LNG Diplomacy and Other Things

Presented to:
Pipeline Insurance Managers Conference (PLIMC)
The Villas at Kiawah Island Golf Resort

November 3, 2022

Mercator Energy

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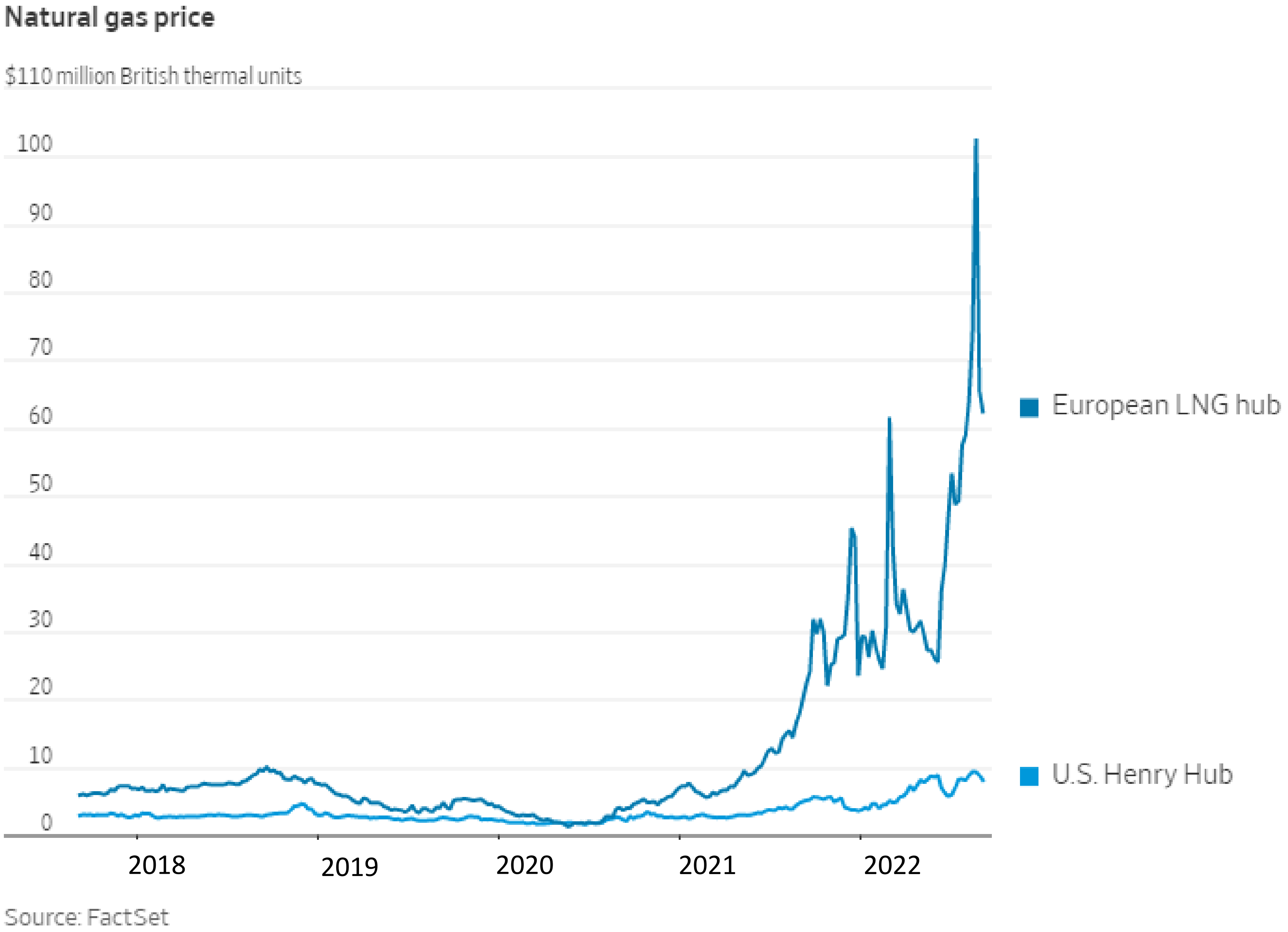
303-825-1100


Natural gas price
$110 million British thermal units
100
90
80
70
60
50
40
30
20
10
0
2018
2019
2020
2021
2022
European LNG hub
U.S. Henry Hub
Source: FactSet

Comparative Forward Strips as of August 26, 2022

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One-Year Forward Strip

NYMEX Henry Hub	$ 7.725
LNG Delivered Price to Europe	$97.993

Source: *cmegroup.com and CIMA Daily Weather and Market Report, August 26, 2022*

Comparative Forward Strips as of October 31, 2022

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One-Year Forward Strip

NYMEX Henry Hub	$ 5.343
LNG Delivered Price to Asia	$31.903
LNG Delivered Price to Europe	$37.956

Three-Year Forward Strip

NYMEX Henry Hub	$ 4.838
LNG Delivered Price to Asia	$27.501
LNG Delivered Price to Europe	$30.834

* Settled price as of October 31, 2022

Source: *cmegroup.com and CIMA Daily Weather and Market Report, November 1, 2022*

Baltic Natural Gas Pipeline Map

Source: *NS Energy, Baltic Pipe Project, GAZ-System*

German government announces fifth floating LNG terminal

Source: *euractiv.com, Nikolaus J. Kurmayer, September 1, 2022, Photo credit: Offshore-mag.com,*

New Dutch LNG Regas Terminal Will Double Import Capacity

Source: Journal of Petroleum Technology, Blake Wright, September 19, 2022, Gasunie

Wave of LNG Tankers is Overwhelming Europe

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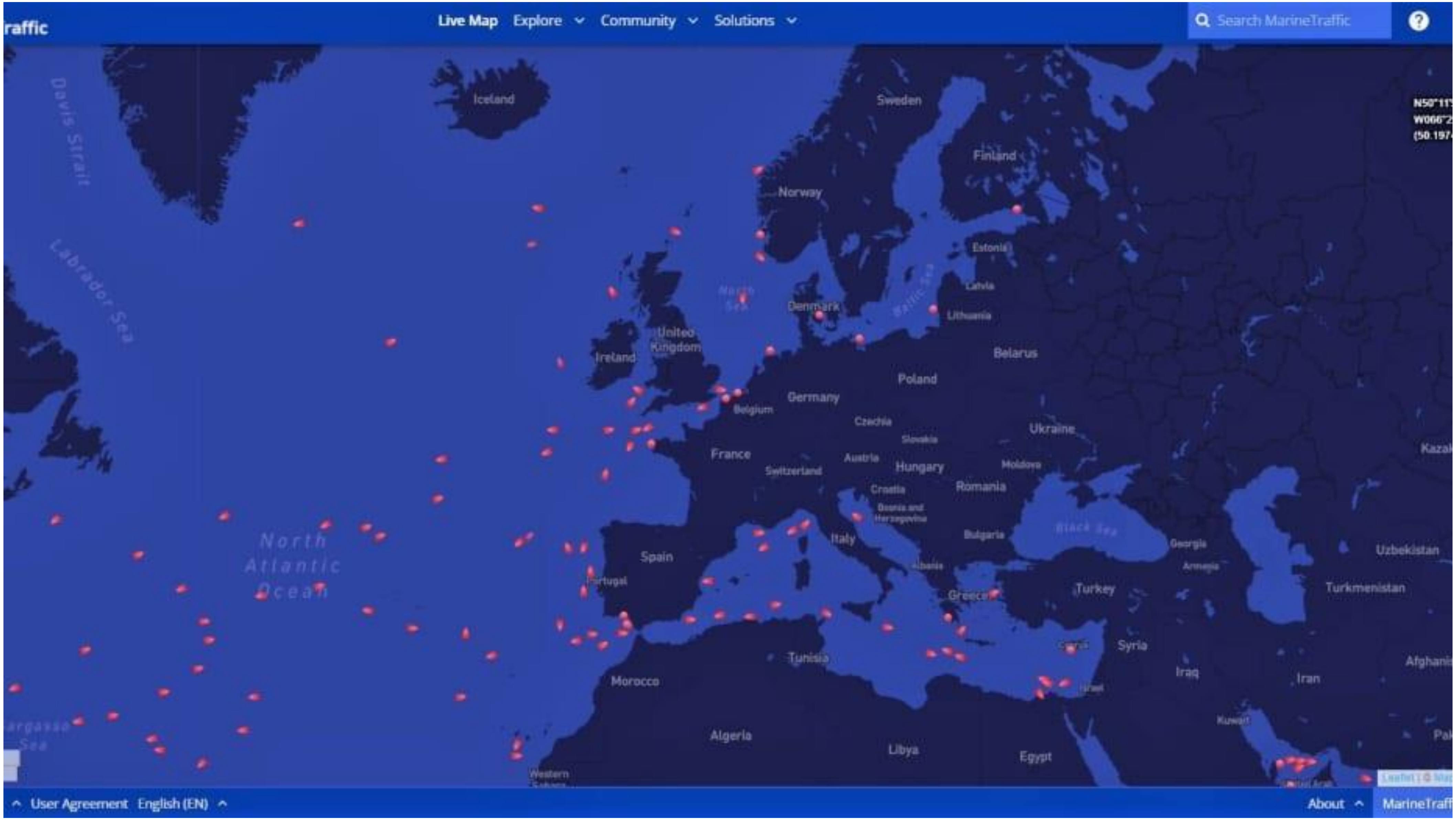

Source: CNBC, Lori Ann LaRocco, October 24, 2022, MarineTraffic

How did we get here?

4 mistakes made by the European Union (& more specifically, Germany)

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- Over reliance on renewables
- Retired coal plants too early
- Retired nuclear plants too early
- Under reliance on fossil fuels

This is a trap laid by Vladimir Putin 20 years in the making.

Historical NYMEX Henry Hub Index Prices (2012-October 2022)

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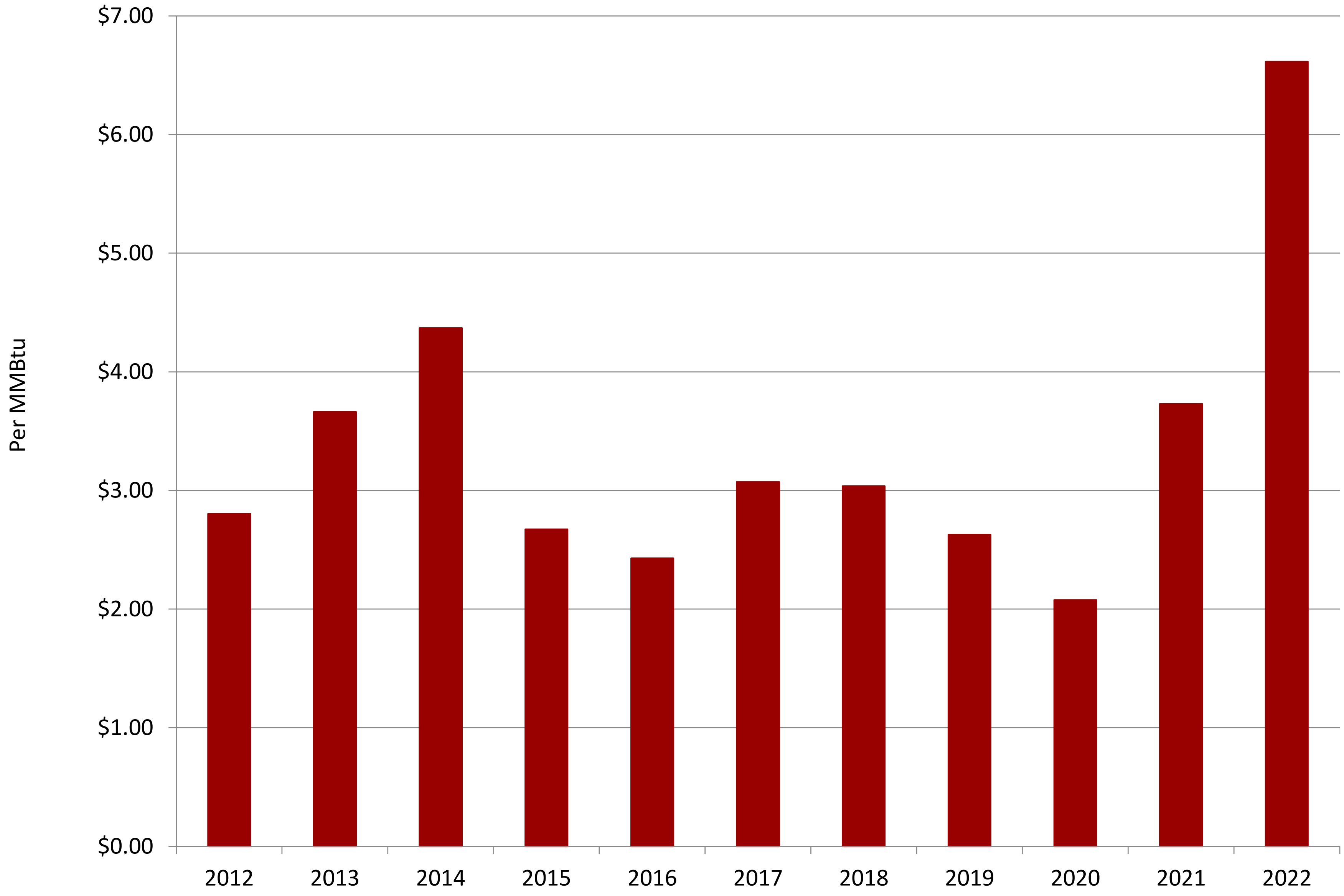

Source: *NYMEX – Average last 3 days of close as reported in Platts Gas Daily Report, An S&P Global Platts publication*

What I'll Cover Today

- Putin's trap, enabled by the pro-scarcity environmentalists
- Germany and EU take the bait
- U.S. LNG to the rescue
- The 3-year impact on world LNG markets

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Closing Bell

LNG Diplomacy:
Keystone XL Pipeline, Part 2?

October 2012

Closing Bell

The Putin Vortex

April 2014

Closing Bell

The Glacial Pace
Of LNG Exports

By John Harpole

September 2014

Closing Bell

Time To
'Out' Russia?

By John Harpole

January 2015

Merkel's Major Mistake – Trusting Putin

Angela Merkel, Chancellor of Germany from 2005 to 2021

Nord Stream Opening Ceremony – November 8, 2011

Francois Fillon, Angela Merkel, Mark Rutte, Dmitry Medvedev, Gunther Oettinger, Erwin Sellering

Source: *Wikipedia*

The Former Chancellor Who Became Putin’s Man in Germany

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Gerhard Schroeder, Chancellor of Germany from 1998 to 2005

Gerhard Schröder Bio

Title	Term	Income
Chancellor of Germany	1998 – 2005	? currently receives $9,000/month stipend
Nord Stream I Chairman/Shareholder	2005 – 2022	$270,000/year
Nord Stream II Board Member	2011 - ?	?
Rosneft Board President	2017 – present	$600,000/year
Gazprom Board Member	2022 - ?	?

The Former Chancellor Who Became Putin's Man in Germany

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"Germany's reliance on Russian gas surged to 55 percent before Russia's attack on Ukraine began in February, from 39 percent in 2011, amounting to 200 million euros, or about $220 million, in energy payments every day to Russia."

Source: *The Former Chancellor Who Became Putin's Man in Germany, Katrin Bennhold, The New York Times, April 23, 2022*

Why trust Russia? History should have been the lesson.

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Russia's Energy Muscle

- Energy Used Over 55 times Against Former Soviet Nations Since 1990

Source: *Europe Doubles Down on Russian Gas to Feed its Energy Appetite*, by Andrew Haney, Ricardo Bracho, Nick Wolfe and Max Faith

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April 4, 2009

Gerhard Schröder

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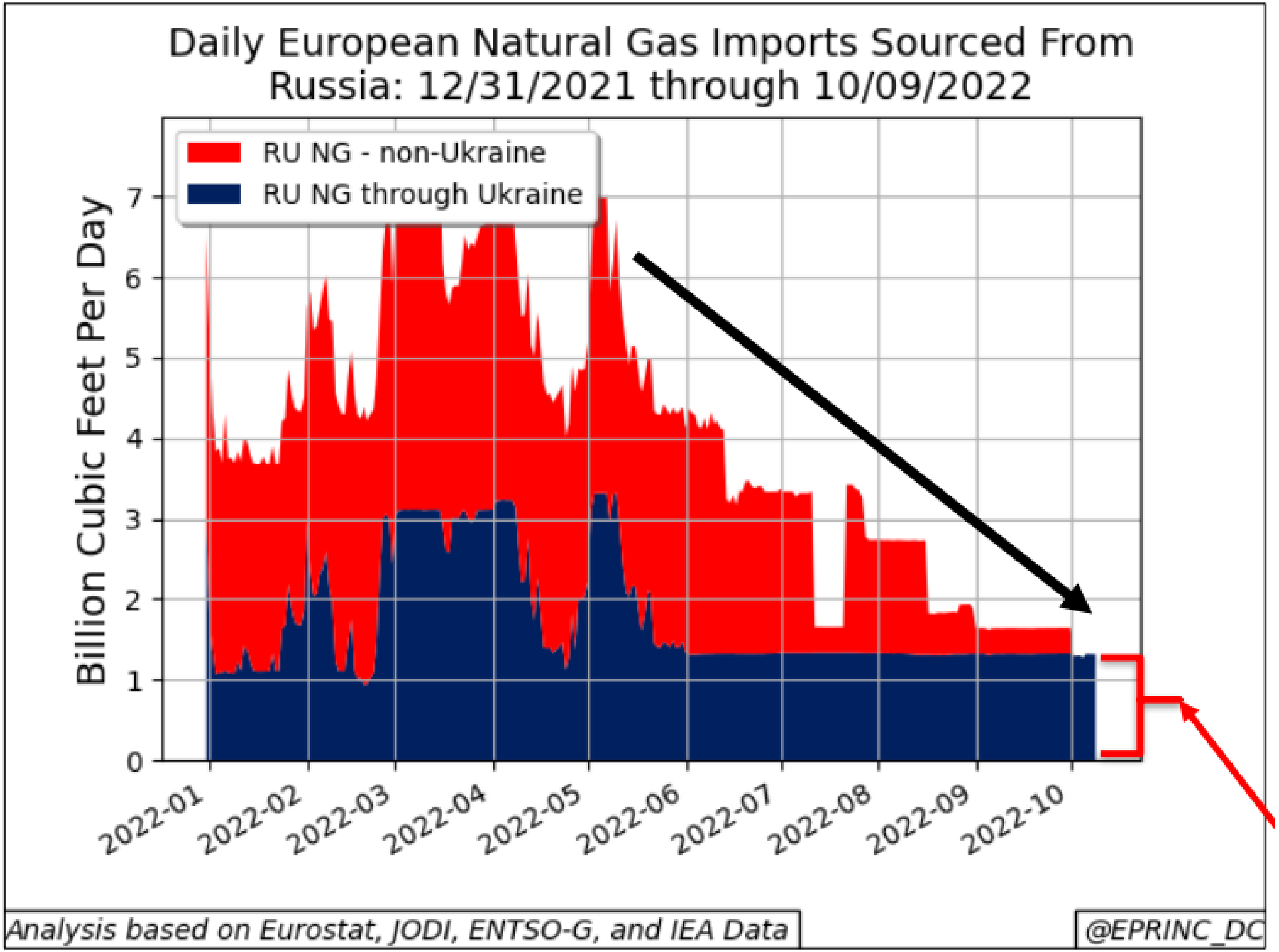
“He took advantage of the reputation and influence of the chancellor’s office and offered himself up as an agent for Russian interests to get rich,” said Norbert Röttgen, a conservative lawmaker, former minister and longtime Russia hawk.

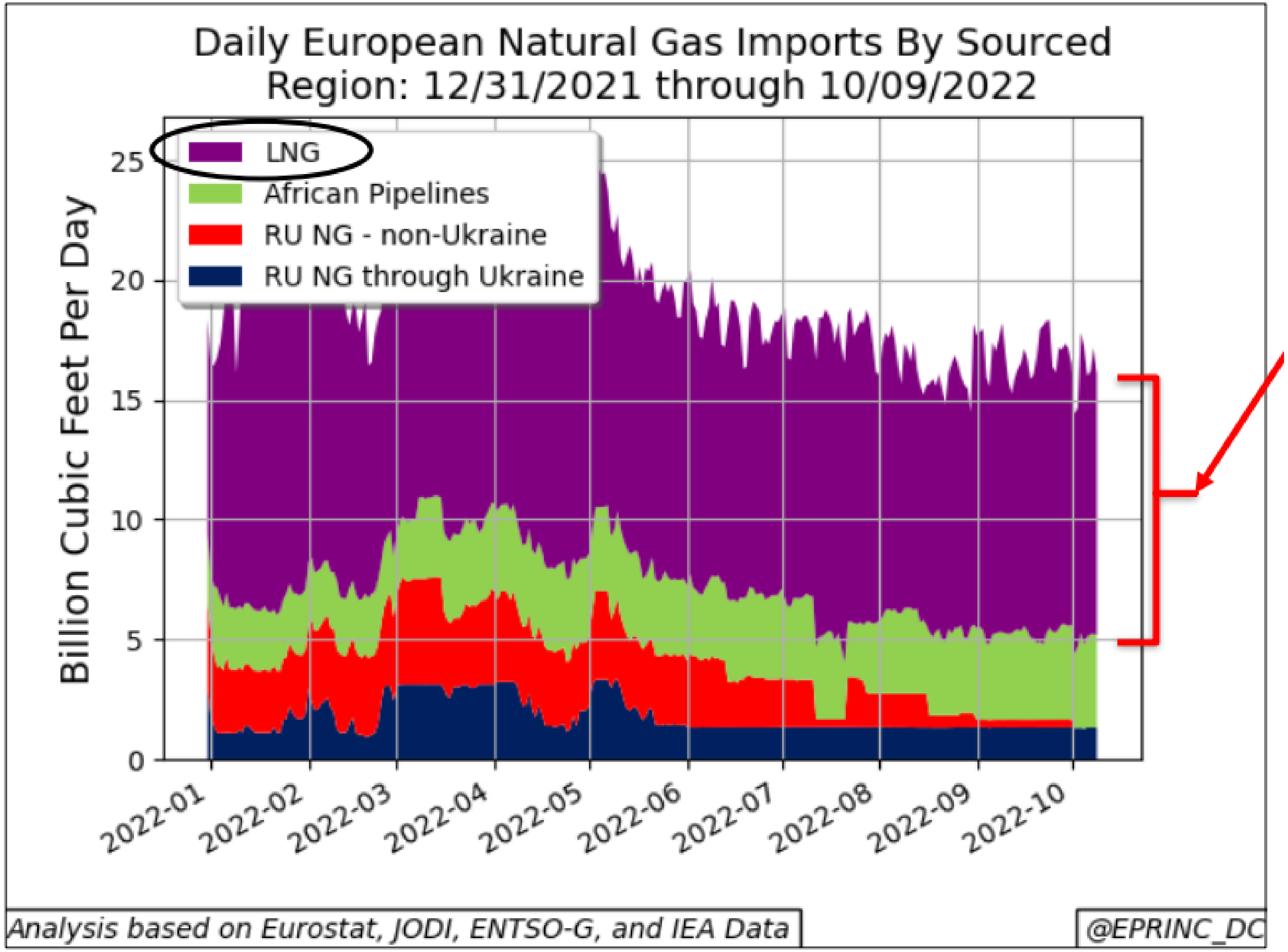
Source: *The Former Chancellor Who Became Putin’s Man in Germany, Katrin Bennhold, The New York Times, April 23, 2022*

Europe – Daily Natural Gas Receipts During 2022



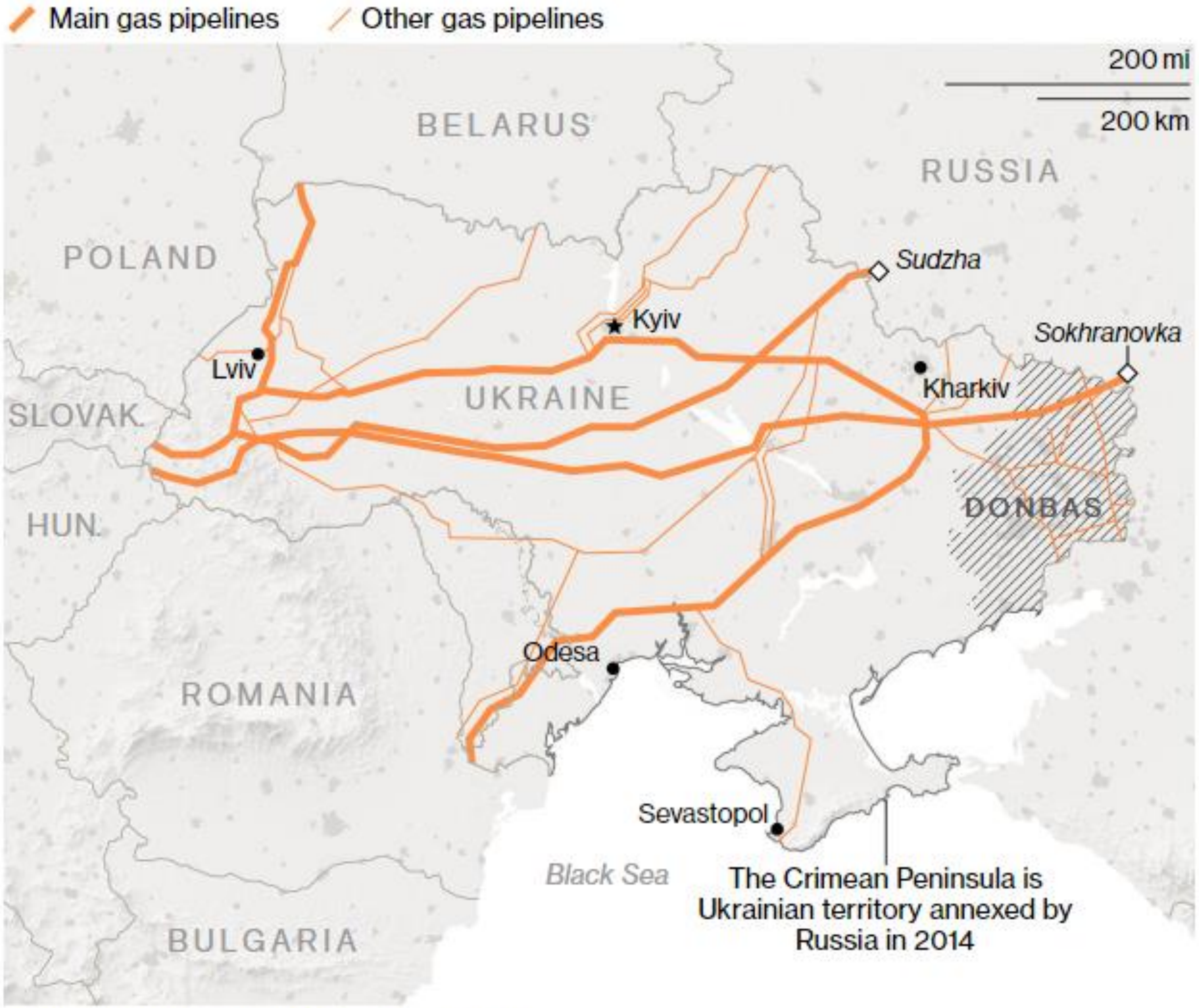
Source: *Energy Policy Research Foundation*

Europe – Daily Natural Gas Receipts During 2022



Source: *Energy Policy Research Foundation*

Natural Gas Runs Through Ukraine



Source: The Oxford Institute for Energy Studies
Note: Only the portion of pipelines that run through Ukraine are displayed on the map

Source: *Ukraine, Russia Gas Clash Raises Threat to Europe's Supply, Bloomberg; Elena Mazneva, Daryna Krasnolutska, Anna Shiryaevskaya; May 10, 2022*

Nord Stream I – Financed by German Banks

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Linking the Super Powers

Source: *Europe Doubles Down on Russian Gas to Feed its Energy Appetite*, by Andrew Haney, Ricardo Bracho, Nick Wolfe and Max Faith

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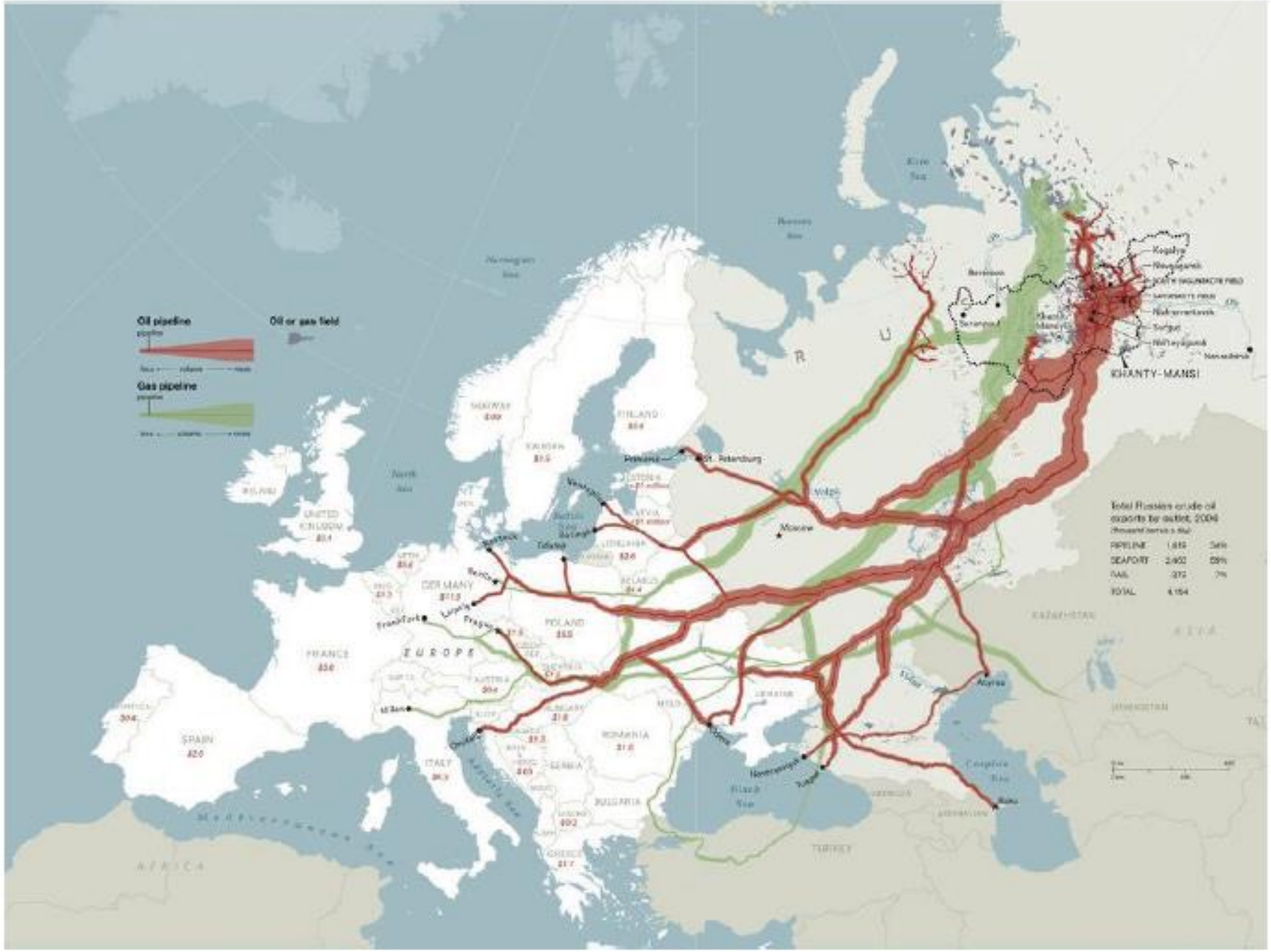
Russian Energy Figures

- Natural gas production: 70 Bcf/d (2nd largest)
- Natural gas pipe exports: 19 Bcf/d (1st largest)
- Oil production: 10.6 MMBpd (3rd largest)
- Oil exports: 7.5 MMBpd (2nd largest)

Europe's Reliance on Russian Energy

- ~40% of EU's gas demand met by Russia
- ~45% of EU's coal imports from Russia
- ~30% of EU's oil imports met by Russia



Source: *Sempra Infrastructure, "Evolving energy for an evolving world," September 27, 2022, WoodMac; Photo Credit: National Geographic*

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European supply diversification away from Russia takes **17 bcfd** out of **50 bcfd** market

Source: *Wood Mackenzie, "Wellhead to LNG: Producers & Export Deals," September 2022, Image: Reuters*

U.S., EU officials on edge over pipeline explosions

Source: *politico.com,* September 28, 2022

Baltic Pipe Opens in Poland

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September 27, 2022

Source: *upstreamonline.com*

Nord Stream leaks will not delay Oct. 1 Baltic Pipe start-up

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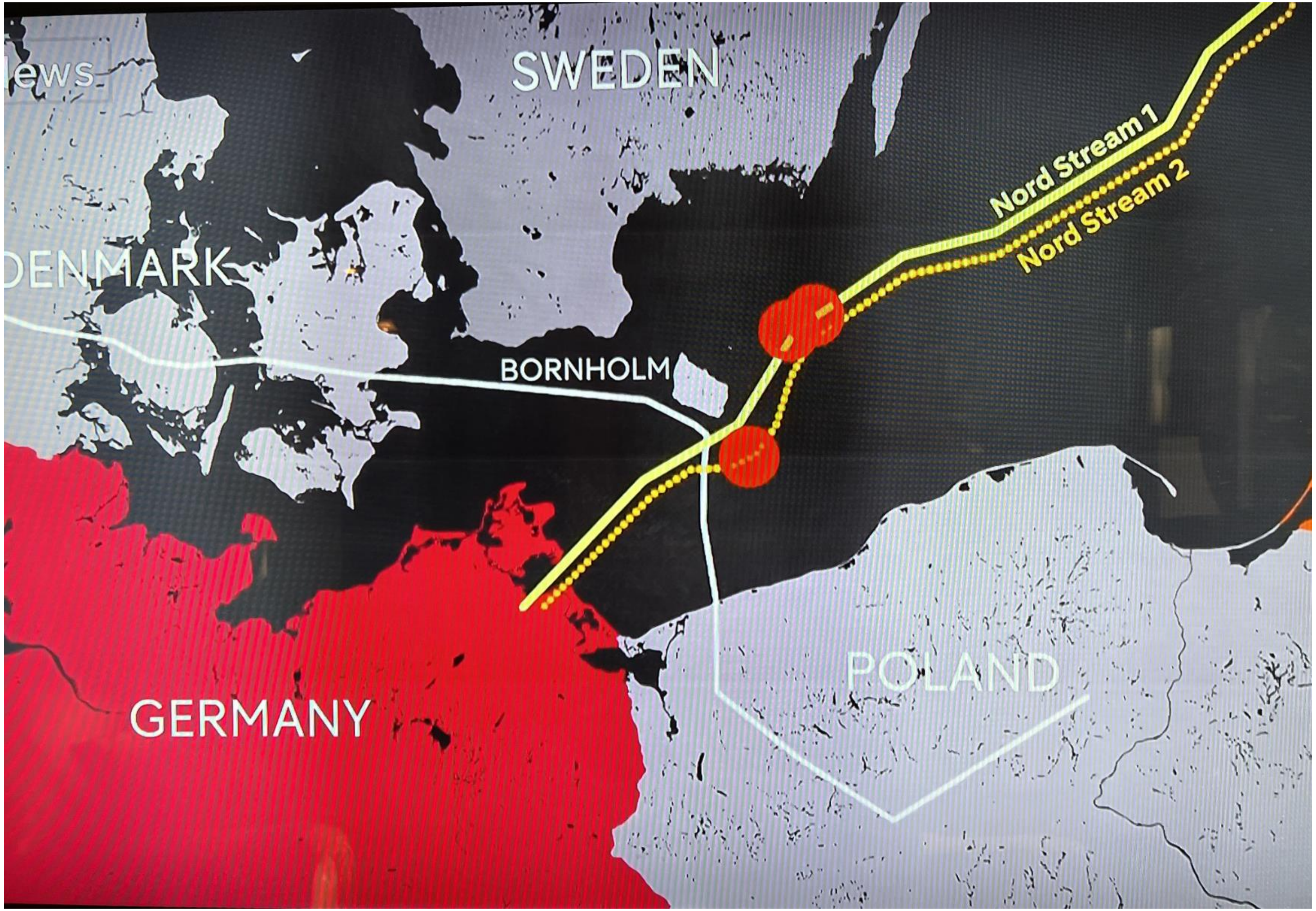
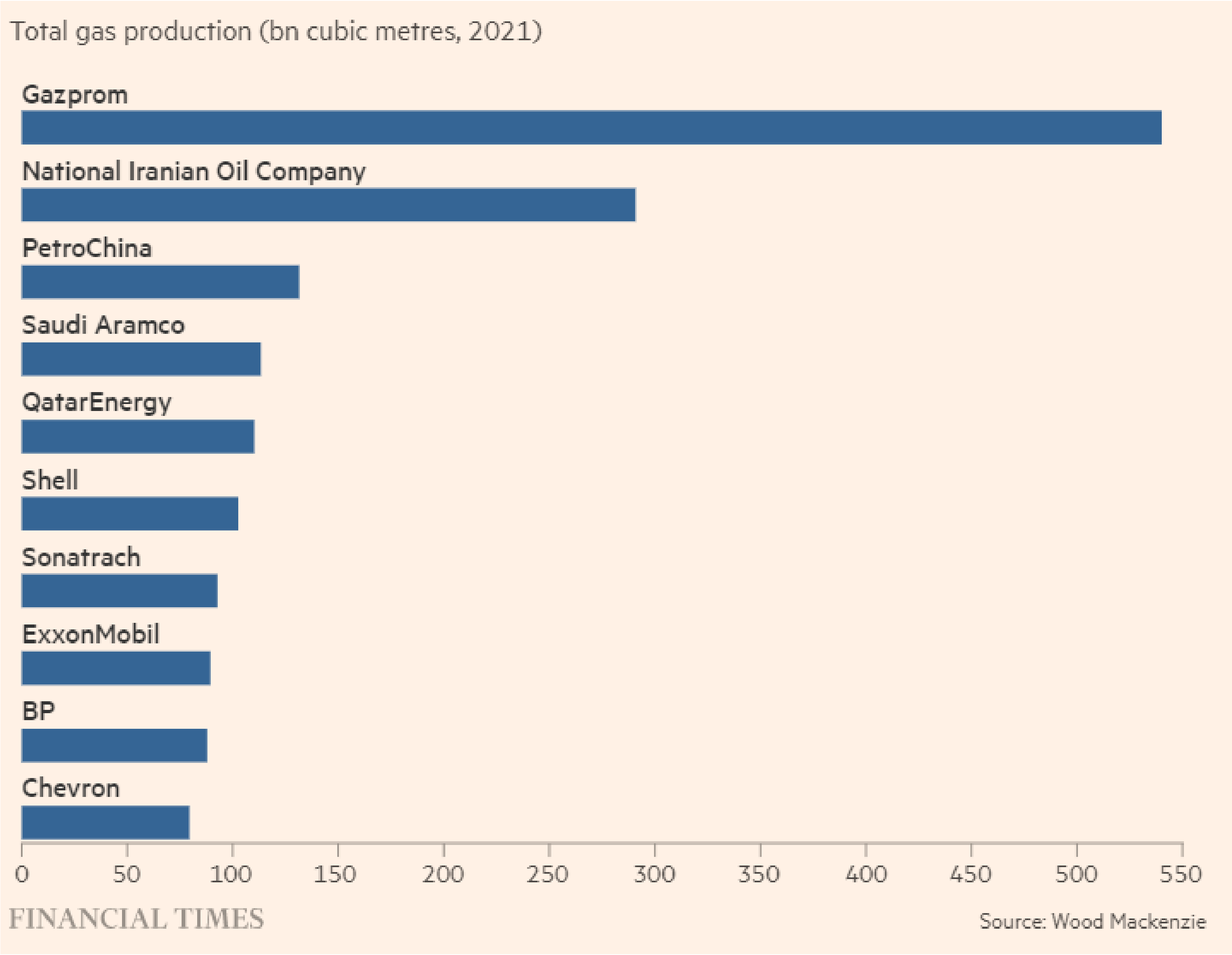


Source: *Reuters, September 29, 2022*

The 10 largest gas companies



Show Me the Money

Rosneft and Gazprom represent 25%-40% of Russia’s budget

Shale Revolution?

Putin spends $95 million on fracking disinformation campaign

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Former NATO Secretary General Anders Fogh Rasmussen backs up the Romanian claim. He said in London recently,

> "Russia, as part of their sophisticated information and disinformation operations, engaged actively with so-called nongovernmental organizations – environmental organizations working against shale gas – to maintain [Europe's] dependence on imported Russian gas."

- Former NATO Secretary General Anders Fogh Rasmussen

EU Fracking Bans/Moratoriums Still in Place

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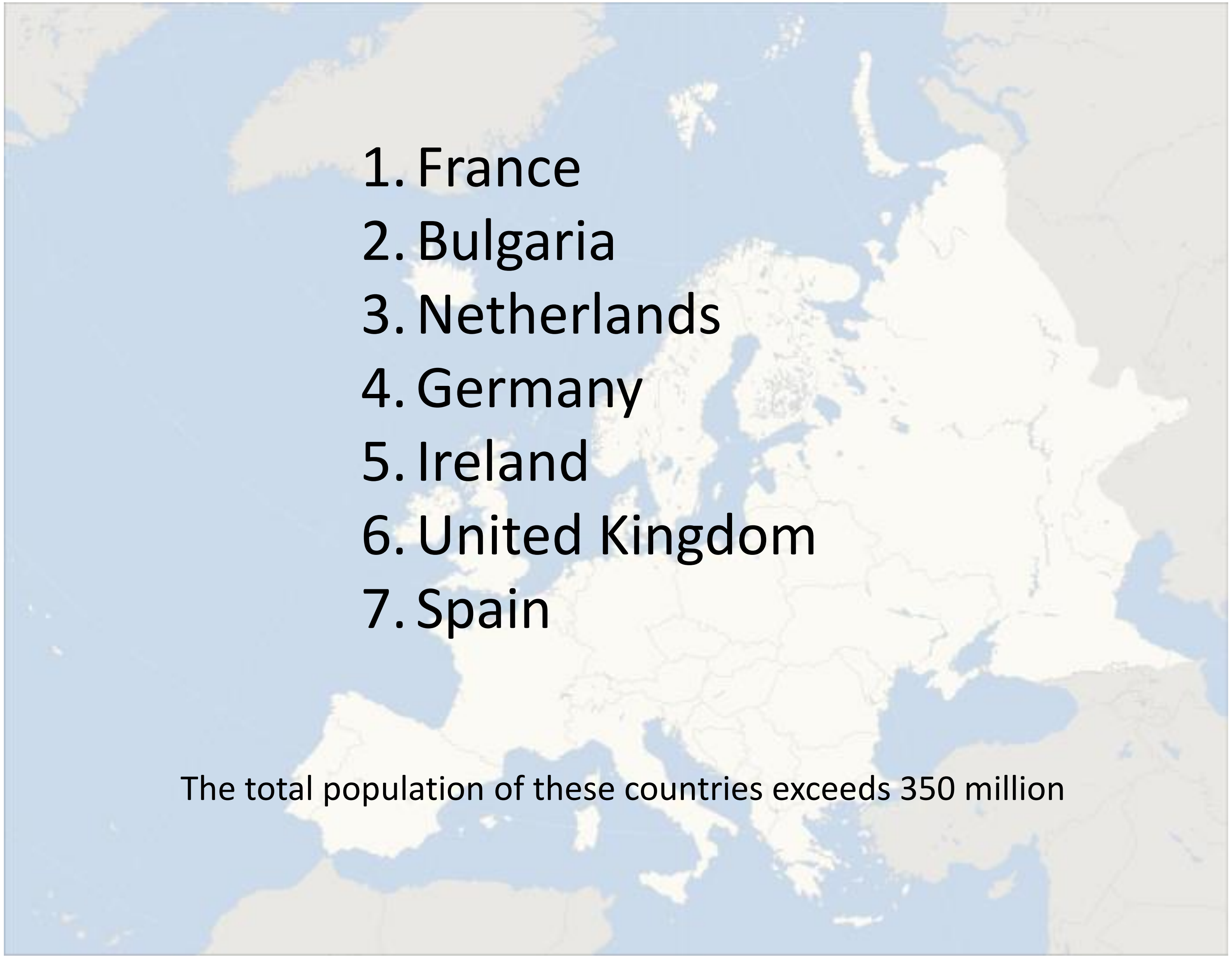


1. France
2. Bulgaria
3. Netherlands
4. Germany
5. Ireland
6. United Kingdom
7. Spain

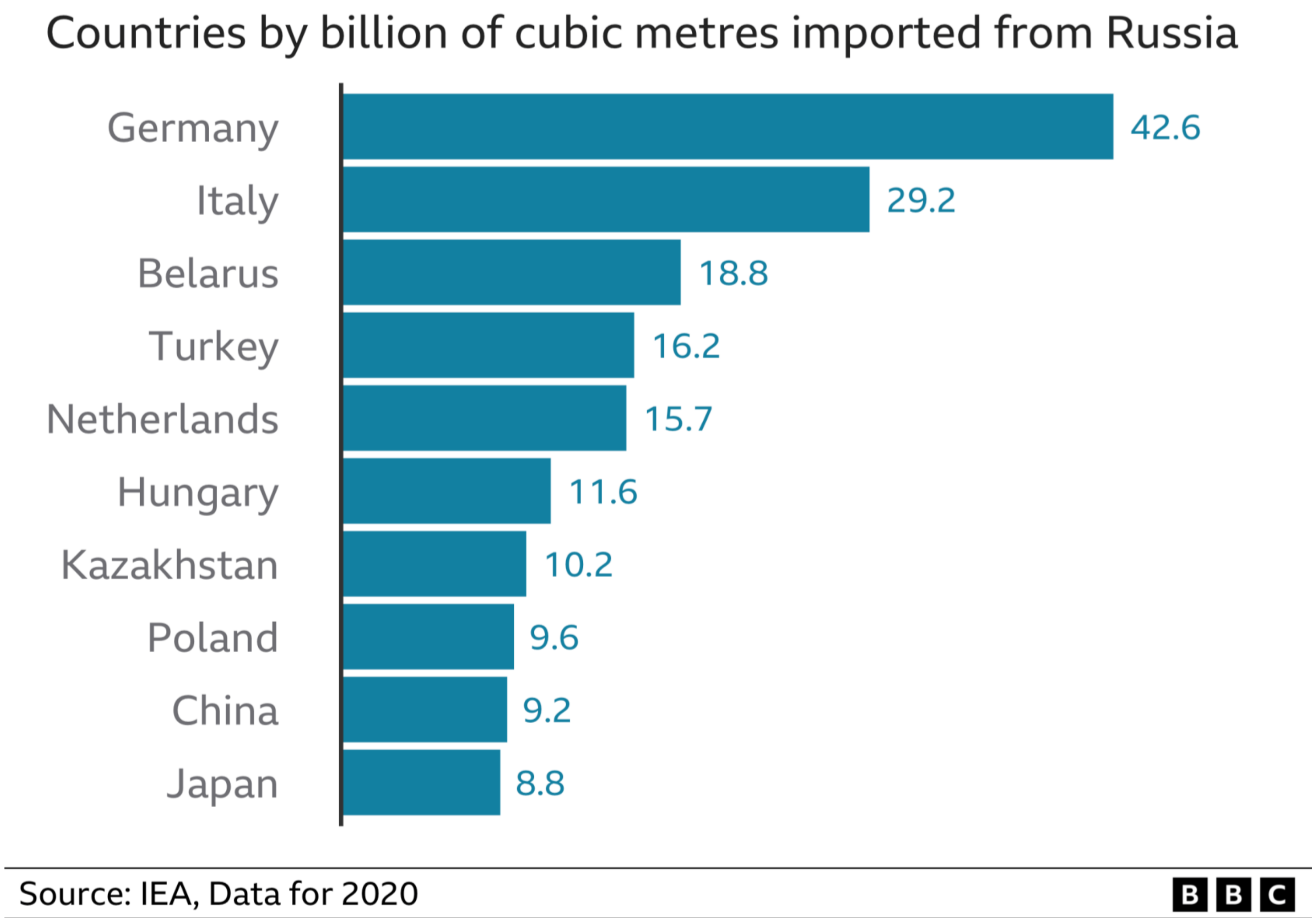
The total population of these countries exceeds 350 million

Energy Security?

- By the year 2020, Gazprom will supply nearly 70% of the European Union's natural gas.
- Would you pursue a conflict with a country that you depend on for the majority of your energy needs?

April 4, 2009

Russia's gas exports



Source: *Russia sanctions: Can the world cope without its oil and gas?; Jake Horton, Daniele Palumbo and Tim Bowler; BBC Reality Check, May 31, 2022*

Russia and LNG – Sakhalin I and II

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- When the Sakhalin II project is fully on stream, it will supply around 5% of the world's LNG and make a significant contribution to strengthening global energy security." (February 18, 2009)

- Sakhalin, formerly owned by Shell Exploration, was "nationalized" by Gazprom. Gazprom currently owns 51% of the project.

April 4, 2009

Kovykta Gas Field

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- Reserves amount to 2 trillion cubic meters of natural gas (70 TCF)
- More than 600 million barrels of gas condensate
- 3-4 BCF gas/day

History of Kovykta

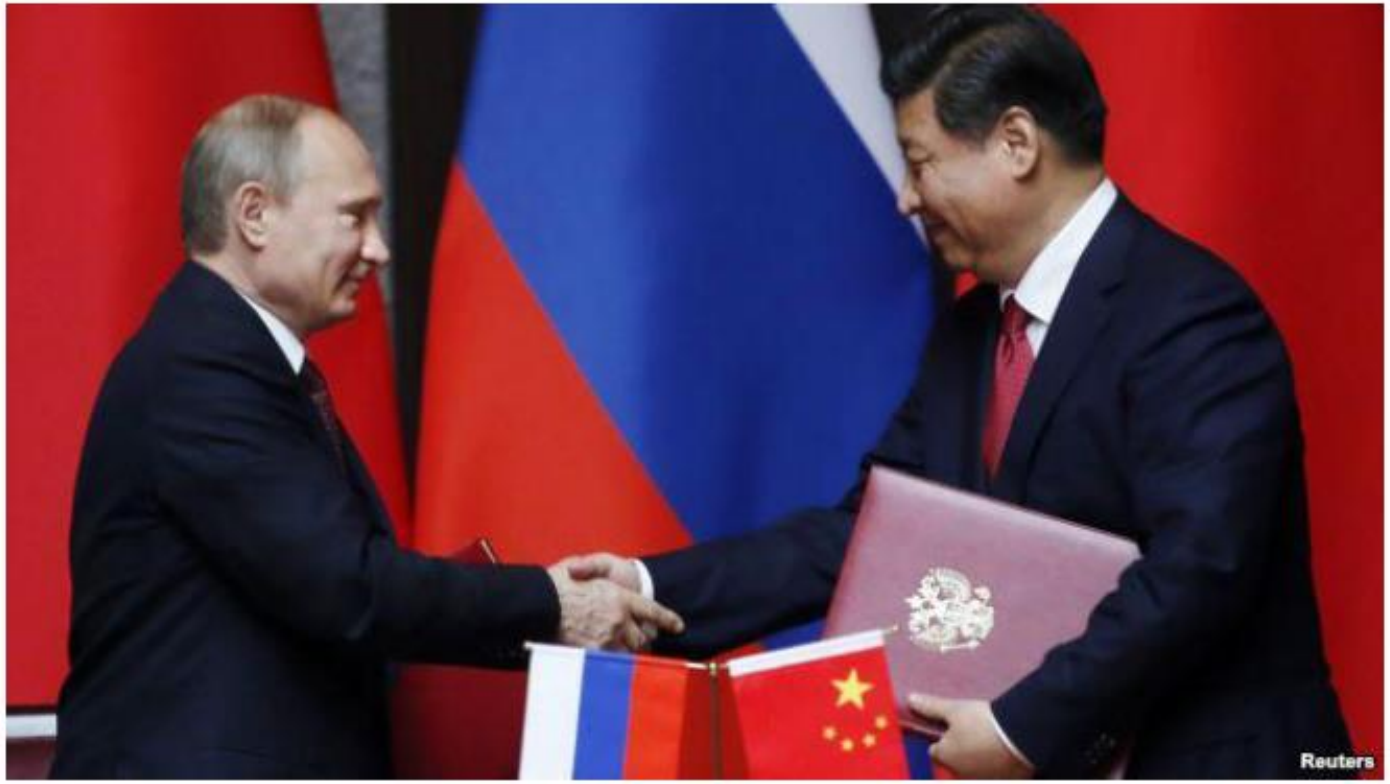
- **1987** – Kovykta discovered
- License to develop held by Russia Petroleum (Majority of RP owned by TNK-BP)
- **June 2006** – Top TNK-BP Engineer Enver Ziganshin murdered
- **June 2007** – TNK-BP offered to sell stake for $700-$900 million to Gazprom, but deal never materialized
- **June 2010** – Russia Petroleum filed for bankruptcy
- TNK-BP attempted to sell field to state owned Rosneft but failed
- **March 2011** – Gazprom bought Russia Petroleum's assets, including Kovykta, for $711 million

Kovykta Today

May 2014 -

The Washington Post

China, Russia sign $400 billion gas deal



Power of Siberia Gas Pipeline Map

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Source: *wikipedia*

European LNG infrastructure

Source: *European Commission 2022, Clean Energy Wire*

Europe has authorized 21 new LNG projects

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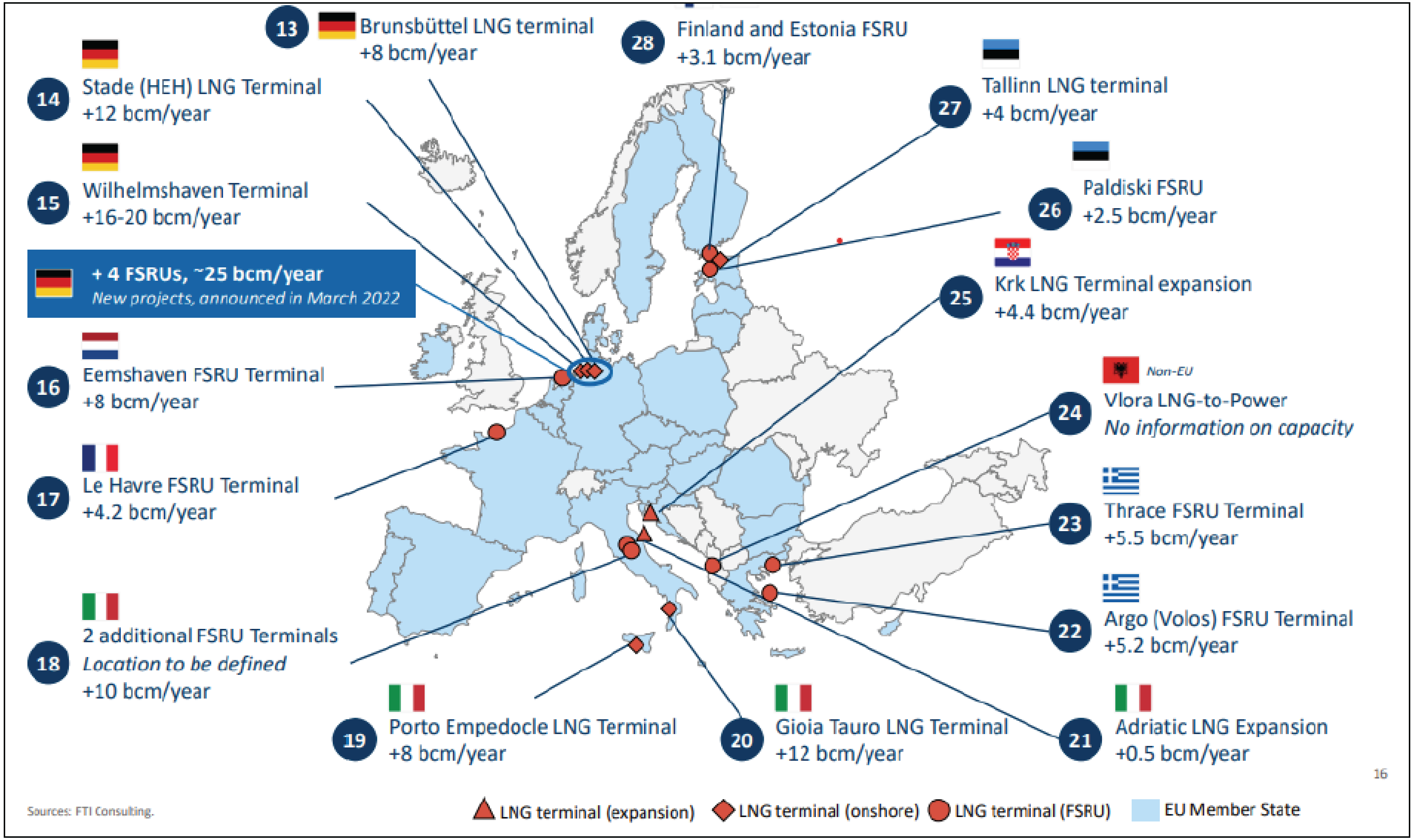

https://www.fticonsulting.com/-/media/files/emea--files/insights/white-papers/2022/may/new-lng-regasification-terminals-europe.pdf

Source: WGC2022 28th World Gas Conference, May 2022

The United States has been the key driver of global natural supply growth

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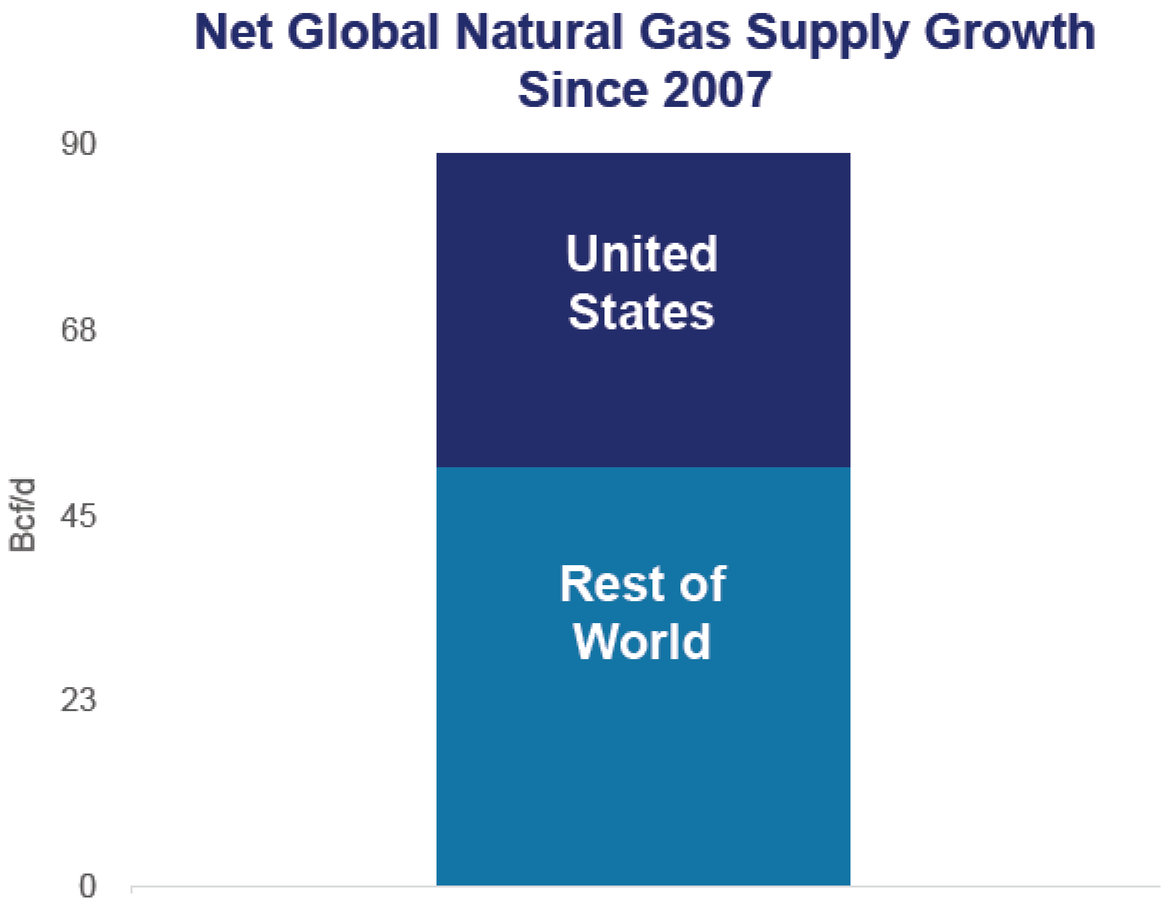
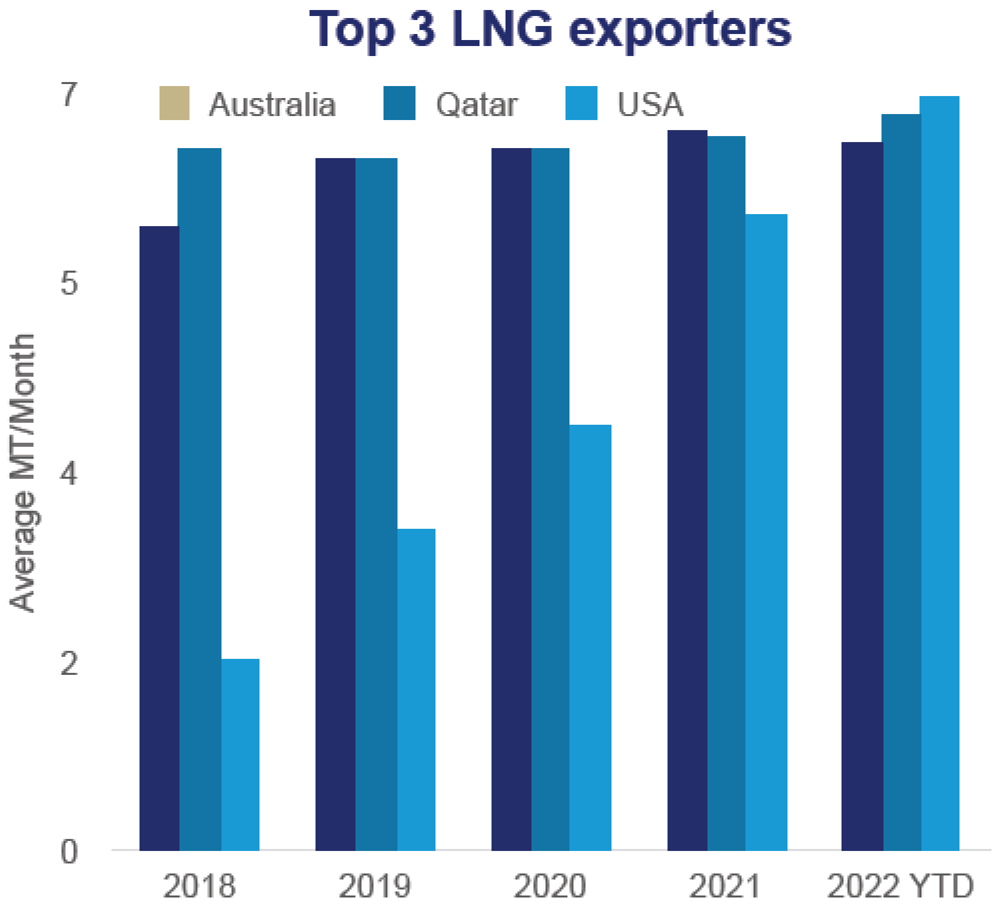


- Since 2007, 42% of global natural gas supply growth has come from the United States



- US natural gas supply growth has supported LNG exports, with the US overtaking Qatar this year

SEMPRA INFRASTRUCTURE

Source: Wood Mackenzie, IHS Markit
Note: 2022 YTD = January 1 to June 15, 2022

Source: *Sempra Infrastructure, "Evolving energy for an evolving world," September 27, 2022*

U.S. LNG Export Capacity

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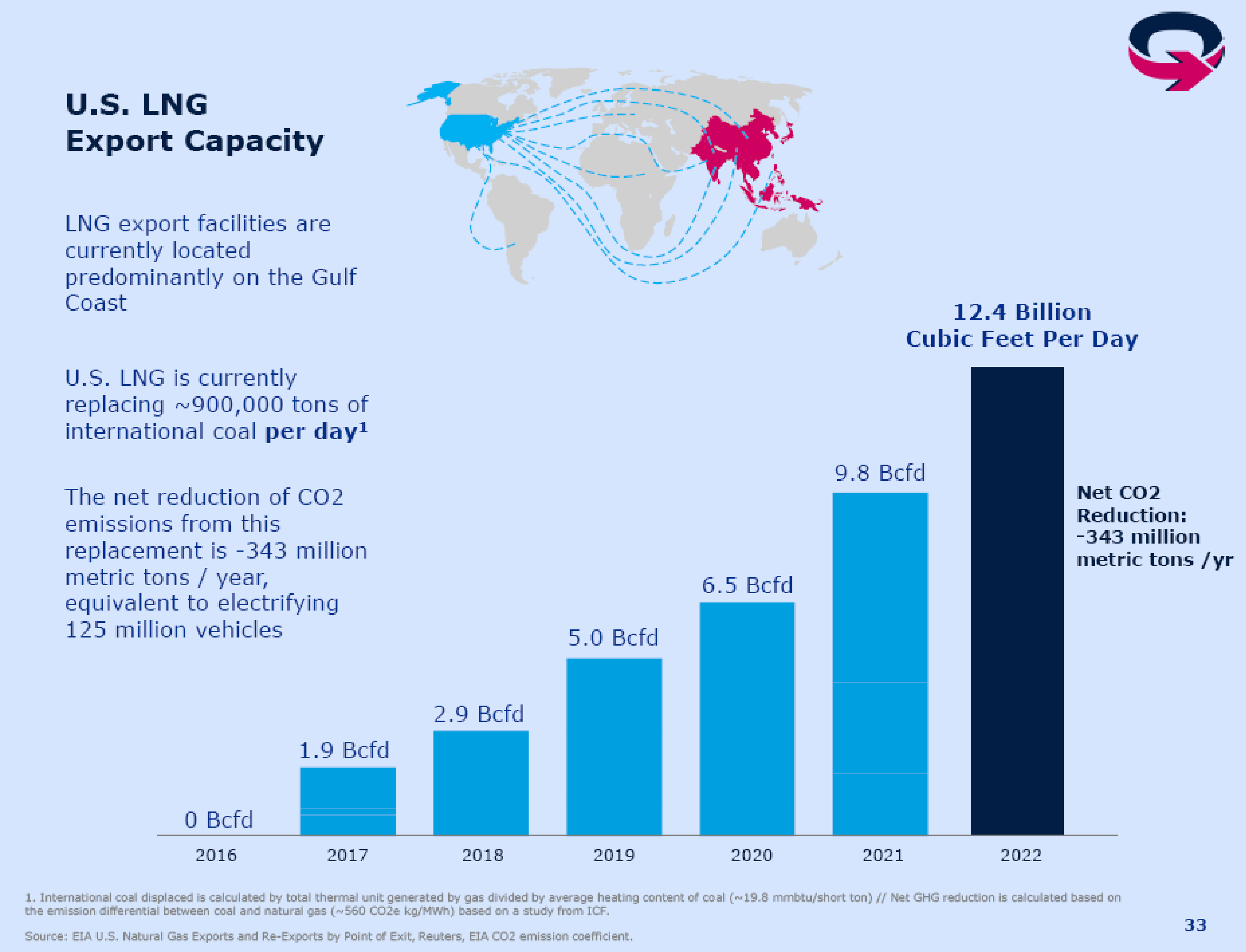

Source: *EQT presentation CERA Week LNG, Unleashing U.S. LNG: The Largest Green Initiative on the Planet*

USGC LNG feed gas is expected to reach ~24 Bcf/d by 2030, adding ~14 Bcf/d to regional demand (from 2021 average of ~10 Bcf/d)

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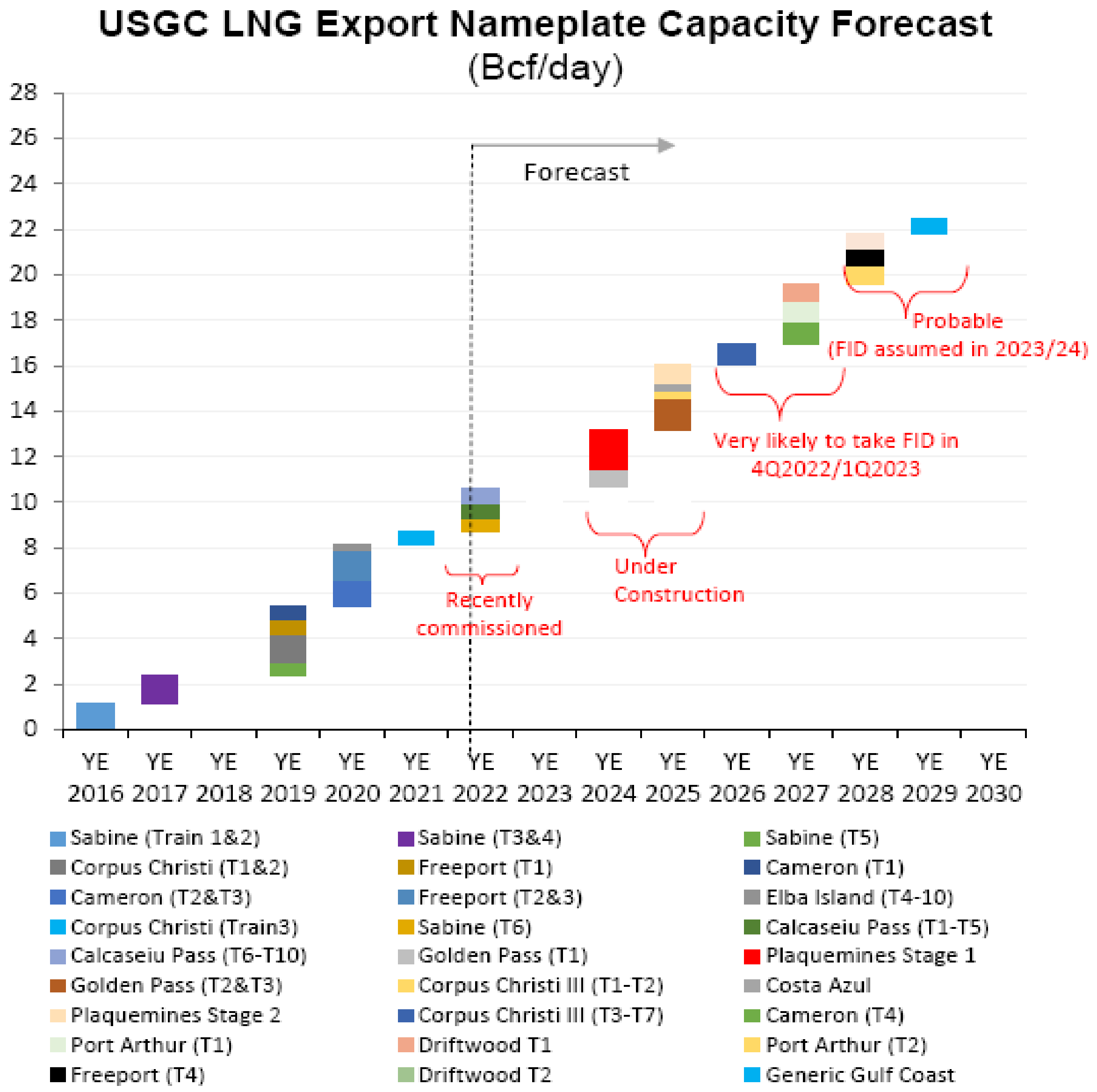

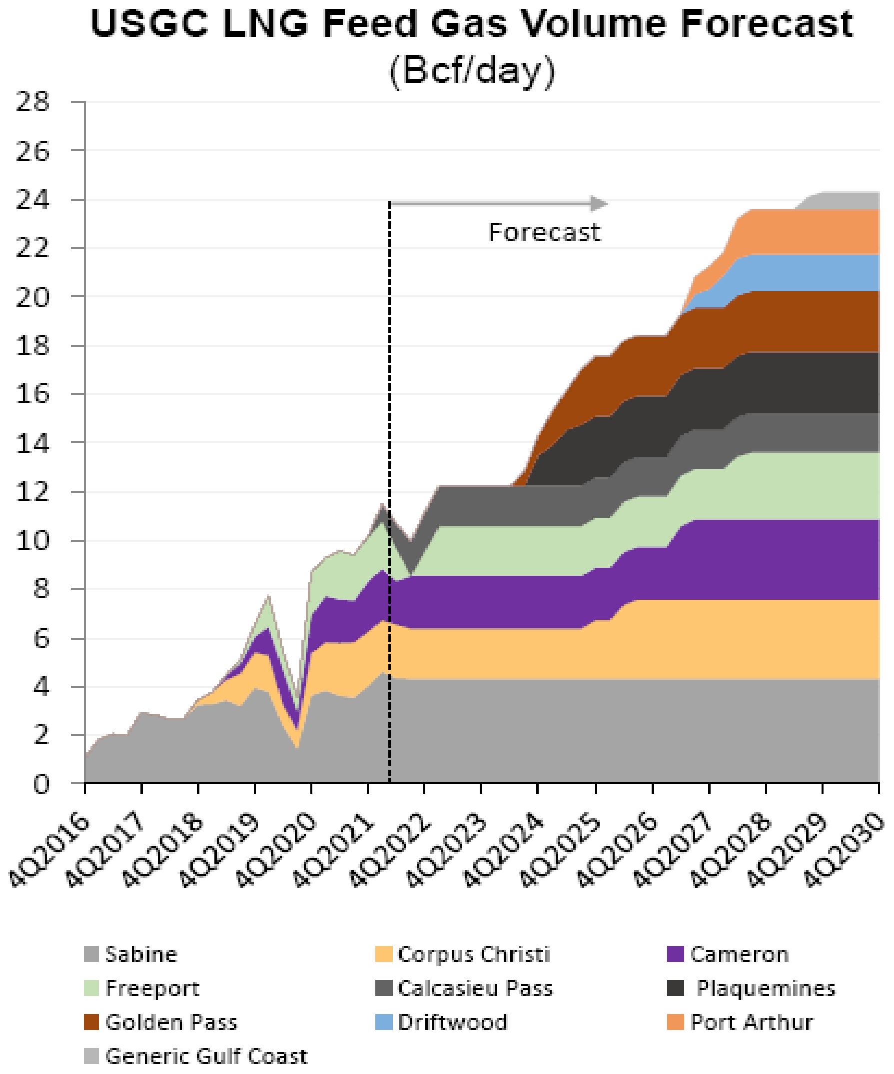

Source: Enkon Energy Advisors, *"Are Stars Aligning for U.S. Natural Gas Storage Assets?" September 27, 2022, Enkon Research and Analysis, Investor presentations, FERC, EIA, Informational Postings*

Ukraine Invasion – Putin Miscalculated

U.S. LNG Responded

The United States became the world's largest LNG exporter in the first half of 2022

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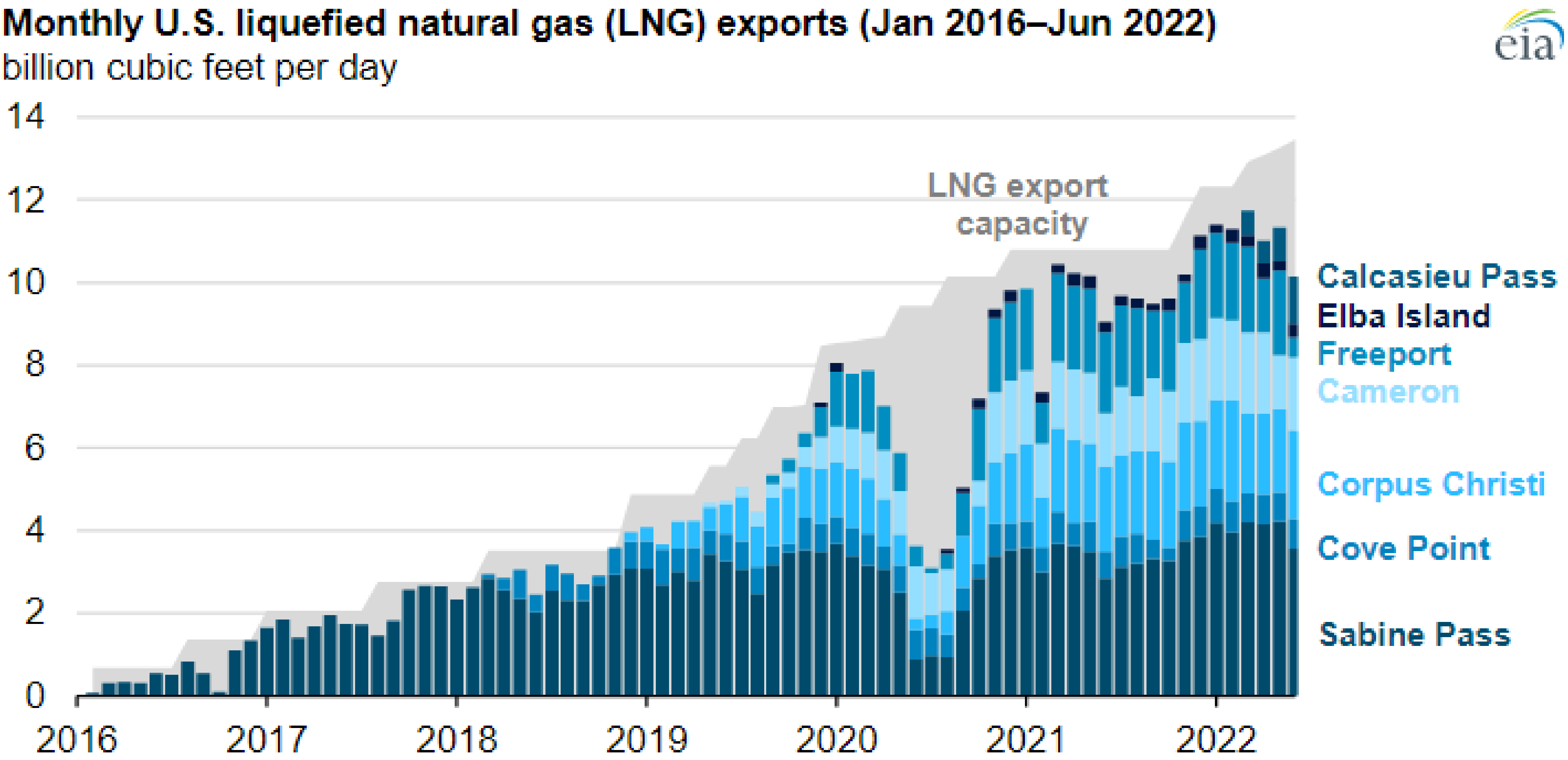
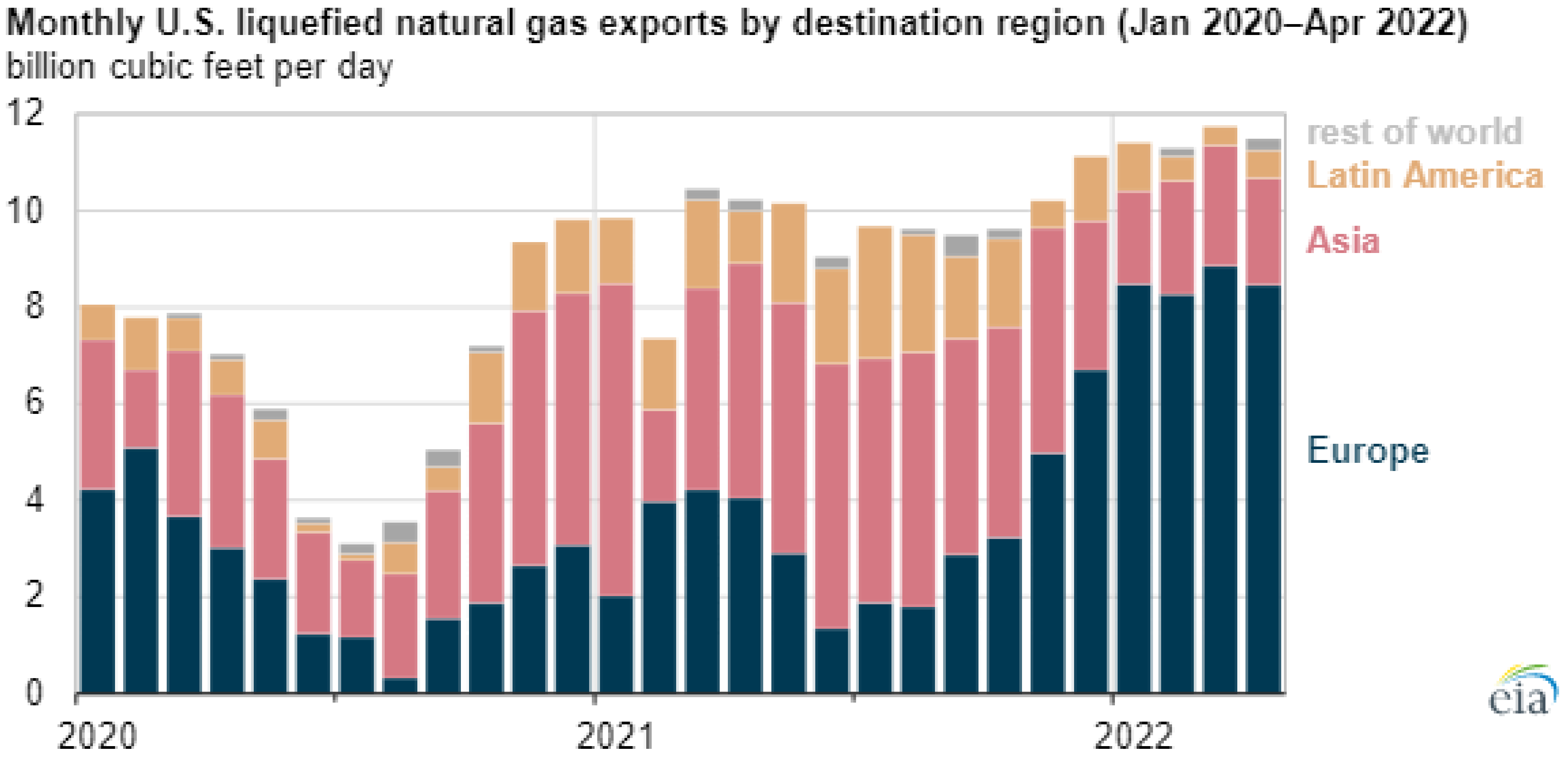


Data source: U.S. Energy Information Administration, *Liquefaction Capacity Table*, and U.S. Department of Energy *LNG reports*

Note: June 2022 LNG exports are EIA estimates based on tanker shipping data. LNG export capacity is an estimated peak LNG production capacity of all operational U.S. LNG export facilities.

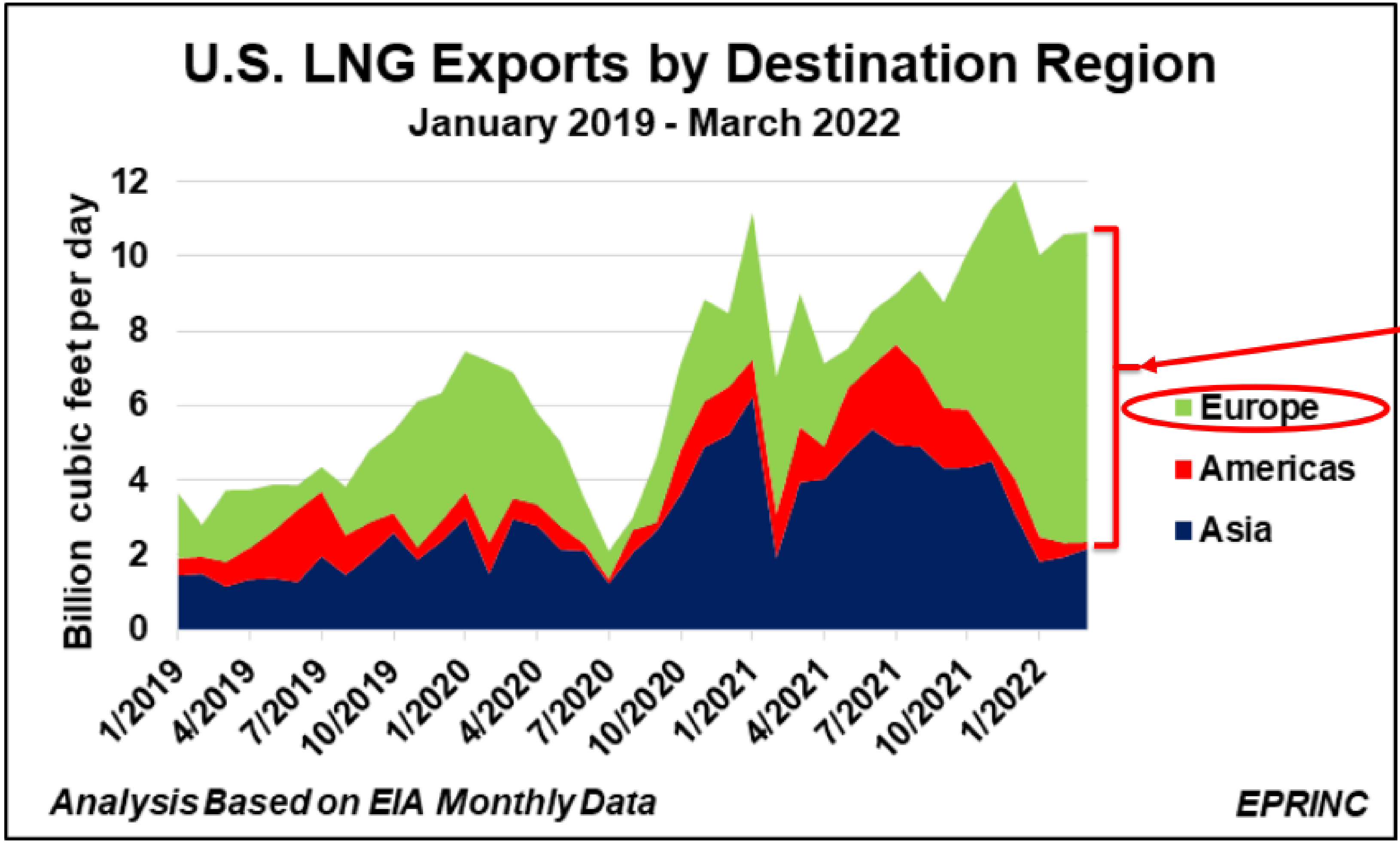
U.S. liquefied natural gas exports to Europe increased during the first 4 months of 2022



Note: Europe includes Turkey

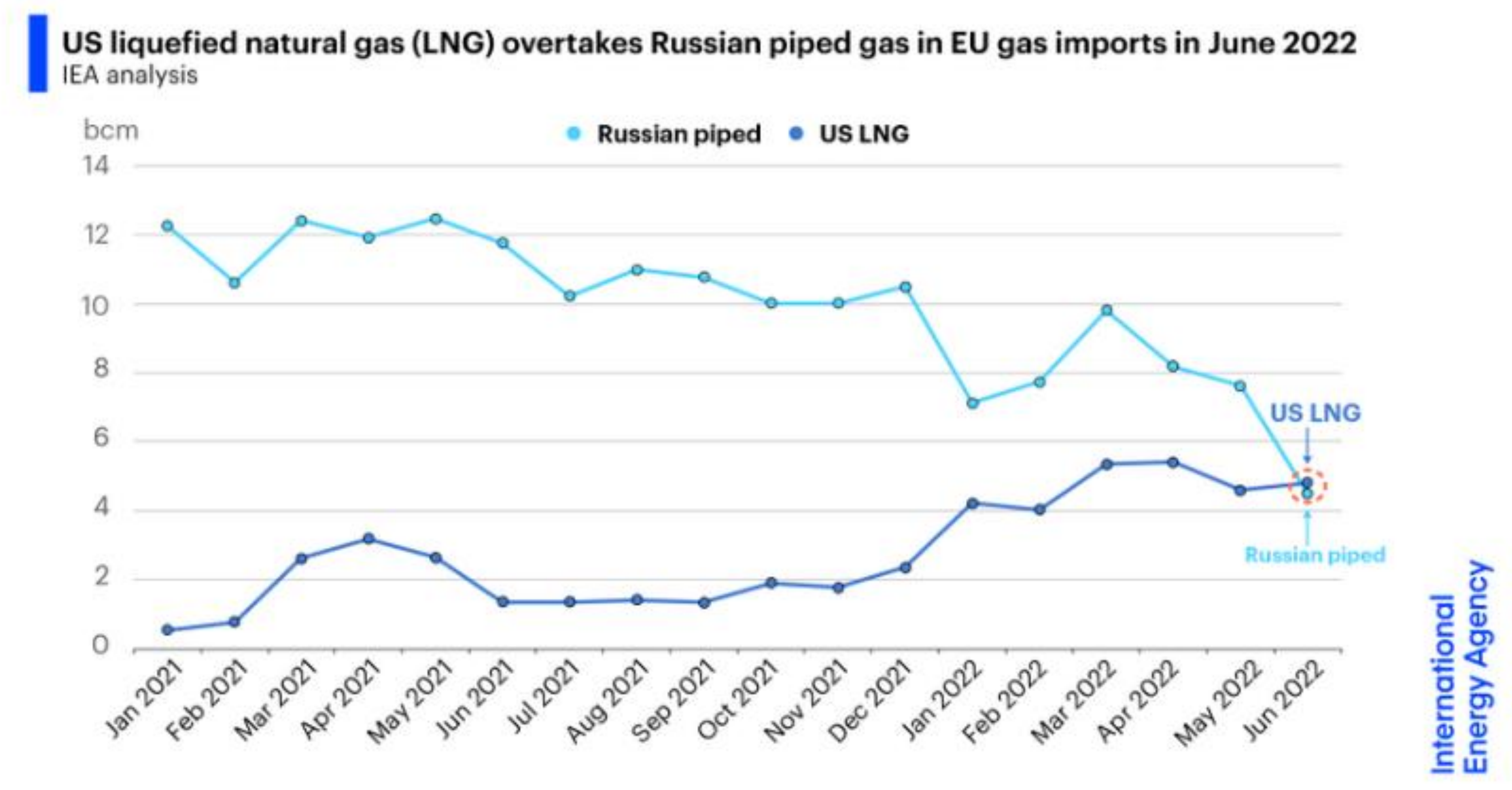
Source: *U.S. Energy Information Administration (EIA), Natural Gas Monthly and EIA estimates for April 2022*

U.S. LNG Exports by Destination Region



With the winter 2021-2022 shortfall in natural gas supplies from Russia, Europe accelerated purchases of U.S. LNG at the rate of 8 BCF/d in the first three months of 2022.

Source: *Chart of the Week #2022-21 U.S. LNG Exports: Recent Trends, Max Pyziur, EPRINC, June 15, 2022*


US liquefied natural gas (LNG) overtakes Russian piped gas in EU gas imports in June 2022
IEA analysis
bcm
Russian piped
US LNG
14
12
10
8
6
4
2
0
Jan 2021
Feb 2021
Mar 2021
Apr 2021
May 2021
Jun 2021
Jul 2021
Aug 2021
Sep 2021
Oct 2021
Nov 2021
Dec 2021
Jan 2022
Feb 2022
Mar 2022
Apr 2022
May 2022
Jun 2022
US LNG
Russian piped
International Energy Agency

Germany’s Angst

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Germany’s pursuit of peace in trade with Russia failed

“Roughly half of Germany’s homes rely on natural gas for their heating, and 55 percent of the country’s gas comes from Russia.”

A near-term cut-off of Russian gas supplies to Germany could cost their economy $120 billion. Germany would be rationing natural gas.

Source: *After Germany Moves Toward Gas Rationing, Putin Appears to Offer a Workaround, Melissa Eddy, The New York Times, March 30, 2022*

Germany's About Face Gives Hope

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"We must change course to overcome our dependence on imports from individual energy suppliers,"

- Chancellor Olaf Scholz

This will include building two liquefied natural gas (LNG) terminals, one in Brunsbuettel and one in Wilhelmshaven, and raising its natural gas reserves.

Source: *Nuclear, coal, LNG: 'no taboos' in Germany's energy about-face; Christoph Steitz, Riham Alkousaa and Maria Sheahan, Reuters, February 27, 2022*

Natural Gas is Critical for Global Food Production

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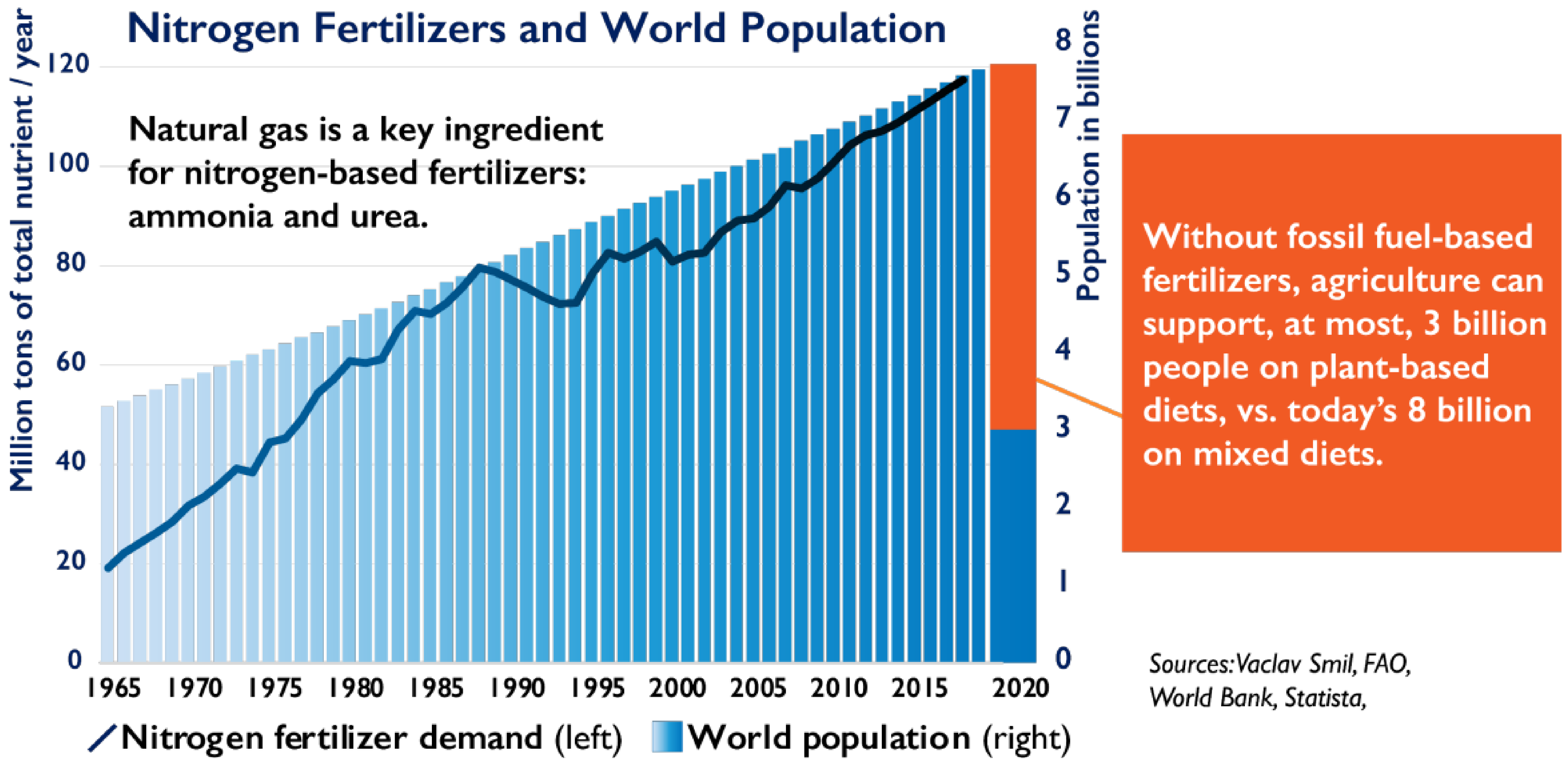

Source: *Chart of the Week #2022-23 Natural Gas and Global Food Production,* Batt Odgerel, Max Pyziur, Lucian Pugliaresi, EPRINC, June 29, 2022

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65-70% of the world caloric food intake is related to 4 grains:

- Wheat
- Rice
- Corn
- Soybeans

All require intense use of nitrogen fertilizers

Food Facts

- The goal of fertilizing grains is to increase the yield

Nitrogen Fertilizer Cost

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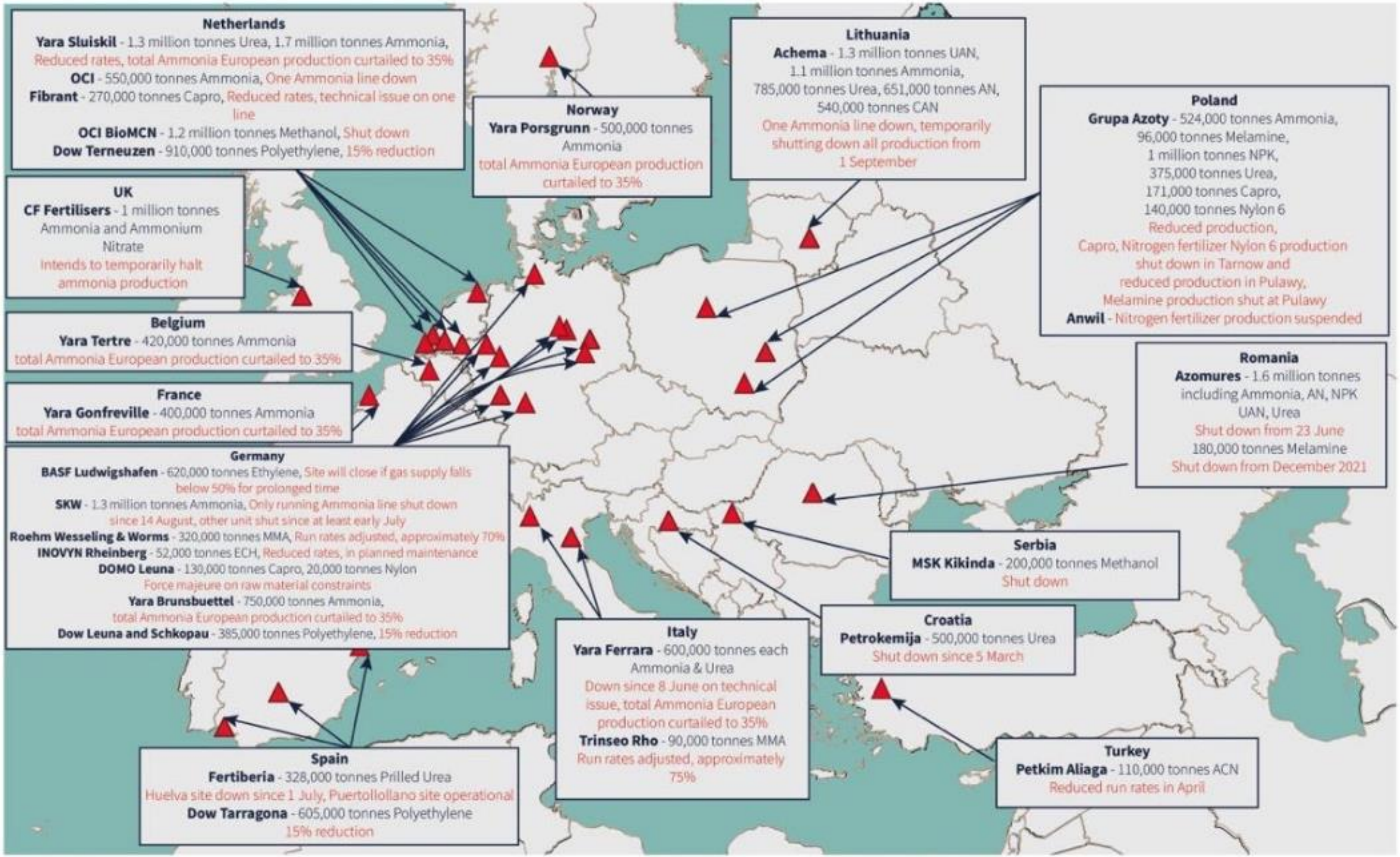
Source: *Fertilizer Usage Is Being Pummeled by Europe's Energy Crisis, Samuel Gebre and Elizabeth Elkin,* Bloomberg, August 17, 2022

Soaring gas prices hit Europe fertilizers, chemicals

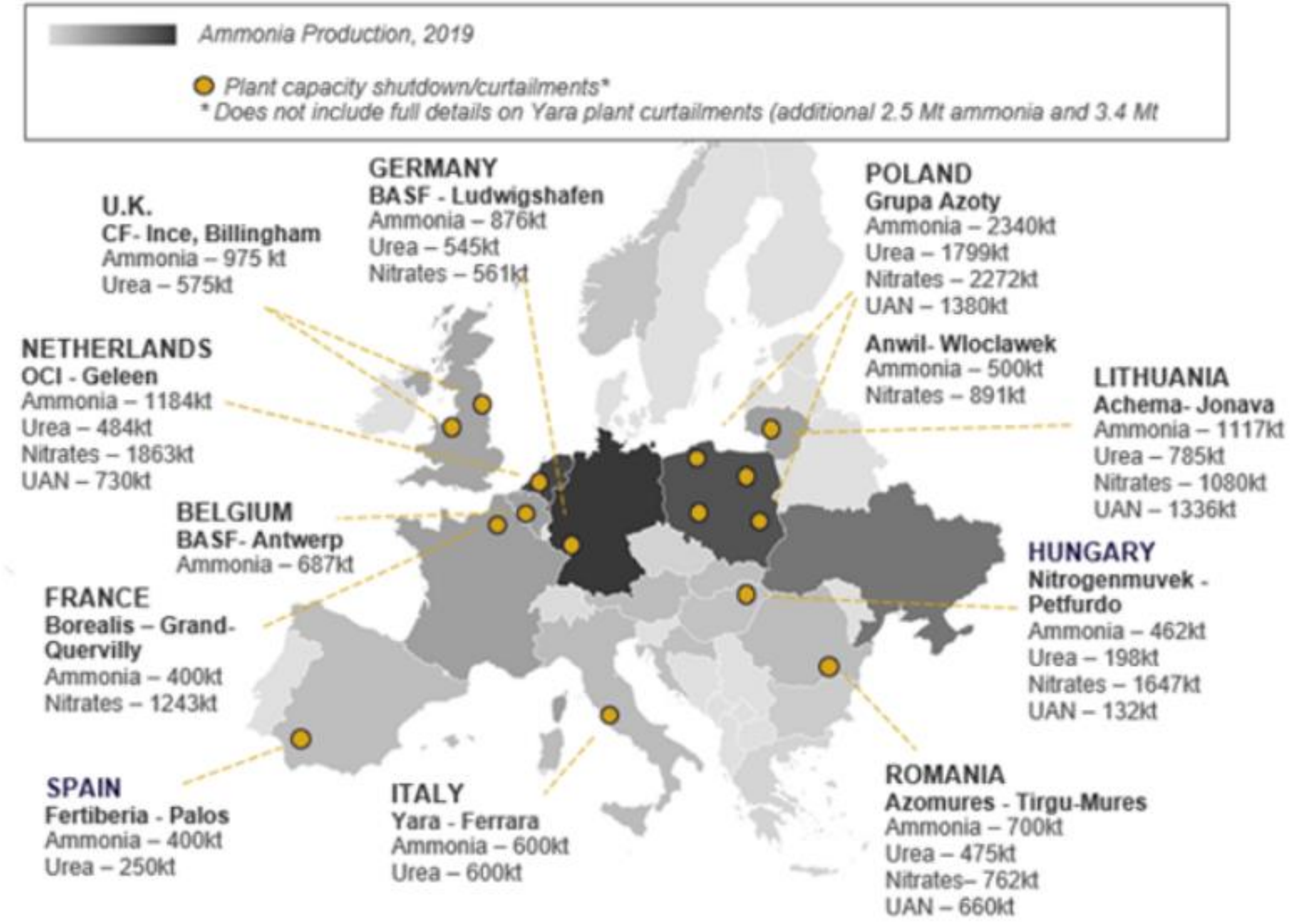


Updated on 25 August 2022

Source: *ICIS, Natural Earth*

70% of Europe's nitrogen fertilizer plants have closed

Figure 1: European nitrogen production shutdowns and curtailments



DATA: CRU, IFA

Source: *Europe nitrogen capacity closure and cost tracker, Chris Lawson,* CRU, August 25, 2022 and *Higher gas prices deepen Europe's fertilizer crunch, threaten food crisis,* Business Standard, Samuel Gebre & Elizabeth Elkin, Bloomberg, August 27, 2022, Fertilizers Europe

Fertilizer/Famine?

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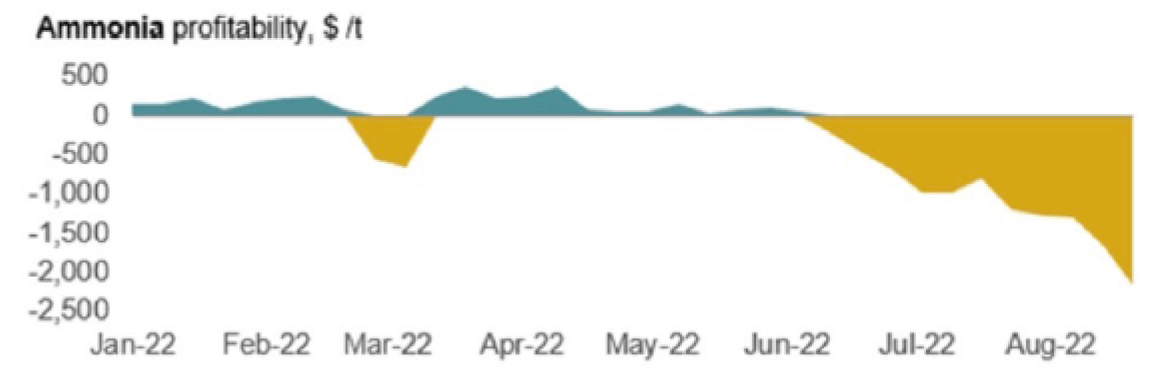
Today's EU Fertilizer Shutdowns Are Tomorrow's Food Shortages/Famine

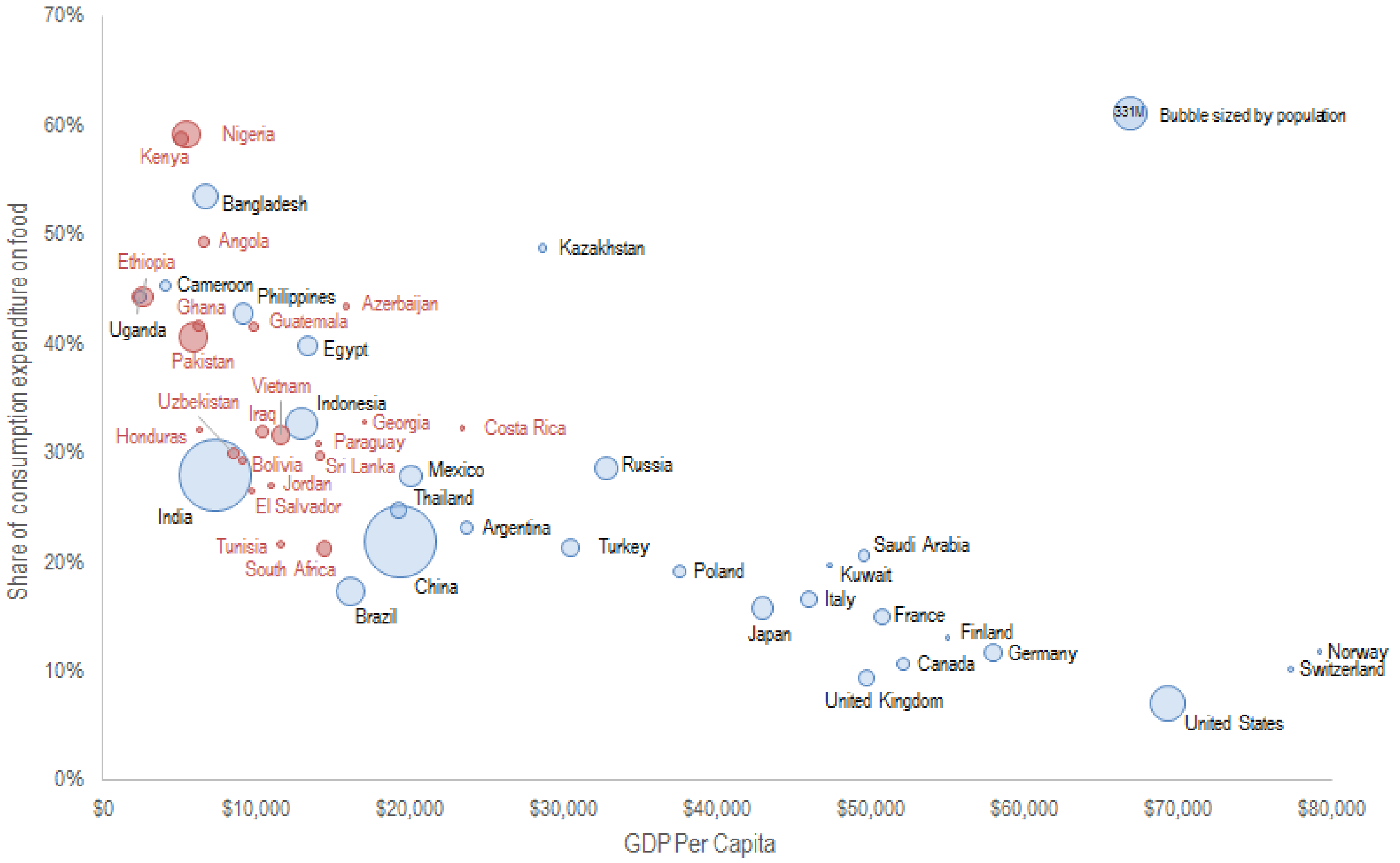
- ≈ 70% of Europe's fertilizer capacity has been shuttered due to high nat gas prices
- Ammonia prices up 5x since 1Q21
- China began restricting fertilizer exports October 2021
- Russia began restricting exports in March 2022
- Harpole: "Fertilizer production in Europe is over"
- Africa facing "shortage of at least 30 million metric tons of food"



Source: https://www.crugroup.com/knowledge-and-insights/insights/2022/europe-nitrogen-capacity-closure-and-cost-tracker/

Figure 3: Low- and middle-income countries are most vulnerable to rising food prices given a larger share of income is spent on food

Share of consumer expenditure spent on food (2020, latest data available) vs. GDP per capita, 2021. Food expenditure relates only to food bought for consumption at home (i.e., it excludes out-of-home food purchases) and excludes alcoholic beverages and tobacco products.



*Countries highlighted in red are currently in NEXGEM

Source: *Our World in Data, ERS, USDA calculations based on annual household expenditure data from Euromonitor International, World Bank, J.P. Morgan Strategic Research.*
J.P. Morgan Perspective Food Insecurity: A New Normal, Global Research, September 20, 2022

Surging Fertilizer Prices Set to Exacerbate African and Mid-East Food Crisis

- Use of nutrients may shrink by a third in sub-Saharan Africa
- Import-dependent region may face increasing food shortages

“That could potentially curb cereals output by 30 million tons, enough to feed 100 million people.”

– Sebastian Nduva, Program Manager at AfricaFertilizer.Org

Source: *Bloomberg.com*

Can European's Afford Their Energy Bills?

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Goldman Sees $2 Trillion Surge in European Household Energy Bills by 2023

- September 6, 2022, Bloomberg.com

3,500 energy intensive industries are surveyed, only half have hedges in place for energy requirements

- July 25, 2022, Oilprice.com

We are witnessing the deindustrialization of Europe

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Energy Prices Trigger Deindustrialization In Germany

- August 19, 2022, Oilprice.com

Germany Risks a Factory Exodus as Energy Prices Bite Hard

August 18, 2022, Bloomberg.com

Germany's Natural Gas Crunch Could Cause Supply Chains to Collapse

- August 3, 2022, Oilprice.com

Europe's metals industry warns of existential threat to their future

- September 2022, Eurometaux

"… pension funds and endowments that invest in private-equity funds have [asked] their managers to stop backing producers of fossil fuels…"

- September 1, 2022, WSJ.com

Shale Profit Bonanza Frees Up Even More Cash to Reward Investors

- August 11, 2022, Bloomberg.com

Make it Rain – E&Ps Shower Cash on Shareholders as Cash Flows Rise with Soaring Oil and Gas Prices

- July 12, 2022, RBN Energy

Growth in Global Energy Supplies (Oil Equivalent Billion Tons/Year)

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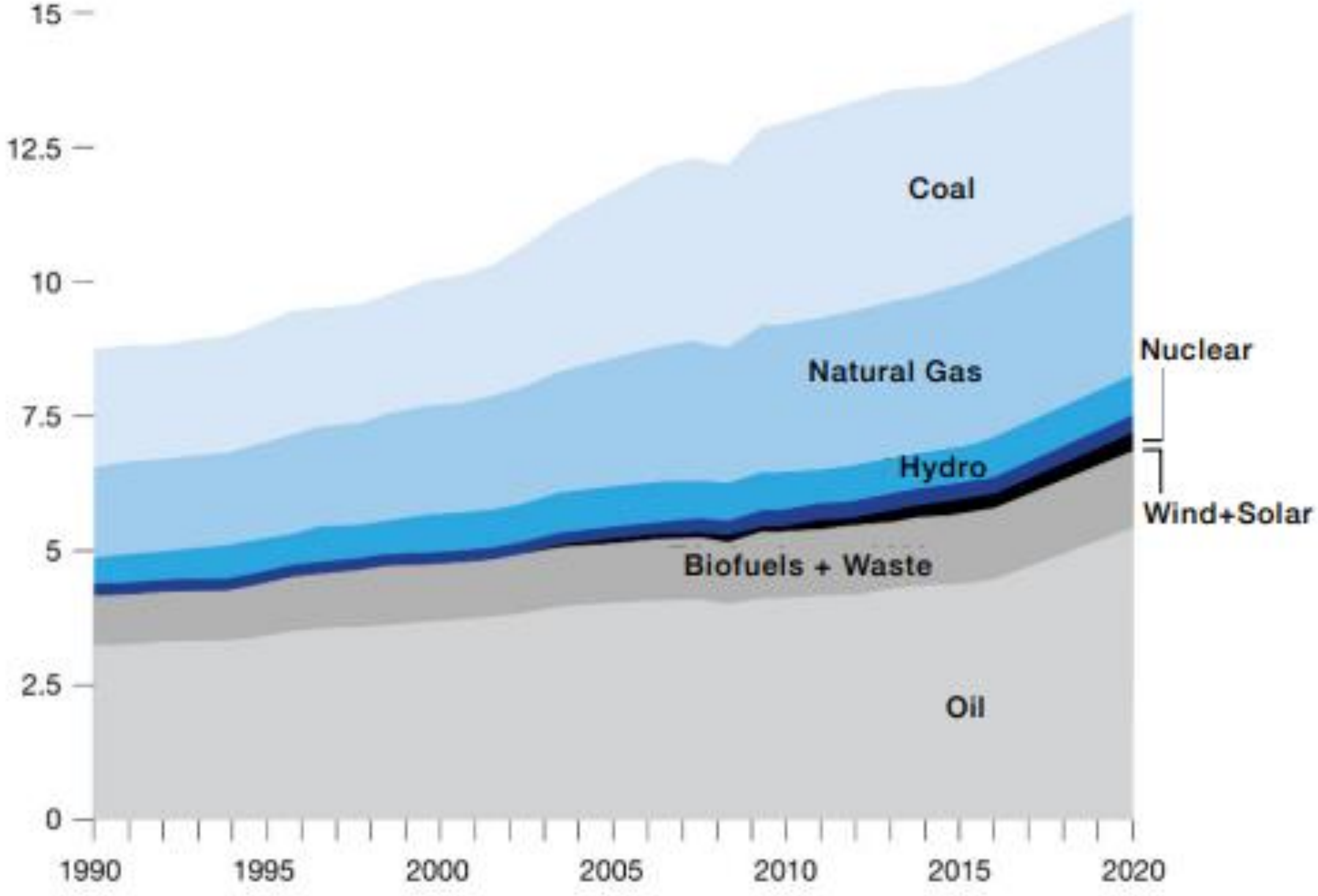

Note: 1 billion tons oil/year = 20 million barrels/day.

Source: BP, Statistical Review of World Energy 2022

Energy and Food Price Shocks, 50-year Look

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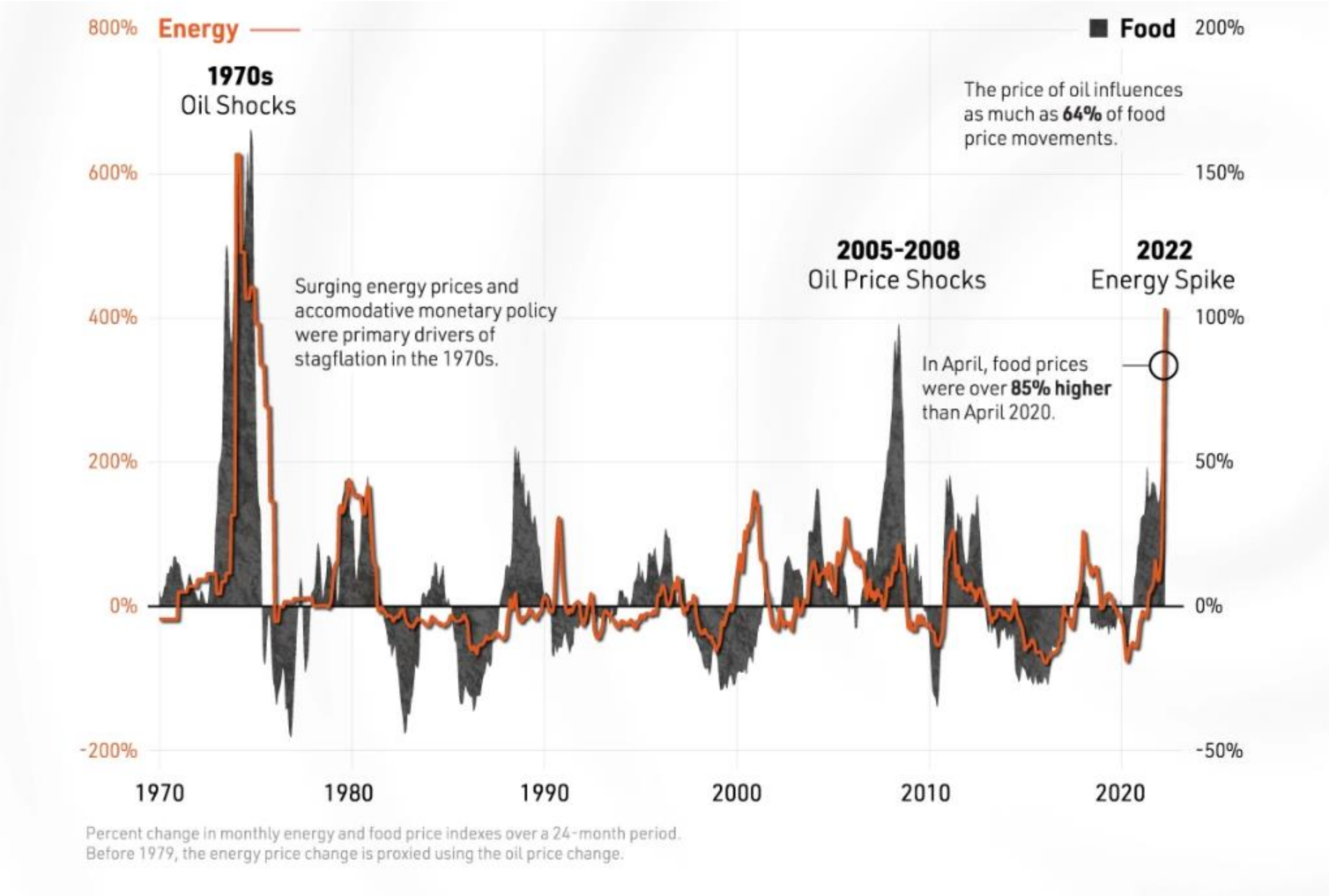
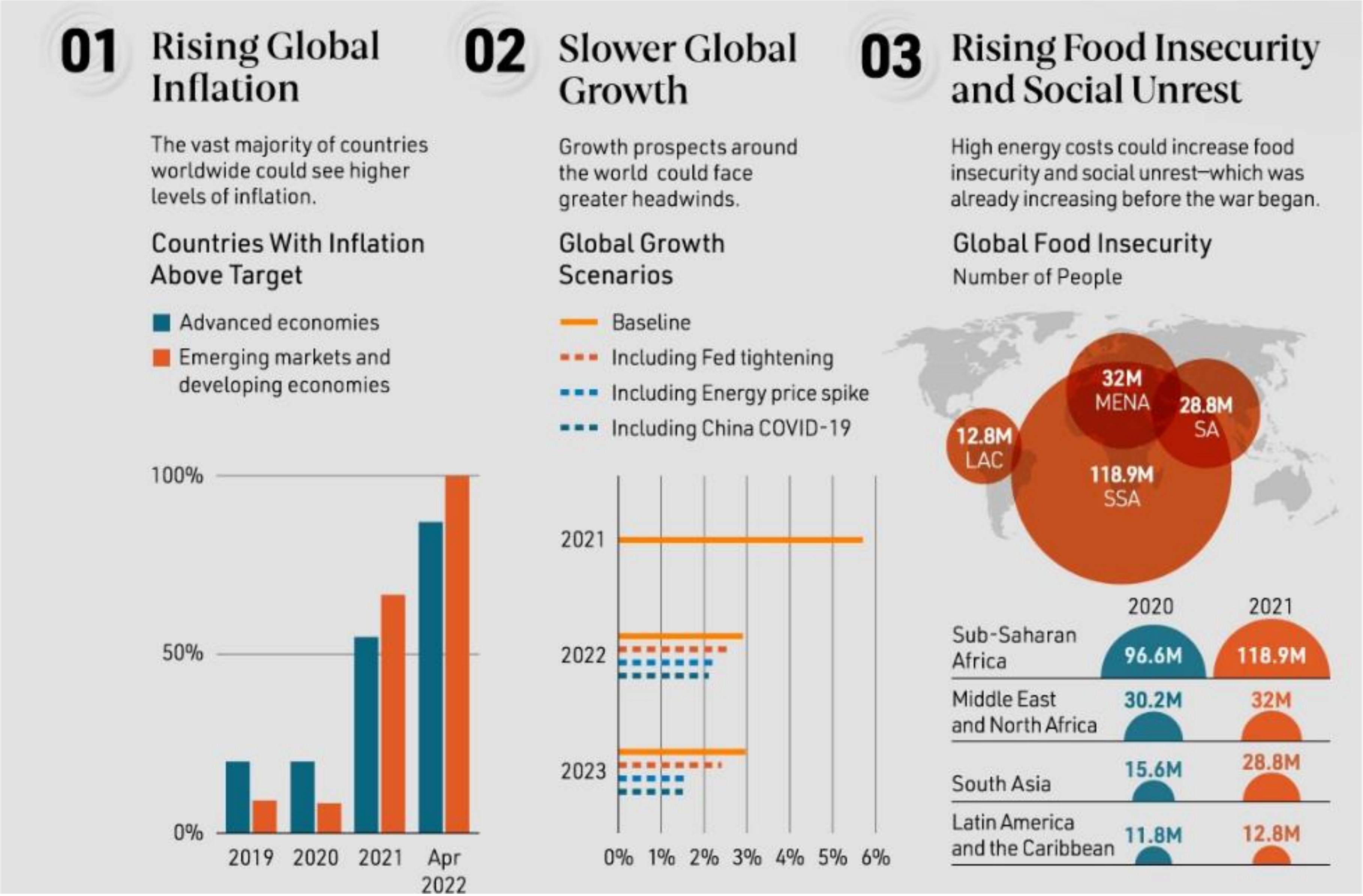


Sources: World Economic Forum, Elements.VisualCapitalist.com

Three Ripple Effects

How energy and food price shocks could affect the world economy



Sources: World Bank (2022), Energy Policy (2018), World Economic Forum, Elements.VisualCapitalist.com

Inflation drivers (percent, median inflation rate)

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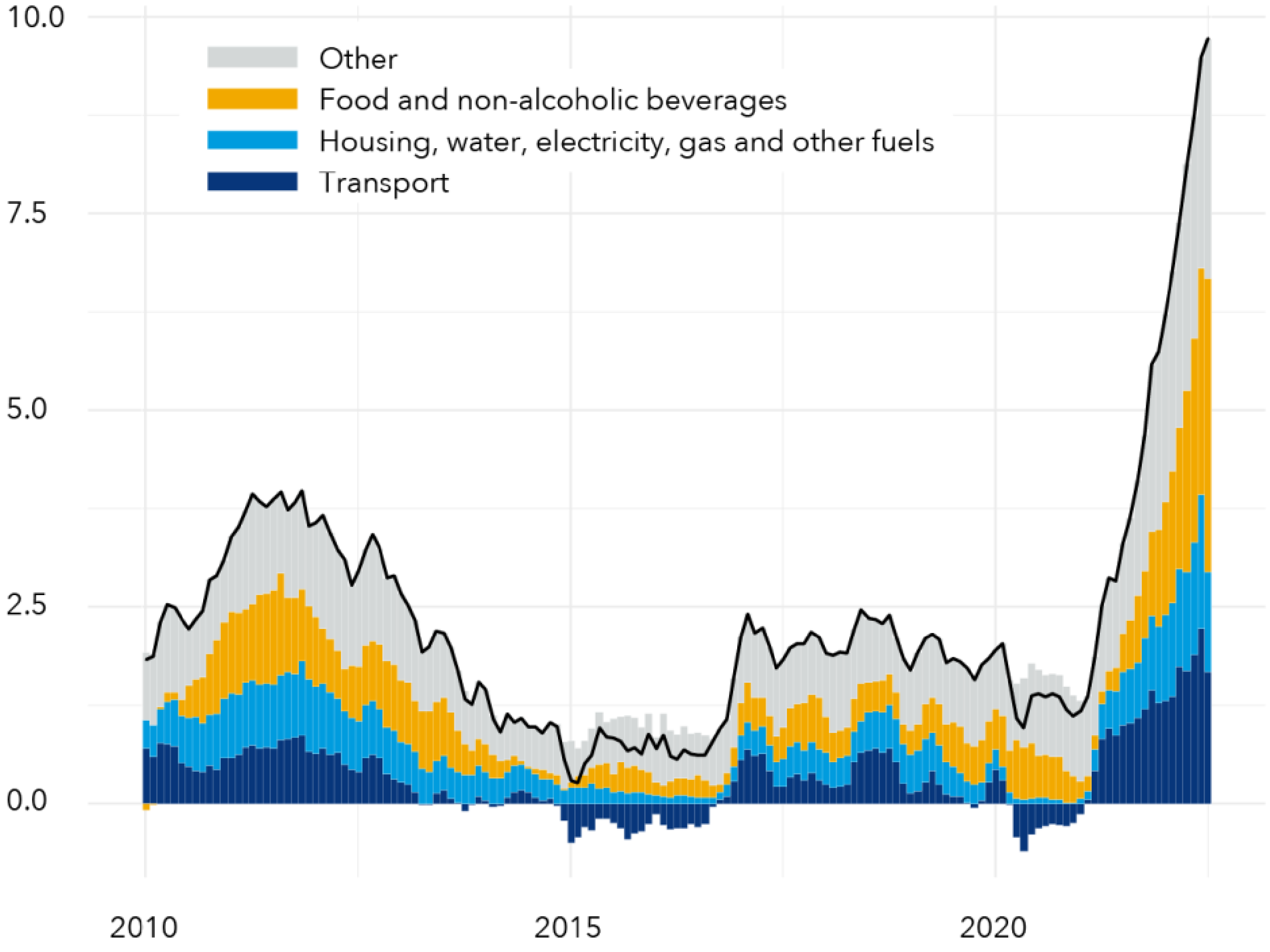

Source: IMF CPI database and IMF staff calculations.
Note: Chart shows median total inflation and in select categories across 88 countries, including 28 advanced economies and 60 emerging and developing economies.

IMF

How Food and Energy are Driving the Global Inflation Surge, Philip Barrett, September 12, 2022

Is this a sunset business?

Mercator Energy

A leading indicator of a sunset business is the inability to attract capital investments into expensive, long-term projects. This is not happening in natural gas.

- Over the past year and a half, nearly 50binding contracts have been signed for LNG offtake from facilities on the U.S. Gulf Coast
- Of these contracts, about 75% contemplate a start date in 2026 or 2027
- Of these contracts, over 70% run for 20 years and about 25% run for 15 years
- Conclusion: **Sophisticated investors are betting material capital that this will remain a good business through at lest 2045**

Source: *TG Natural Resources LLC, Craig Jarchow, September 27, 2022*

Conclusions

- European natural gas prices will remain 5x-10x the historical norm for the next 3 years
- That will cause the continued deindustrialization of Europe
- Putin’s goal of separating the EU may succeed
- Food security and famine will be one of the top concerns of all world leaders
- This is essentially a clash between globalism and nationalism
- This is also the clash between the extreme radical environmental agenda and energy pragmatism

Closing

The far green left still doesn't understand scale.

Daniel Yergin: "… this is a $90 trillion world economy that gets 80% of its energy from hydrocarbons. It's not going to change overnight."

Source: *Energy conference leader pans Kerry's 2050 climate goals: 'Going to still be an energy mix,' Tyler Olson, Fox Business, March 15, 2022*

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Other Headlines - Positive

Mercator Energy

FERC retreats on gas policies as chair pursues clarity

- March 25, 2022, E&E News

Calif. gives 'new life' to gas plants in emergency overhaul

- July 1, 2022, E&E News

New [Floating LNG] Terminals Arrive to Ease Putin's Grip on Europe

- September 7, 2022, Bloomberg.com

Mexico Plans to Become an [LNG] Export Hub With US-Drilled Natural Gas

- August 12, 2022, Bloomberg.com

Other Headlines - Negative

Texas Consumers On Hook for $10 Billion In Debt Incurred During Winter Storm Uri

- August 24, 2022, Forbes.com

Railroad Commission adopts state's first weatherization rule for natural gas facilities

- September 8, 2022, The Center Square

EPA denies Cheniere Energy's request for LNG pollution waiver

- September 6, 2022, Associated Press

Other Headlines - Negative

Mercator Energy

Worried about a warming world, thousands of Germans reject using LNG – including Canada's

- August 14, 2022, CBC

Macron Backs EU-Wide Windfall Tax on Energy Company Profits

- September 5, 2022, Bloomberg.com

Flush with cash [$41.5 billion], EPA could toughen methane rules

- October 7, 2022, E&E News

CFE has plans to tender for ~10 GW of gas fired combined cycle plants, potentially adding 1.2 Bcf/d of new gas demand by 2030

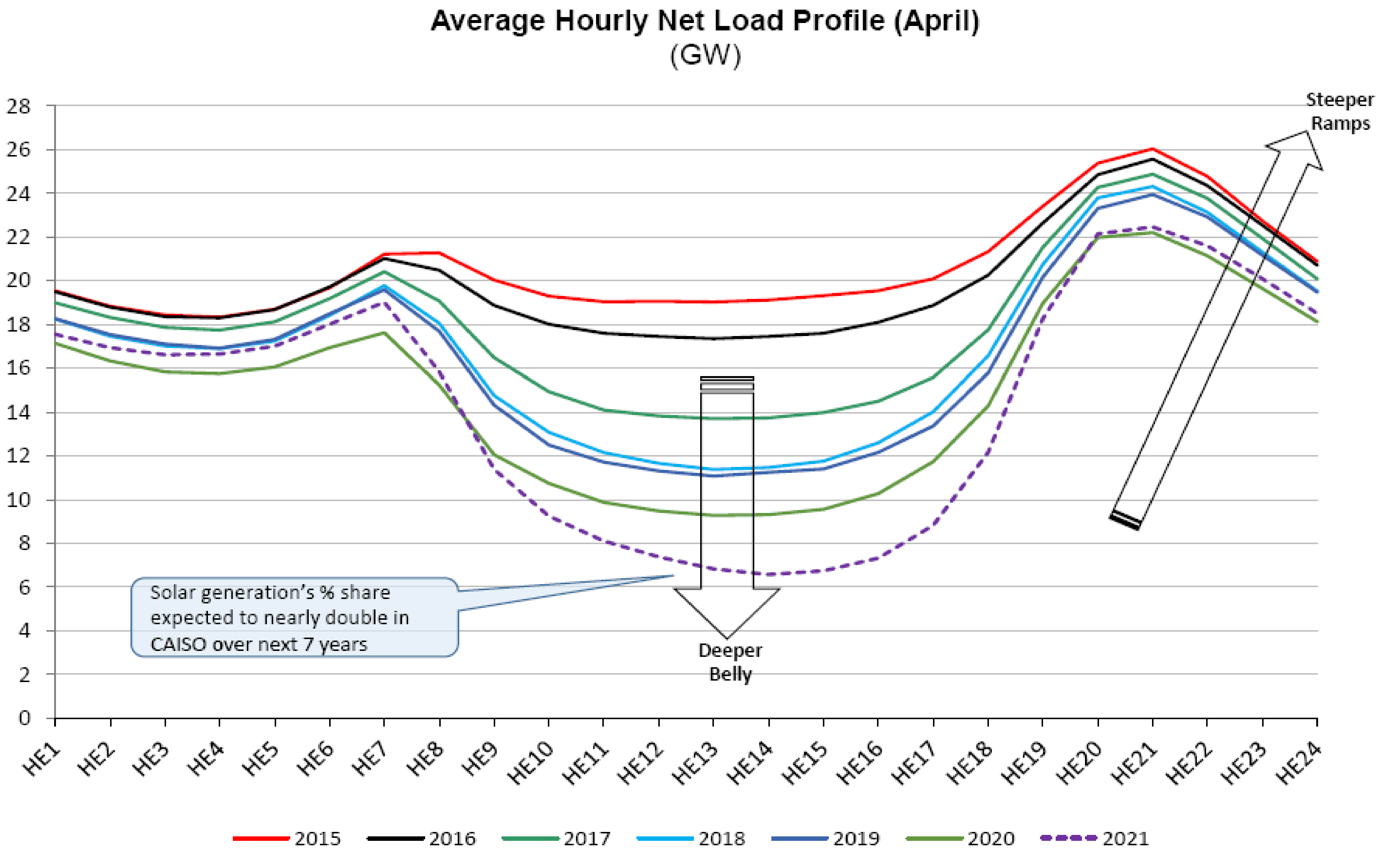
Mercator Energy

New Gas-Fired Generation Capacity in Mexico
(2022-2030)

#	CFE Proposed Power Plant	Capacity (MW)	COD
1	Riveria Maya-Valladolid (CC)	752	2023
2	Gonzalez Ortega (CC)	699	2024
3	Baja California Sur (CC)	164	2024
4	Merida (CC)	521	2024
5	Tuxpan (CC)	1086	2024
6	San Luis Rio Colorado (CC)	697	2024
7	Salamanca (CC)	932	2024
8	El Suaz II (CC)	256	2024
9	SAN LUIS POTOSI (CC)	442	2024
10	Mexicali Oriente (IC)	429	2023
11	Parque Industrial (IC)	202	2023
12	Manzanillio (CC)	950	2026
NA	Generic Plant (CC)	875	2028
NA	Generic Plant (CC)	864	2028
NA	Generic Plant (CC)	875	2029
	Total (GW)	9.9	

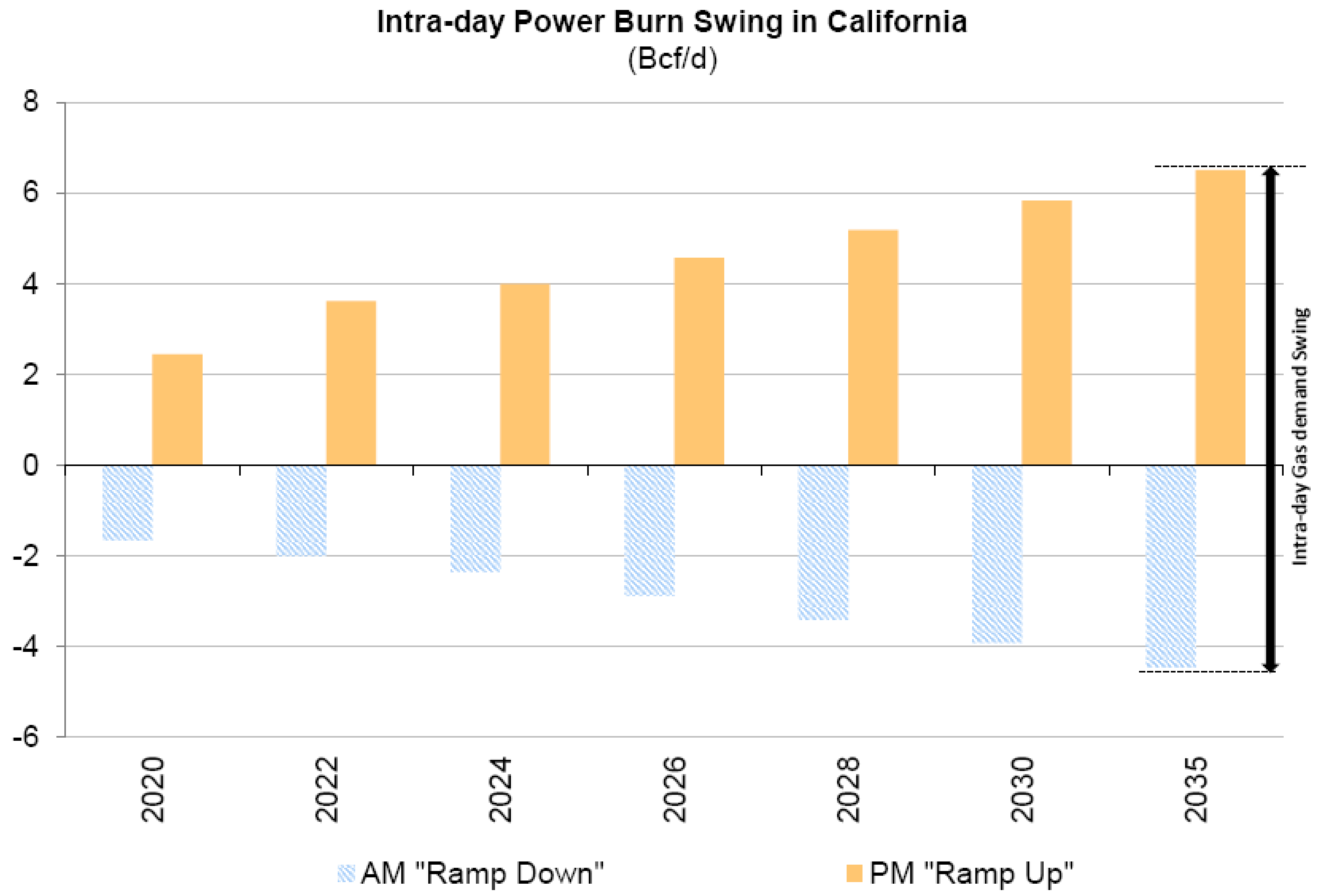
Source: Enkon Energy Advisors, *"Are Stars Aligning for U.S. Natural Gas Storage Assets?"* September 27, 2022, Enkon research and modeling

Growth in wind/solar resource will amplify hourly swings in net load stressing pipeline systems that rely on ratable 1/24 deliveries



Source: Enkon Energy Advisors, *"Are Stars Aligning for U.S. Natural Gas Storage Assets?" September 27, 2022, Enkon Research and Analysis*

…resulting in ~11 Bcf/d of swing in gas burn by 2035, all within a period of 24 hour in California gas market



Note: AM "Ramp Down" from approx. 8 AM to 1 PM as solar output increases while PM "Ramp UP" or late Afternoon Ramp Up from approx. 3 or 4 PM as sun sets

Source: Enkon Energy Advisors, *"Are Stars Aligning for U.S. Natural Gas Storage Assets?" September 27, 2022, Enkon Leidos forecast*

While multiple USGC projects can provide access to LNG projects, not all are located or positioned equally to meet LNG exporter needs

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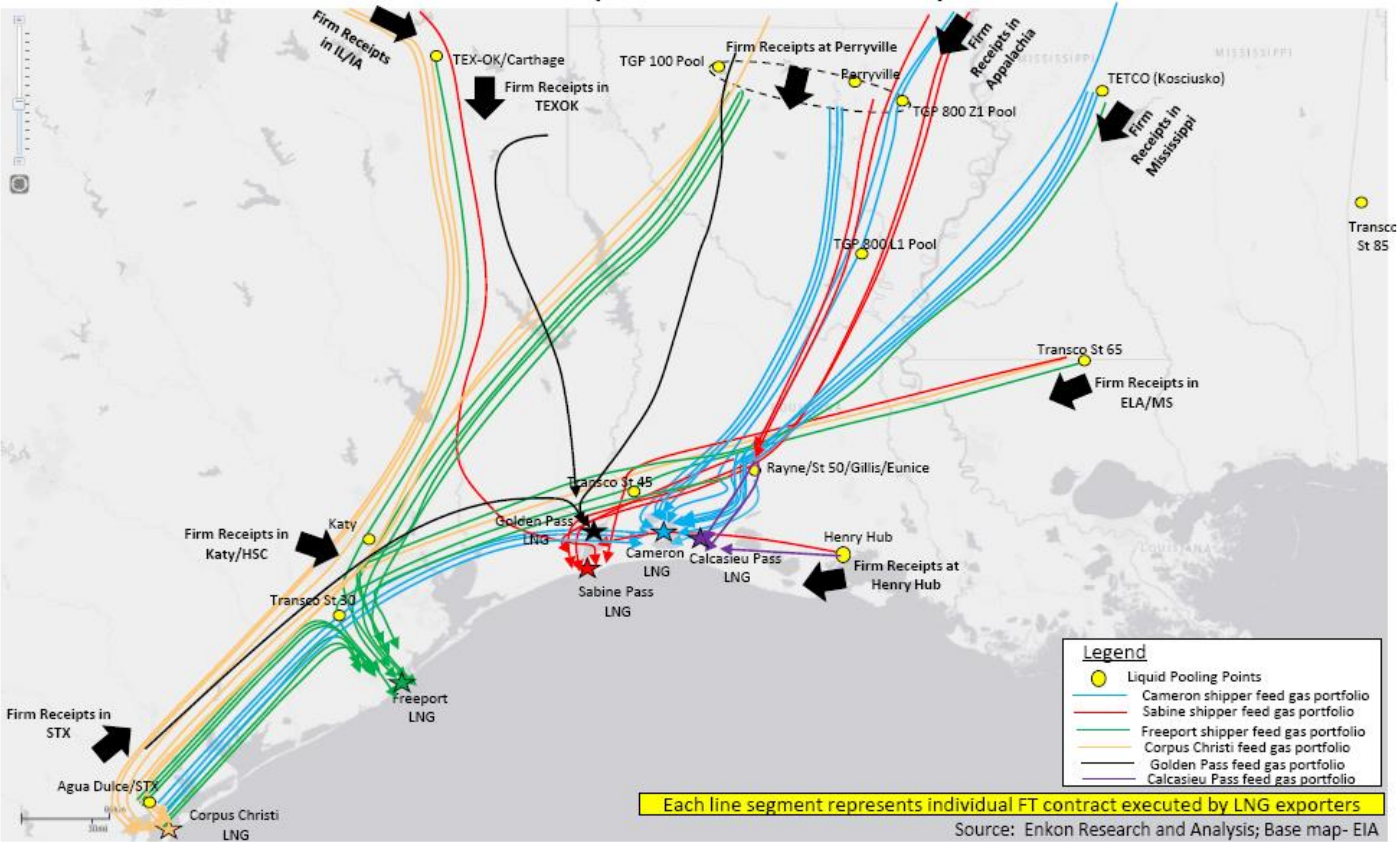
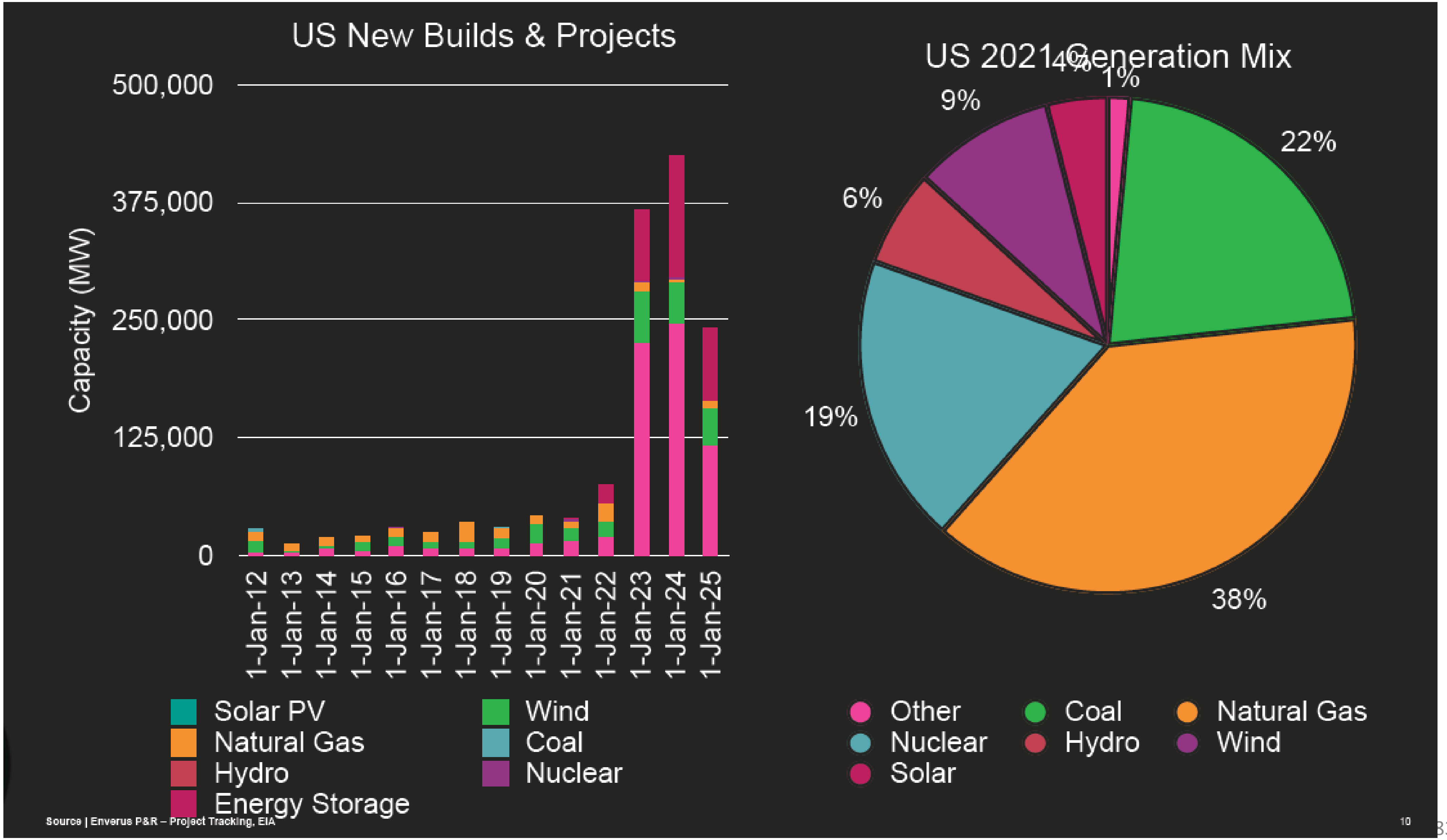
Firm Gas Transport Portfolios for LNG Exporters



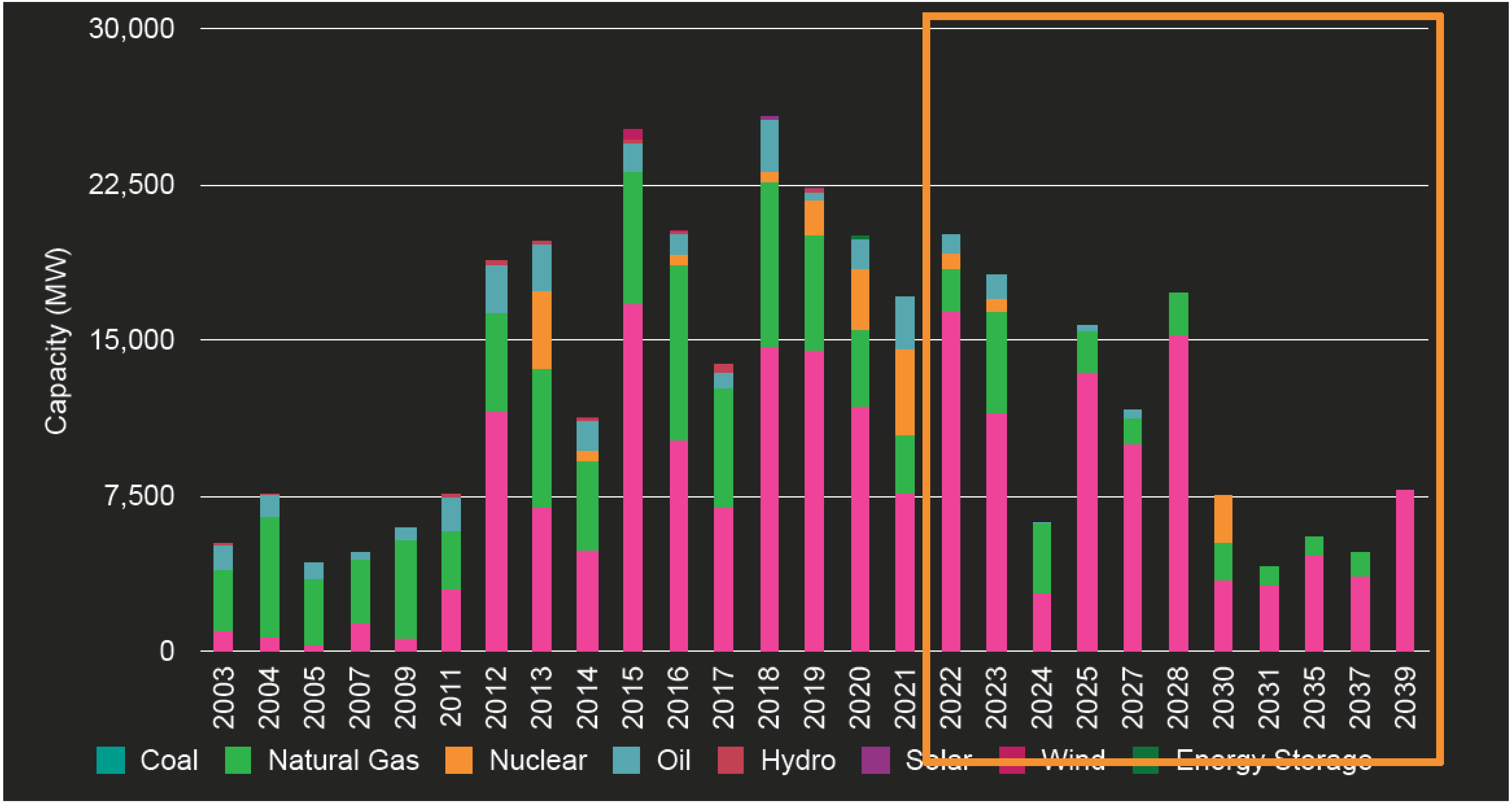
Source: Enkon Energy Advisors, *"Are Stars Aligning for U.S. Natural Gas Storage Assets?" September 27, 2022*

Generation Mix, New Builds, & Projects



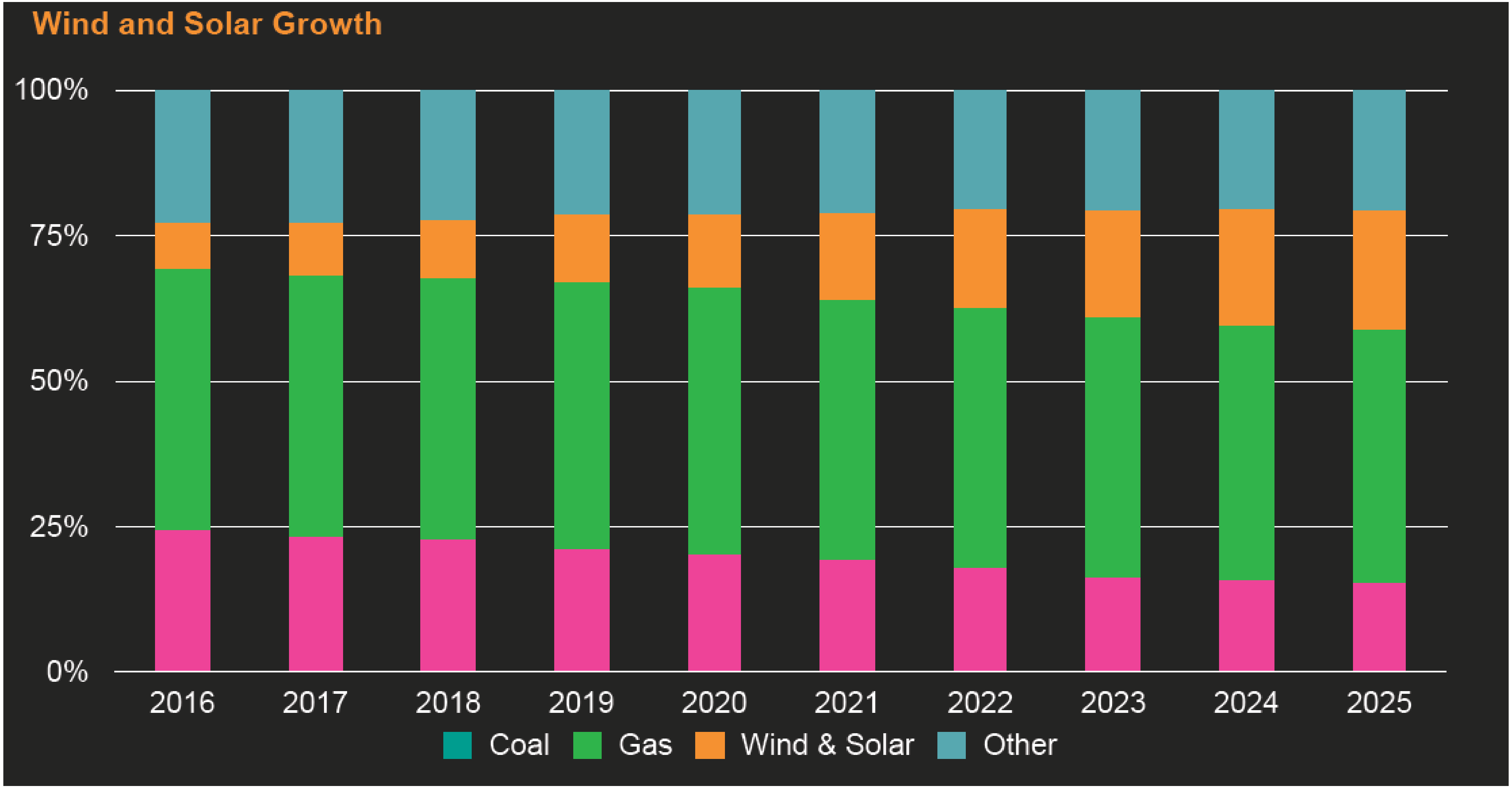
Source: *Enverus, "Power Demand & Displacement by Alternative Energy Sources," Bernadette Johnson, September 2022*

Power Gen Retirements



Source: Enverus, *"Power Demand & Displacement by Alternative Energy Sources," Bernadette Johnson, September 2022, Enverus P&R – Project Tracking*

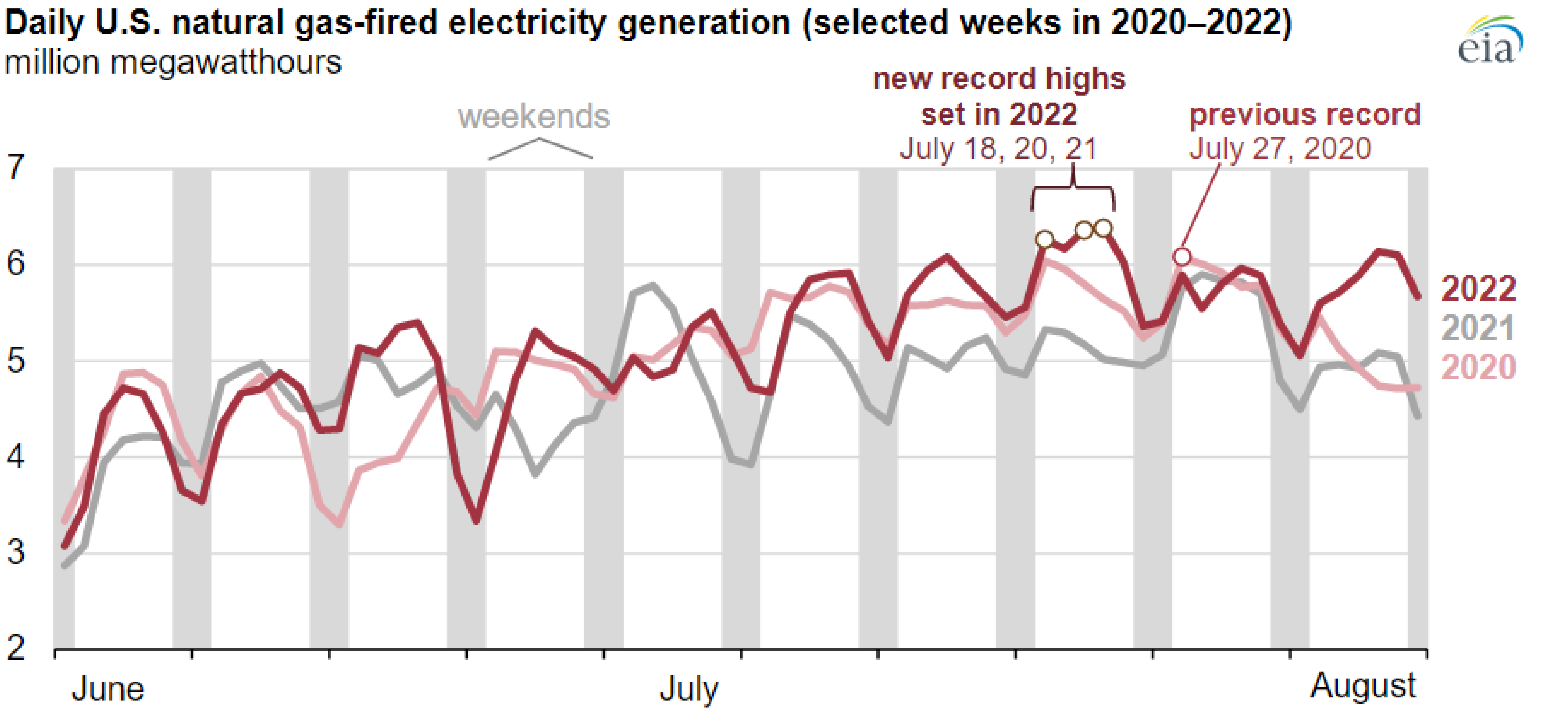
Power Generation Capacity Expectations



Source: *Enverus, "Power Demand & Displacement by Alternative Energy Sources," Bernadette Johnson, September 2022, Enverus Intelligence, EIA*

Daily U.S. electricity generation from natural gas hits a record in mid-July

Mercator Energy



Data source: U.S. Energy Information Administration, *Hourly Electric Grid Monitor*

Note: We adjusted values for previous years to align weekdays and weekends.

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Natural Gas is Critical for Global Food Production

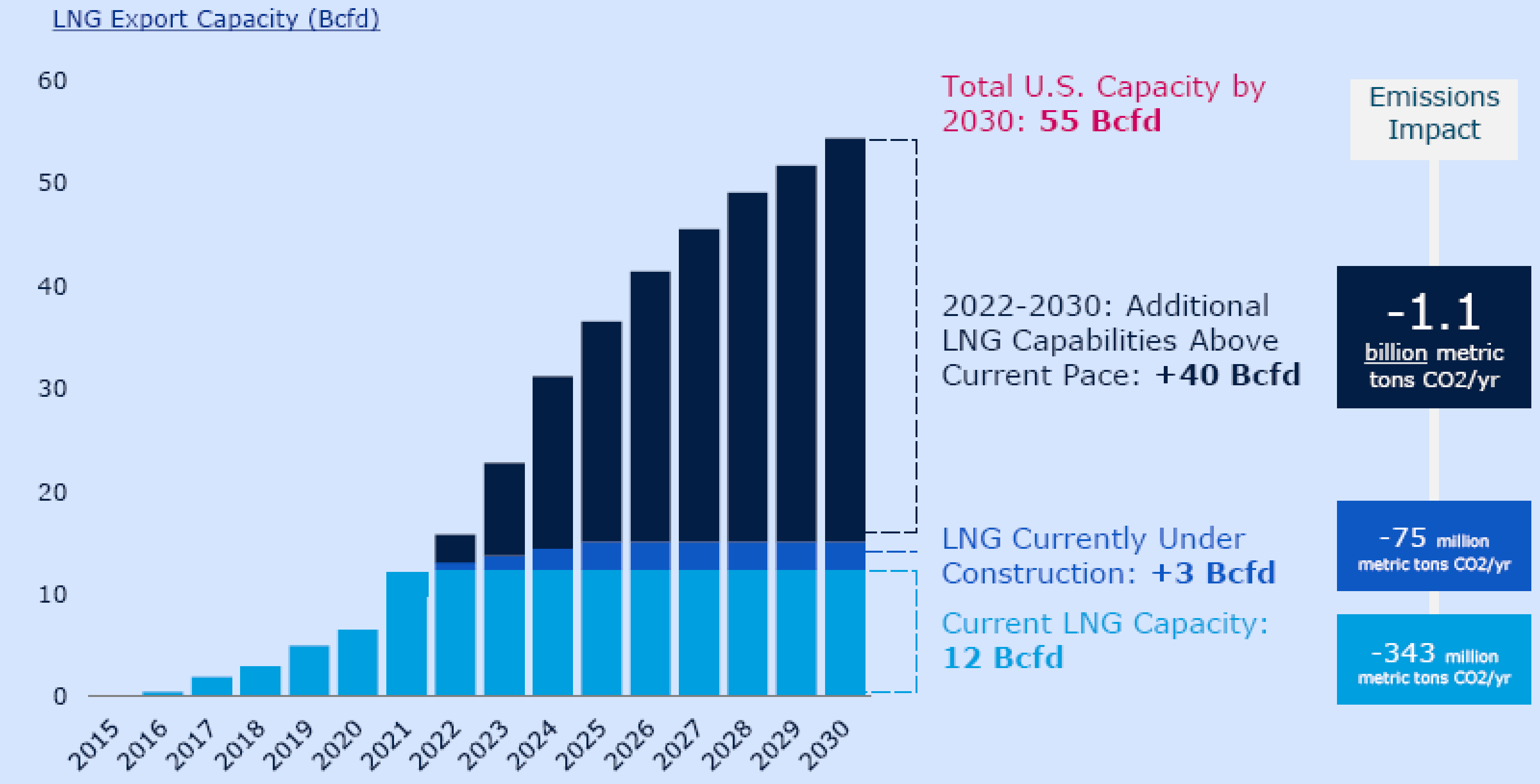
EPRINC

- Natural gas is the main feedstock for nitrogen-based fertilizers: ammonia and urea, the primary fertilizers used in agriculture.
- Without fossil fuel-based fertilizers, agriculture can support, at most, 3 billion people on plant-based diets vs. today's 8 billion on mixed diets.
- Mass urbanization and diet change began in the mid-nineteenth century. But it was only in the mid-twentieth century, preceded by a series of haphazard but serendipitous technological breakthroughs that, through the use of natural gas, nitrogen fertilizers were able to be produced at large scale.
- Current production of fertilizers is approximately 117 million metric tons per year. Each ton requires about 33.5 thousand cubic feet of natural gas for a total of 4 trillion cubic feet per year, or 11 billion cubic feet per day.

- This slide deck is available at EPRINC's Chart of The Week Archive.
- For more information on these charts, please contact Batt Ogderel (batto@eprinc.org) or Lucian Pugliaresi (loup@eprinc.org).

Source: *Chart of the Week #2022-23 Natural Gas and Global Food Production,* Batt Odgerel, Max Pyziur, Lucian Pugliaresi, EPRINC, June 29, 2022

Projected LNG Export Capacity Through 2030[1]



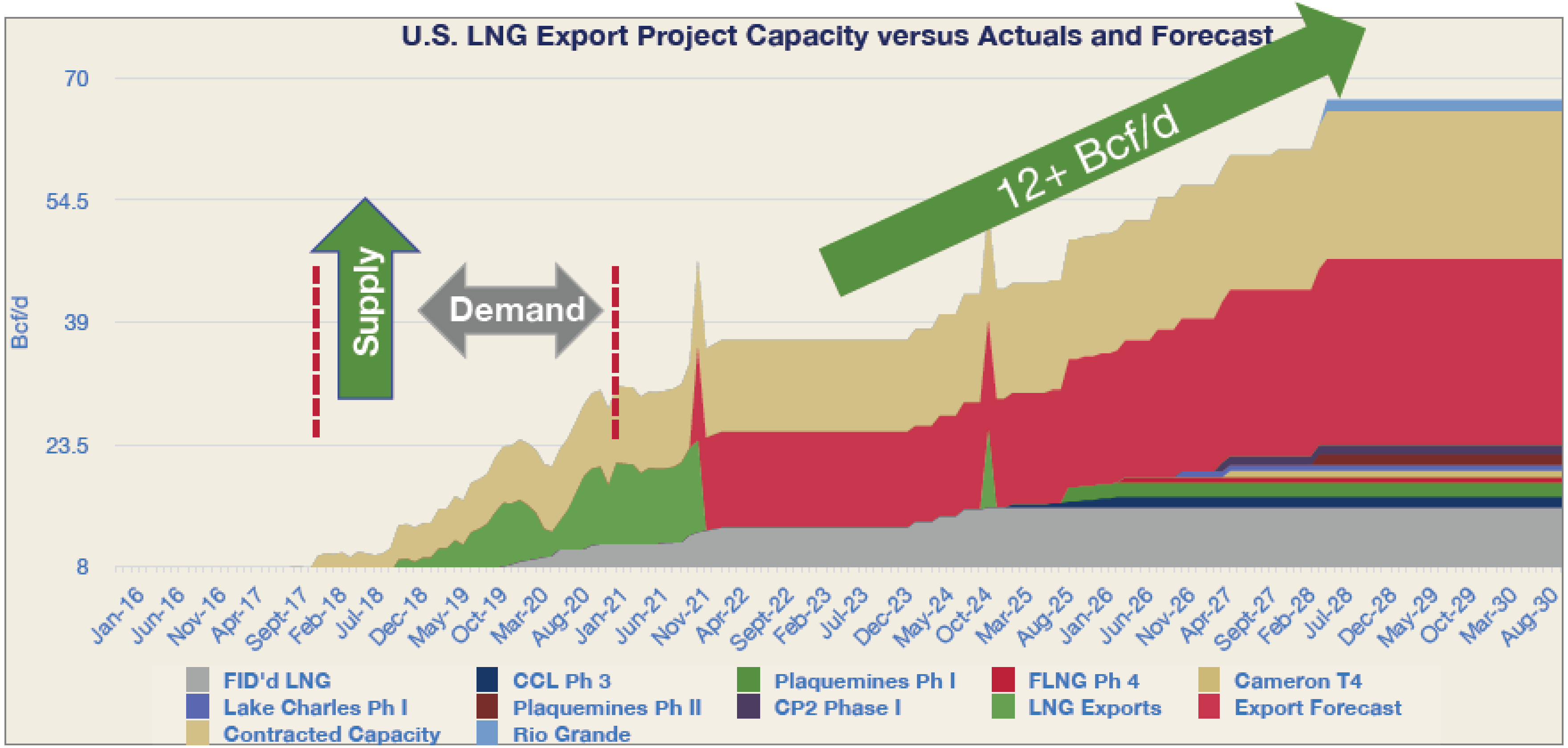
1. Based on an internal study, U.S can produce 40 bcfd production surplus by 2030. 2. There is 3 bcfd capacity currently under construction, and another 3 bcfd anticipated. Therefore, projected incremental capacity is 6bcfd. To reach an additional 40 bcfd, the incremental needs to be 6x, which is in line with non-obstructed pace. 3. Assuming 3 bcfd under construction, and 40 bcfd additional capacity by 2030.

Source: ICF Update to the life-cycle analysis of GHG emissions for U.S. LNG exports analysis to calculate emissions saving from coal to gas; EQT analysis for additional production (based on Enverus data)

35

Source: *EQT presentation CERA Week LNG, Unleashing U.S. LNG: The Largest Green Initiative on the Planet*

2024 to 2030

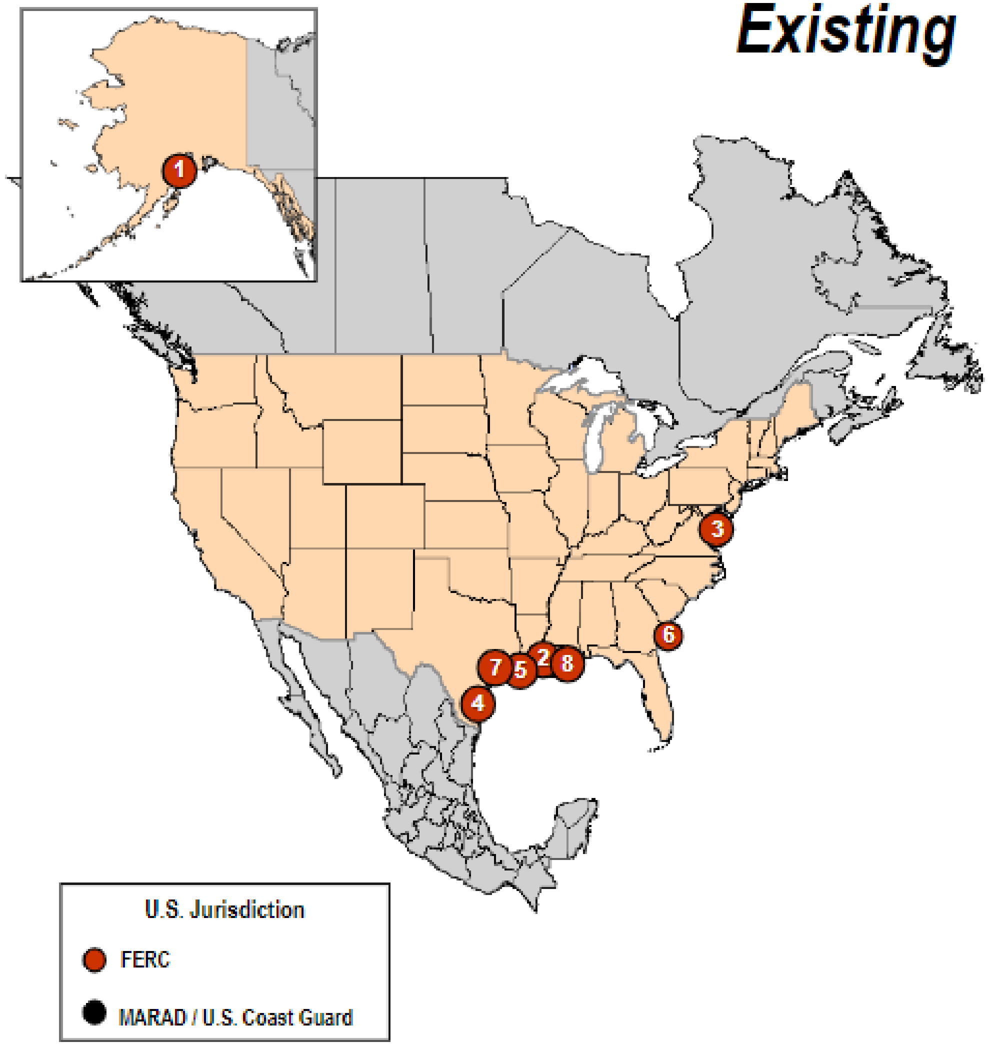


Where will all the gas come from to meet this massive increase in Demand?

Source: *East Daley Analytics, "Natural Gas Supply & Demand Outlook," Zack Van Everen, September 27, 2022, East Daley SPA Tracker, East Daley Supply & Demand Forecast*

North American LNG Export Terminals

Existing



Export Terminals

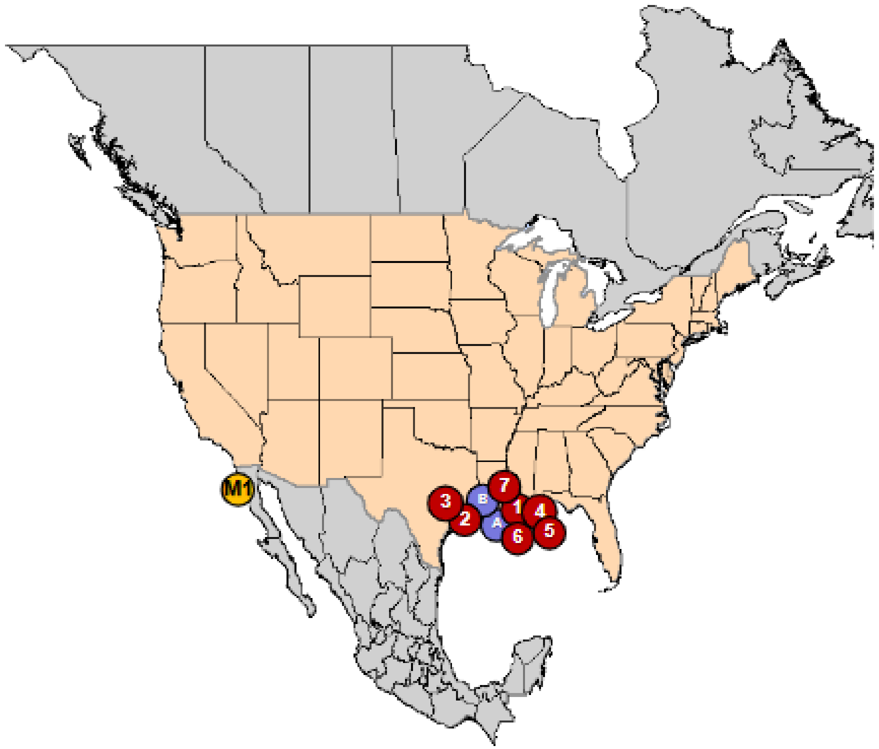
UNITED STATES

1. **Kenai, AK:** 0.2 Bcfd (Trans-Foreland)
2. **Sabine, LA:** 4.55 Bcfd (Cheniere/Sabine Pass LNG – Trains 1-6)
3. **Cove Point, MD:** 0.82 Bcfd (Dominion–Cove Point LNG)
4. **Corpus Christi, TX:** 2.40 Bcfd (Cheniere – Corpus Christi LNG Trains 1-3)
5. **Hackberry, LA:** 2.15 Bcfd (Sempra–Cameron LNG, Trains 1-3)
6. **Elba Island, GA:** 0.35 Bcd (Southern LNG Company Units 1-10)
7. **Freeport, TX:** 2.14 Bcfd (Freeport LNG Dev/Freeport LNG Expansion/FLNG Liquefaction Trains 1-3)
8. **Cameron Parish, LA:** 0.74 Bcfd (Venture Global Calcasieu Pass Units 1-4)

As of June 7, 2022
No updates since previous issuance

Source: *Federal Energy Regulatory Commission*

North American LNG Export Terminals
Proposed



UNITED STATES

PROPOSED TO FERC
Pending Applications:
1. Cameron Parish, LA: 1.18 Bcfd (Commonwealth, LNG) (CP19-502)
2. Port Arthur, TX: 1.86 Bcfd (Sempra - Port Arthur LNG Trains 3 & 4) (CP20-55)
3. Freeport, TX: 0.24 Bcfd (Freeport LNG uprate) (CP21-470
4. Cameron Parish, LA: 1.45 Bcfd (Venture Global CP2 Blocks 1-9) (CP22-21)
5. Cameron Parish, LA: .057 Bcfd (Venture Global Calcasieu Pass) (CP22-25)
6. Hackberry, LA: -0.45 Bcfd (Sempra - Cameron LNG Vacate T5 & modify T4) (CP22-41)
7. Plaquemines Parish, LA: 0.45 Bcfd (Venture Global Plaquemines) (CP22-92)

Projects in Pre-filing:
A. LaFourche Parish, LA: 0.65 Bcfd (Port Fourchon LNG) (PF17-9)
B. Plaquemines Parish, LA: 2.76 Bcfd (Delta LNG - Venture Global) (PF19-4)

CANADA
For Canadian LNG Import and Proposed Export Facilities:

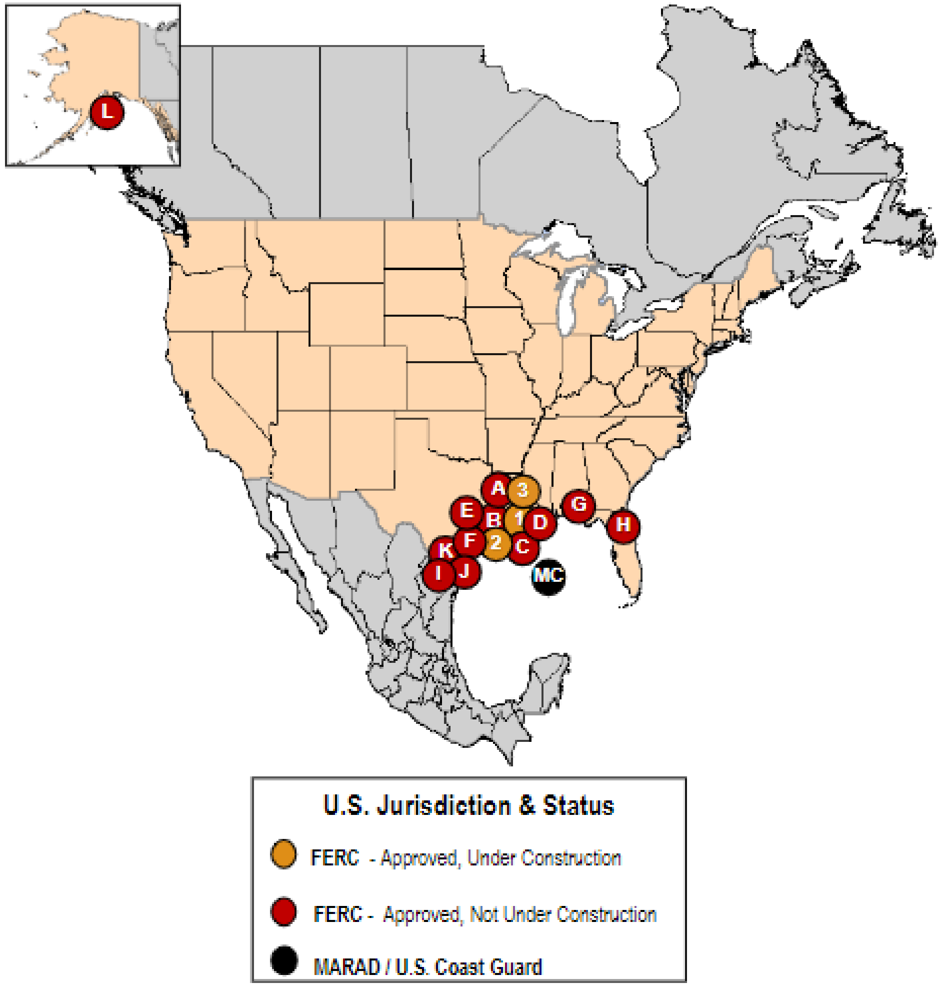
https://www.nrcan.gc.ca/energy/natural-gas/5683

MEXICO (Projects in advanced planning/development stages)
M1. Baja California, MX: 0.4 Bcfd (Sempra – Energía Costa Azul Phase 1)

As of June 7, 2022
No updates since previous issuance

Source: *Federal Energy Regulatory Commission*

North American LNG Export Terminals
Approved, Not Yet Built



Export Terminals

UNITED STATES

FERC – APPROVED, UNDER CONSTRUCTION

1. **Cameron Parish, LA:** 0.92 Bcfd (Venture Global Calcasieu Pass Units 5-9) (CP15-550)
2. **Sabine Pass, TX:** 2.26 Bcfd (ExxonMobil – Golden Pass) (CP14-517, CP20-459)
3. **Plaquemines Parish, LA:** 3.40 Bcfd (Venture Global Plaquemines) (CP17-66)

FERC – APPROVED, NOT UNDER CONSTRUCTION

A. **Lake Charles, LA:** 2.2 Bcfd (Lake Charles LNG) (CP14-120)
B. **Lake Charles, LA:** 1.186 Bcfd (Magnolia LNG) (CP14-347)
C. **Hackberry, LA:** 1.41 Bcfd (Sempra - Cameron LNG Trains 4 & 5) (CP15-560)
D. **Calcasieu Parish, LA:** 4.0 Bcfd (Driftwood LNG) (CP17-117)
E. **Port Arthur, TX:** 1.86 Bcfd (Sempra - Port Arthur LNG Trains 1 & 2) (CP17-20)
F. **Freeport, TX:** 0.72 Bcfd (Freeport LNG Dev Train 4) (CP17-470)
G. **Pascagoula, MS:** 1.5 Bcfd (Gulf LNG Liquefaction) (CP15-521)
H. **Jacksonville, FL:** 0.132 Bcf/d (Eagle LNG Partners) (CP17-41)
I. **Brownsville, TX:** 0.55 Bcfd (Texas LNG Brownsville) (CP16-116)
J. **Brownsville, TX:** 3.6 Bcfd (Rio Grande LNG – NextDecade) (CP16-454)
K. **Corpus Christi, TX:** 1.86 Bcfd (Cheniere Corpus Christi Stage III) (CP18-512)
L. **Nikiski, AK:** 2.63 Bcfd (Alaska Gasline) (CP17-178)

MARAD/USCG – APPROVED, NOT UNDER CONSTRUCTION

MC. **Gulf of Mexico:** 1.8 Bcfd (Delfin LNG)

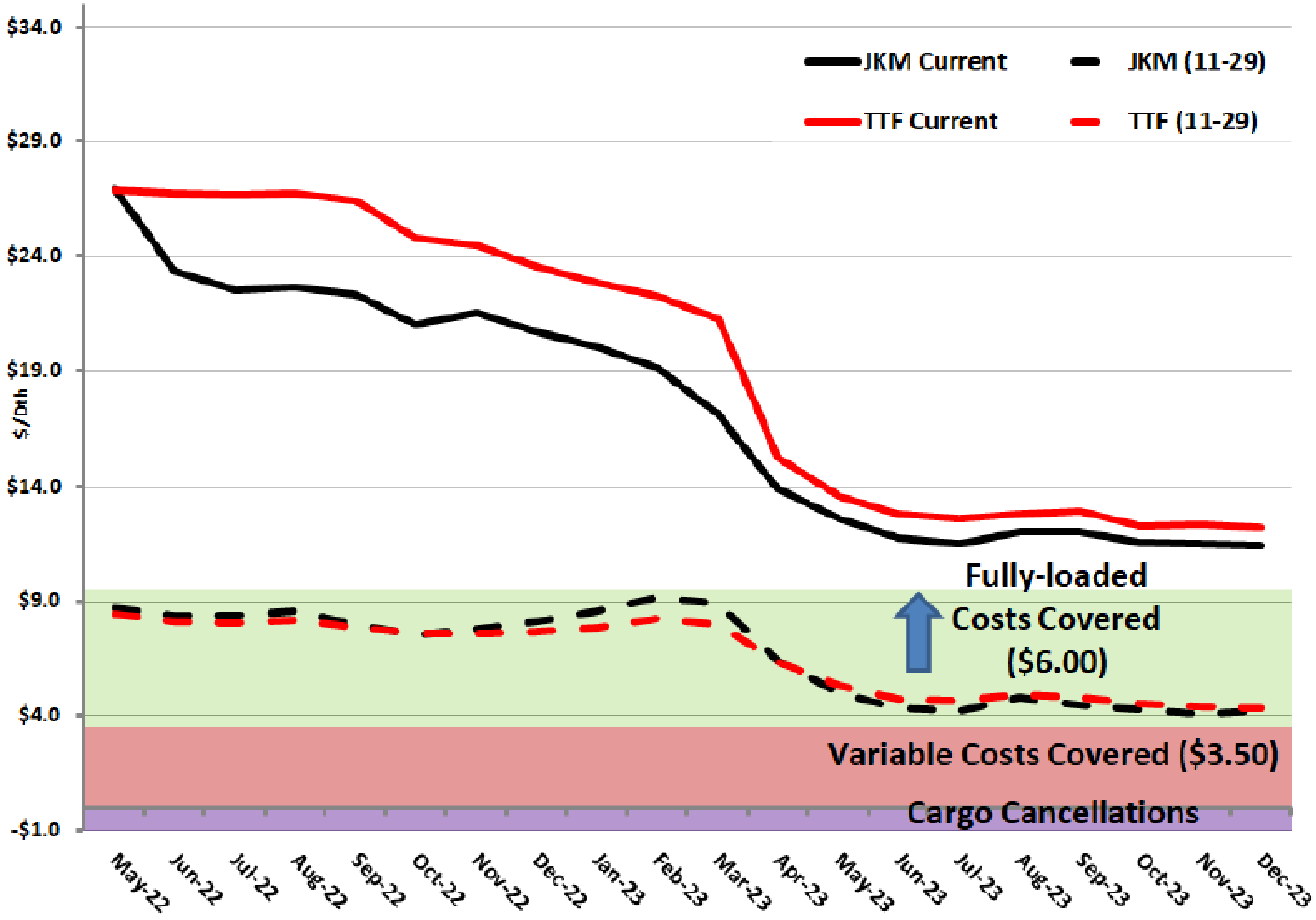
CANADA - LNG IMPORT AND PROPOSED EXPORT FACILITIES
https://www.nrcan.gc.ca/energy/natural-gas/5683

As of June 7, 2022
No updates since previous issuance

Source: *Federal Energy Regulatory Commission*

LNG Export Trends

Near Term Outlook Margins



Margins through ‘23 well above fully loaded costs. Supply demand balance remains tight due to greater demand in Asia and Europe. Competition for cargos between Asia and Europe and Russia/Ukraine conflict sustaining elevated prices in both markets.

Nord Stream 2 will not enter service for the foreseeable future with current situation in Europe

Sources: *CME, NGI, KM Analysis, Kinder Morgan presentation, March 30, 2022,*