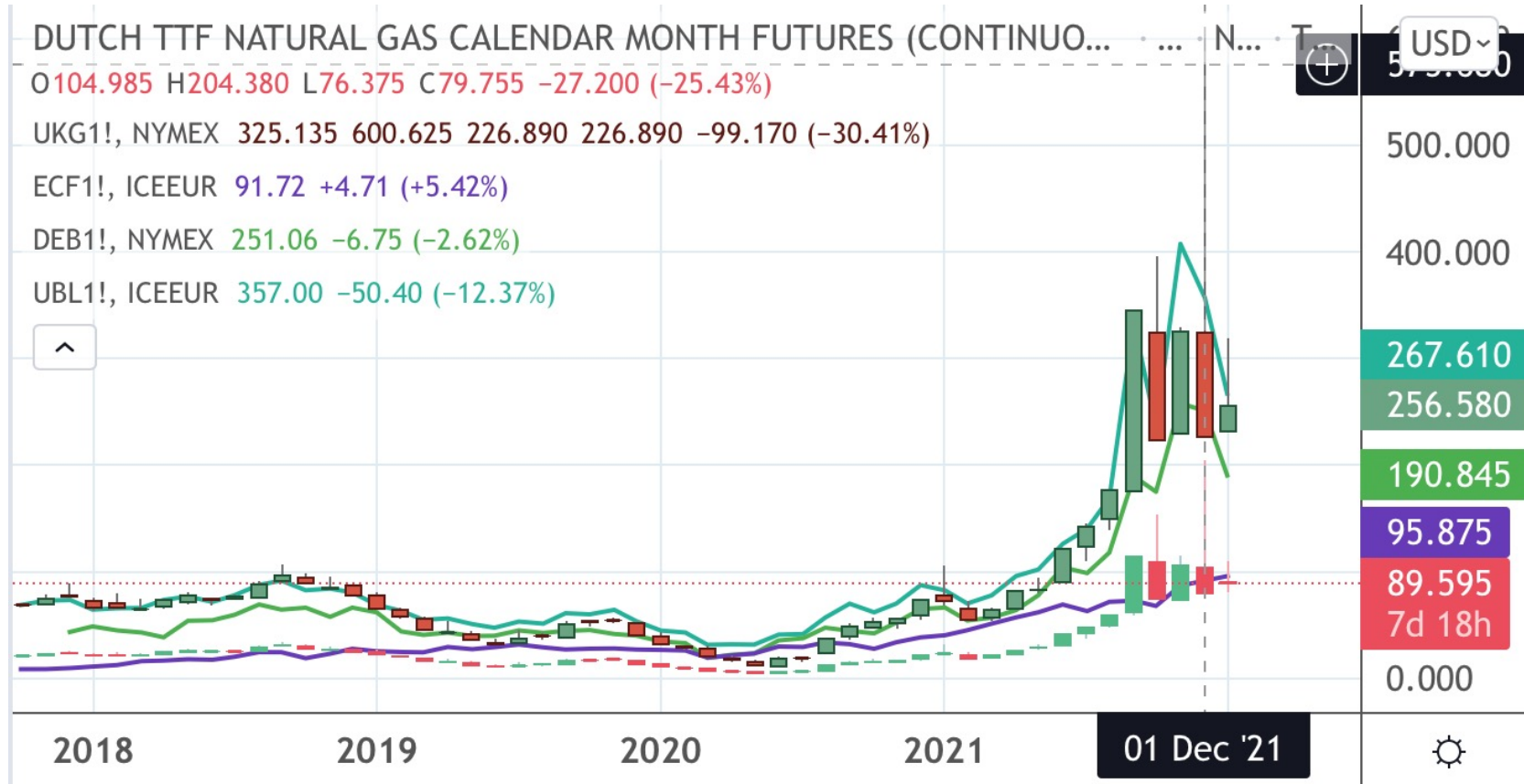
Per quarter

— Denmark — Britain — Germany



Source: Refinitiv

Spot Pricing vs Energy Security



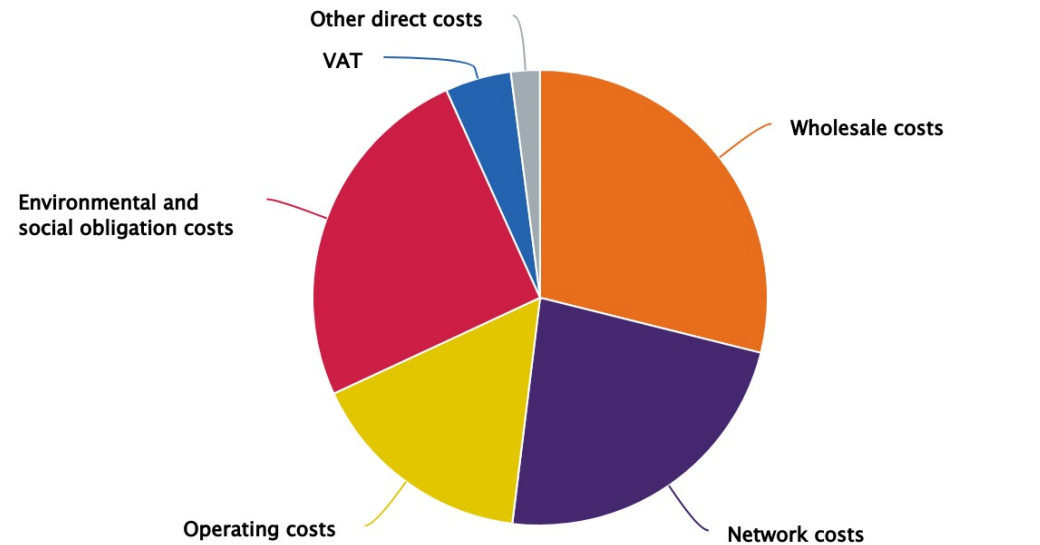
Dutch Gas Futures Peak at
\$204.380

Carbon Futures Peak at
\$91.72/tonne

UK Wholesale Power Futures Peak
at \$357.00

Taxes constitute majority of Consumer Bills

Breakdown of an electricity bill



August 2021

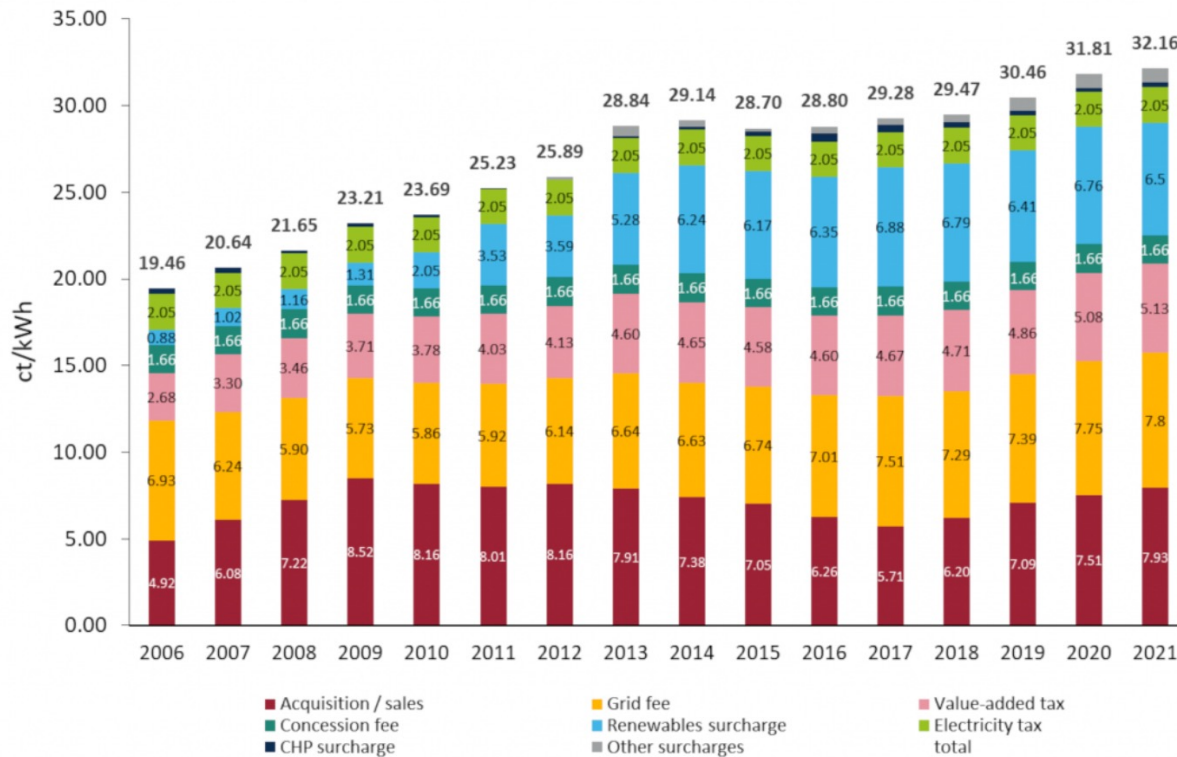
Source: Companies' consolidated segmental statements

Source: Ofgem

Affordability Relief in form of Cut in Taxes

Composition of average power price in ct/kWh for a German household using 3,500 kWh per year, 2006 - 2021.

Data: BDEW November 2021.



In the end all will share in cost

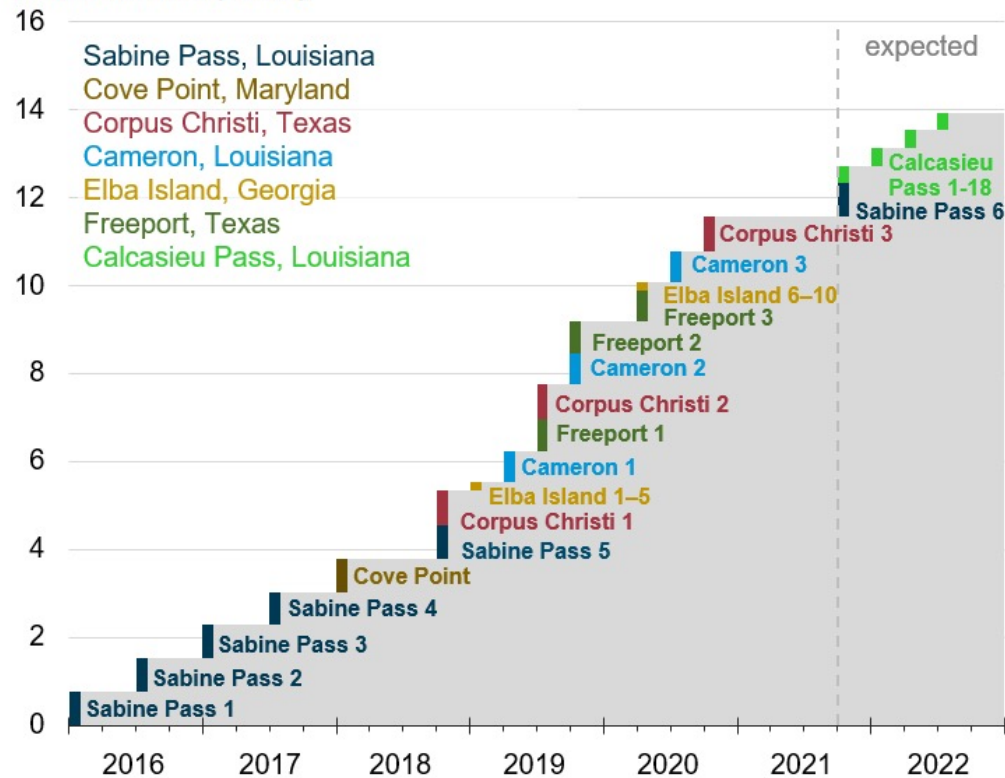
- Government
- Ratepayers
- Utilities

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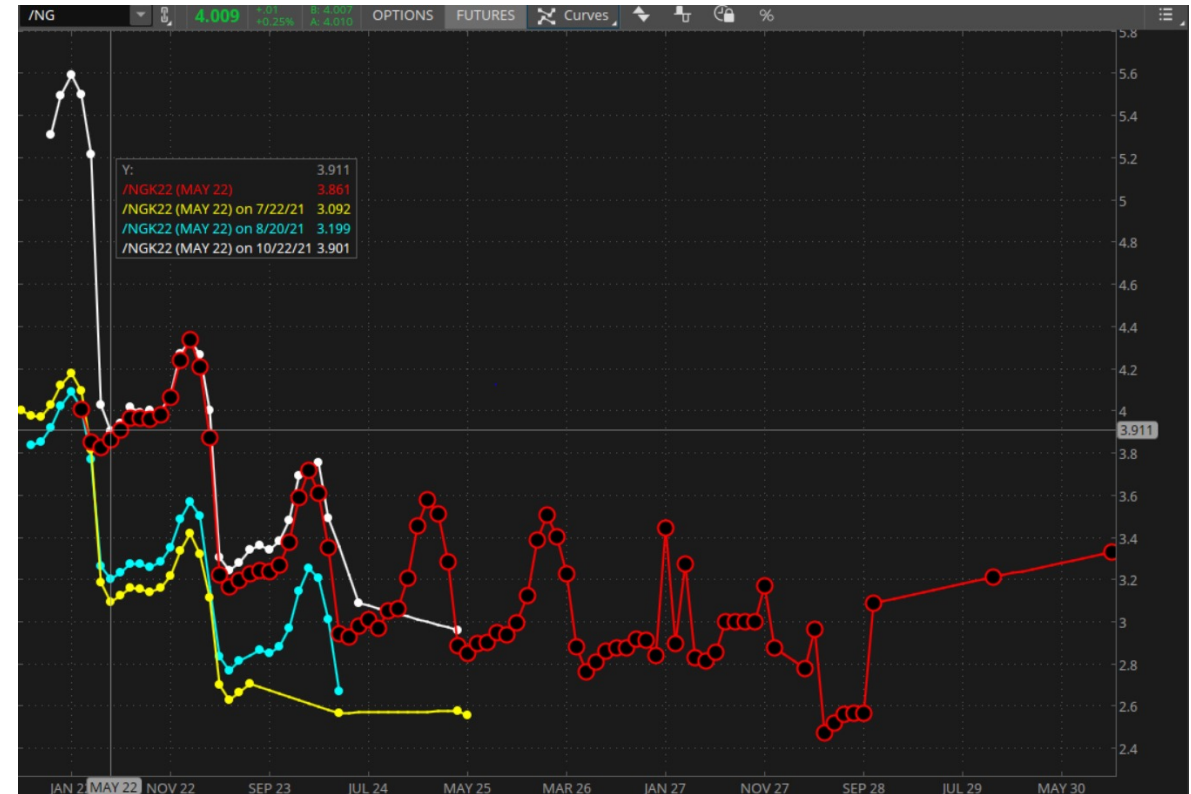
Flattening US Natural Gas Curves – Dominated by Export Capacity

U.S. liquefied natural gas export capacity by project (2016–2022)

billion cubic feet per day



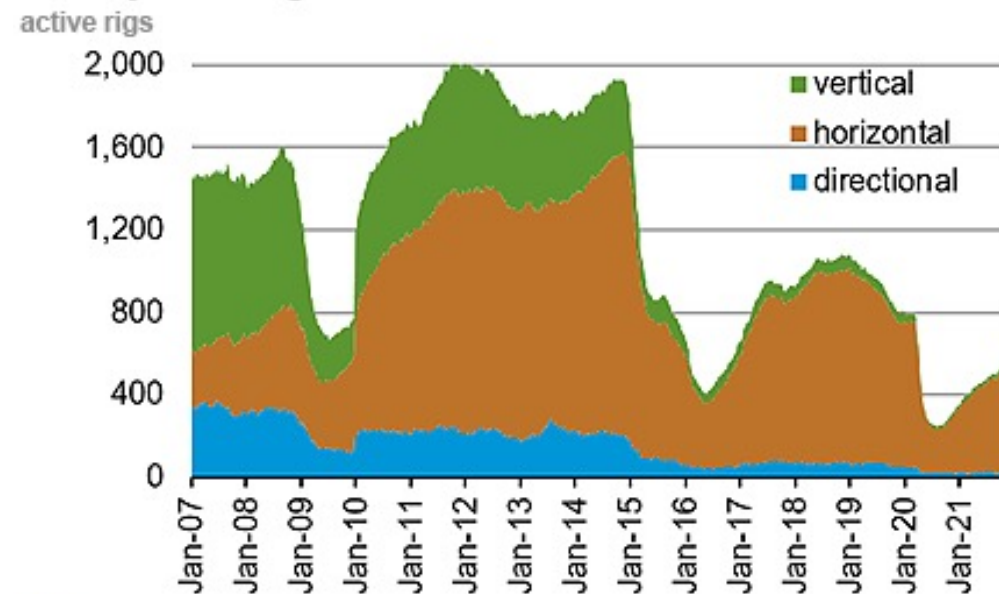
Natural Gas Future Curve



Source: Graph created by the U.S. Energy Information Administration (EIA)
Note: The chart shows U.S. LNG peak export capacity buildout by quarter, project, and liquefaction train

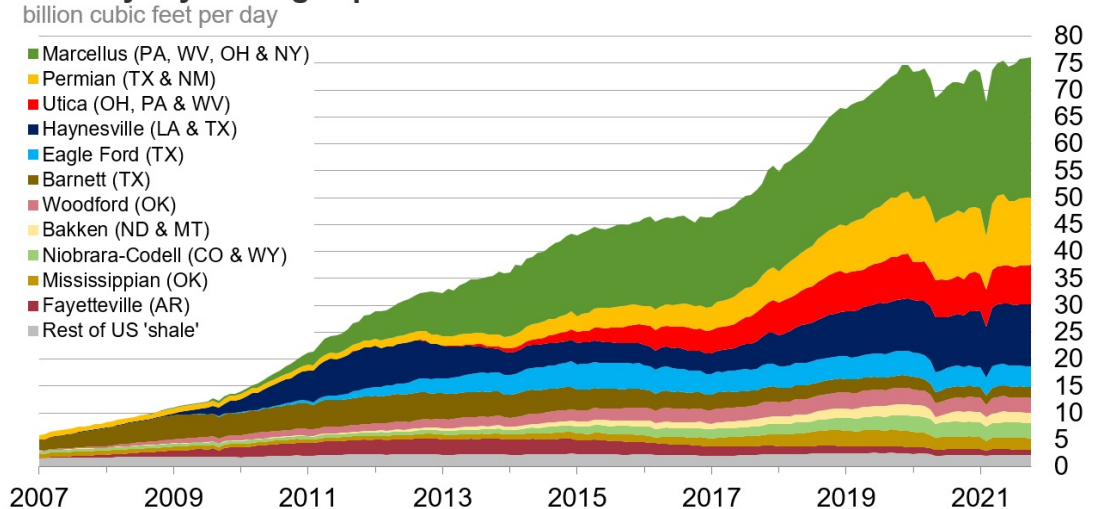
US Rig Count not Supportive of Production Increases

Weekly total rig count



Source: Graph by the U.S. Energy Information Administration (EIA), based on data from Baker Hughes Company

Monthly dry shale gas production



Source: Graph by the U.S. Energy Information Administration (EIA) based on state administrative data collected by Enverus. Data are through October 2021 and represent EIA's official tight gas estimates, but are not survey data. State abbreviations indicate primary state(s).

Note: Improvements to play identification methods have altered production volumes of between various plays.