The role of US gas in a rapidly changing global energy landscape

Dustin Meyer

VP, Natural Gas Markets

American Petroleum Institute

October 13, 2022

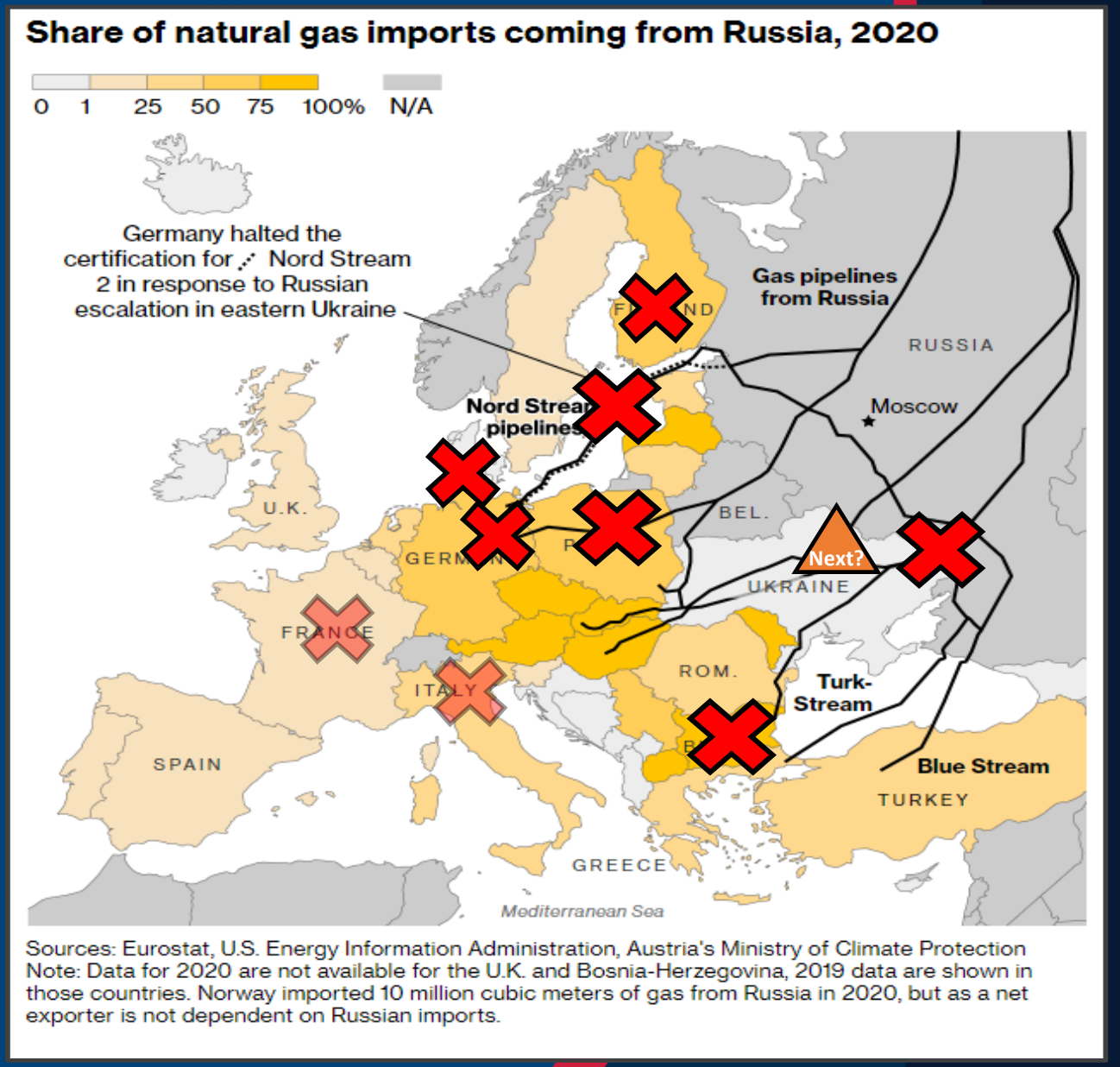
Destin, Florida

American Petroleum Institute

Russian gas has officially been ‘weaponized’

- EU imported ~40% of its gas from Russia, but flows have been sharply reduced
- Many countries already cut off; then Nord Stream 1 shut off indefinitely Sep. 2
- Tremendous fear heading into winter, even w/ storage ~88% full
- LNG doing its best – Mar. 2022 US/EU agreement

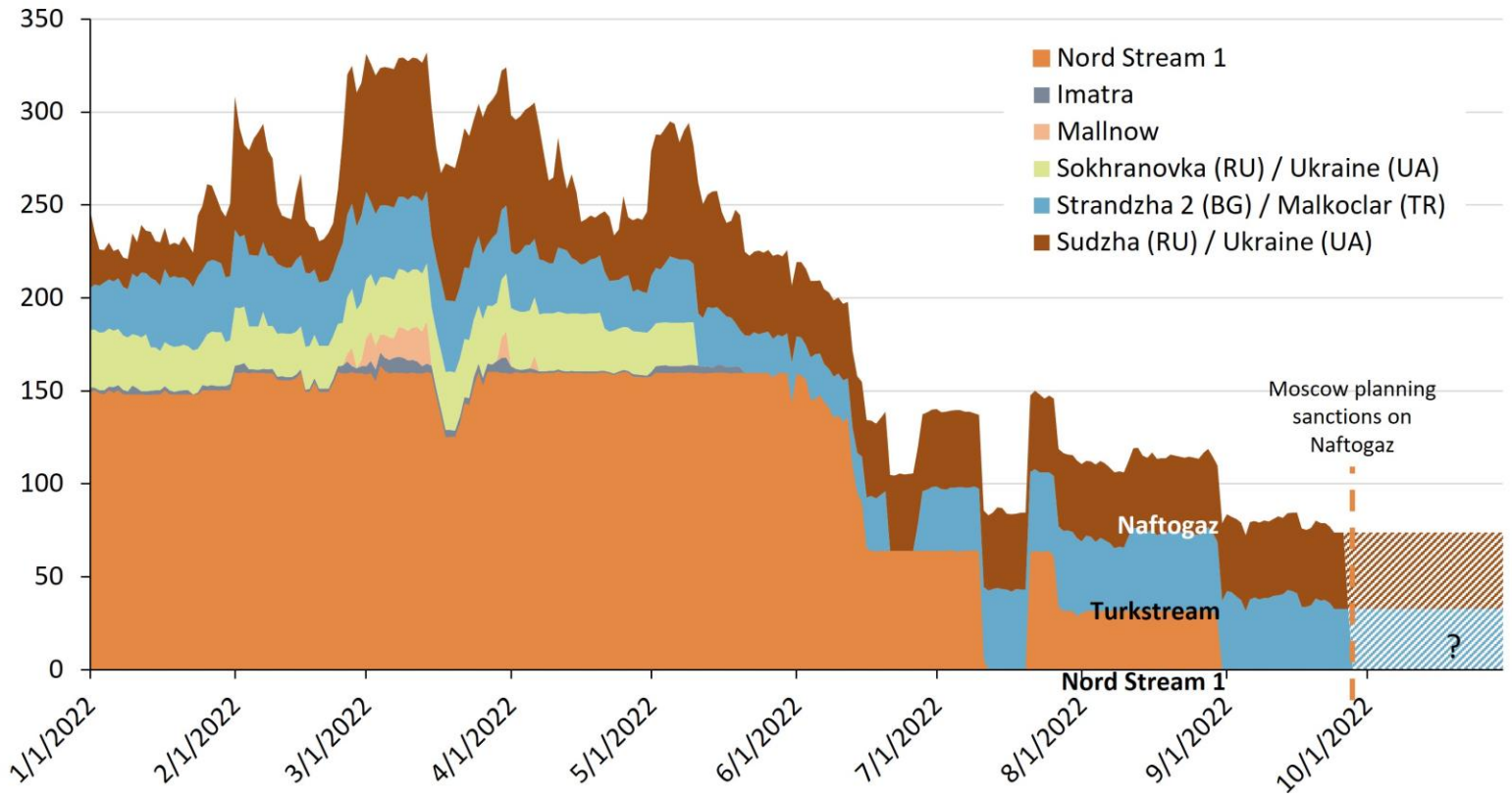
****This is the biggest shift global gas markets have ever experienced****



Pipeline flows to Europe are down ~80%

Figure 4: Russian gas flows to mainland Europe this year split by entry points

Million cubic meters per day

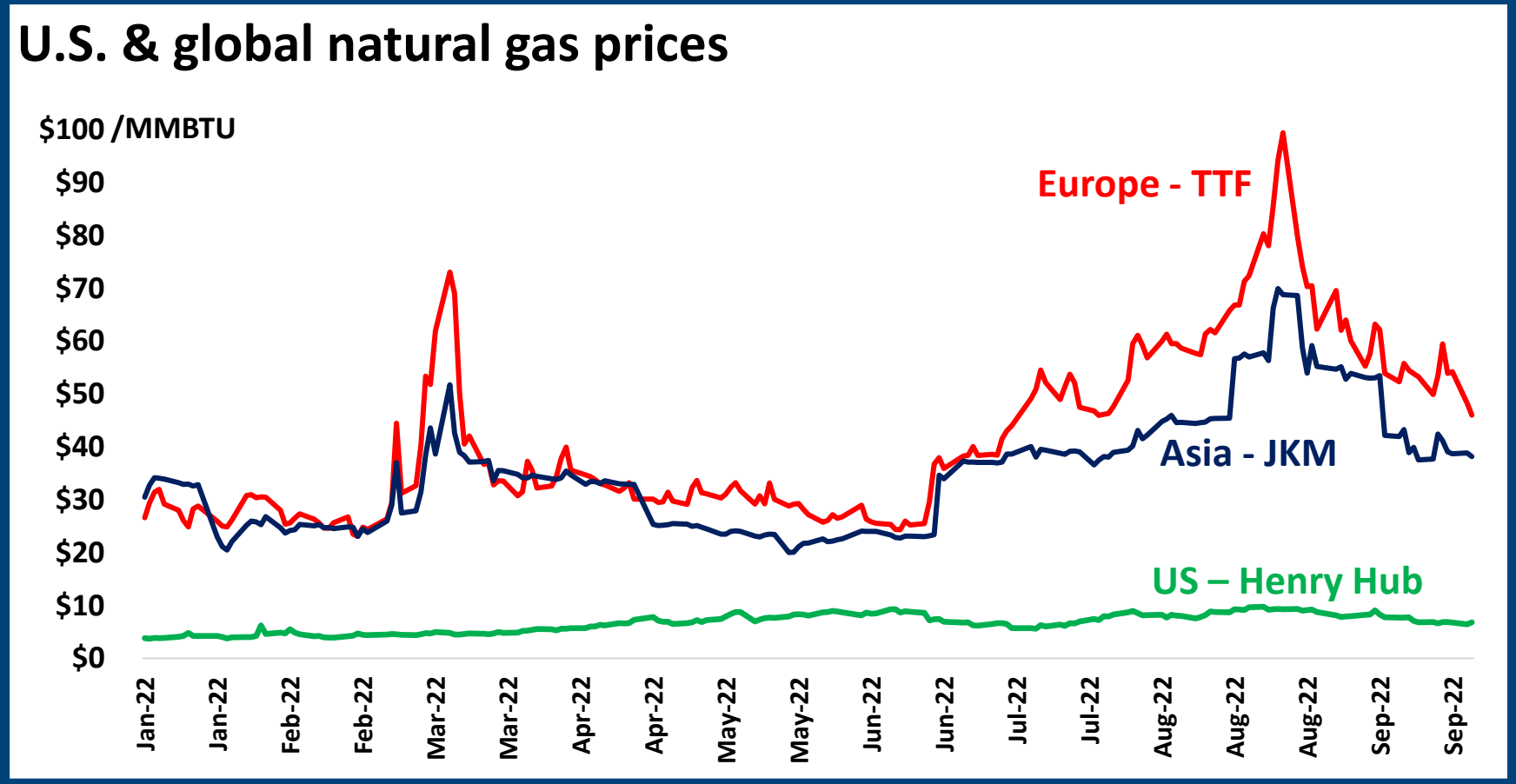


Source: Rystad Energy European Gas Flow Monitor dashboard

American Petroleum Institute

The global gas market is on the brink of collapse

- Russian pipeline curtailments have sent global gas prices soaring
- They peaked around $100/MMBTU – equivalent to $580/bbl oil



Source: API using Energy Ventures Analysis, Inc., data

Compounding problems

- **Freeport outage**
- **Pipeline curtailments**
- **Low river levels**
- **Poor nuclear performance**

Asia has been priced out of the market

This is what energy security looks like!

American Petroleum Institute

What has this done to European industry?

Europe Aluminum Cuts Get Deeper by the Day as Power Crisis Bites

- Speira to curtail production immediately at plant in Neuss
- Europe metal industry warns of 'permanent deindustrialization'

European Industry Buckles Under Weight of Soaring Energy Prices

- Chemical, glass, metal, paper makers struggle to stay open
- German industry seen as uncompetitive given gas costs

Europe Faces An Exodus Of Energy-Intensive Industries

By Irina Slav - Sep 25, 2022, 4:00 PM CDT

MARKETS

Fertilizer Prices Spike Again As Russia Cuts Natural Gas Supply

'Crippling' Energy Bills Force Europe's Factories to Go Dark

Manufacturers are furloughing workers and shutting down lines because they can't pay the gas and electric charges.

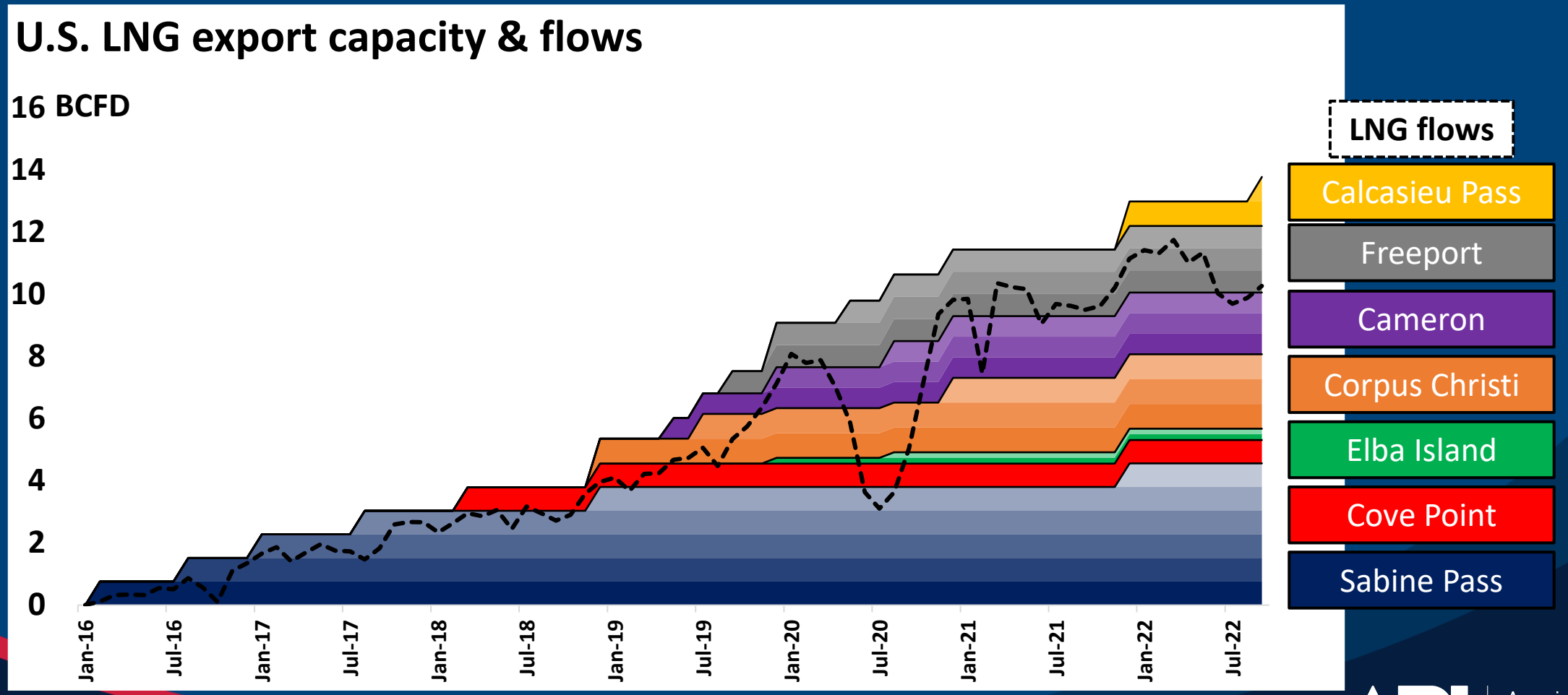
American Petroleum Institute

The US response? An armada of LNG.

Source: Bloomberg

American Petroleum Institute

New export terminals enable US ramp-up

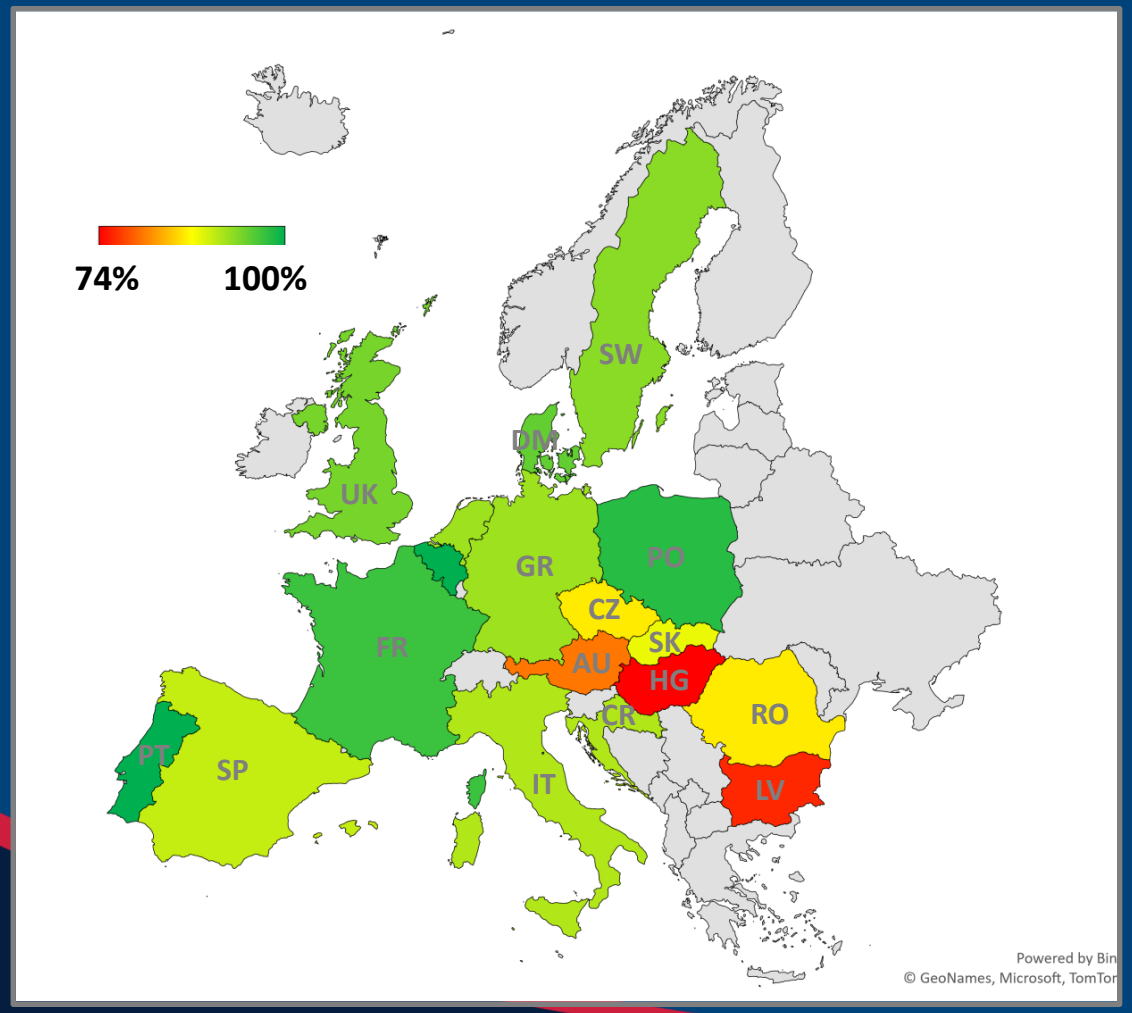


Source: API using US EIA and DOE data

American Petroleum Institute

Where are we now? EU gas storage is healthy.

Oct 1 gas storage levels in select countries



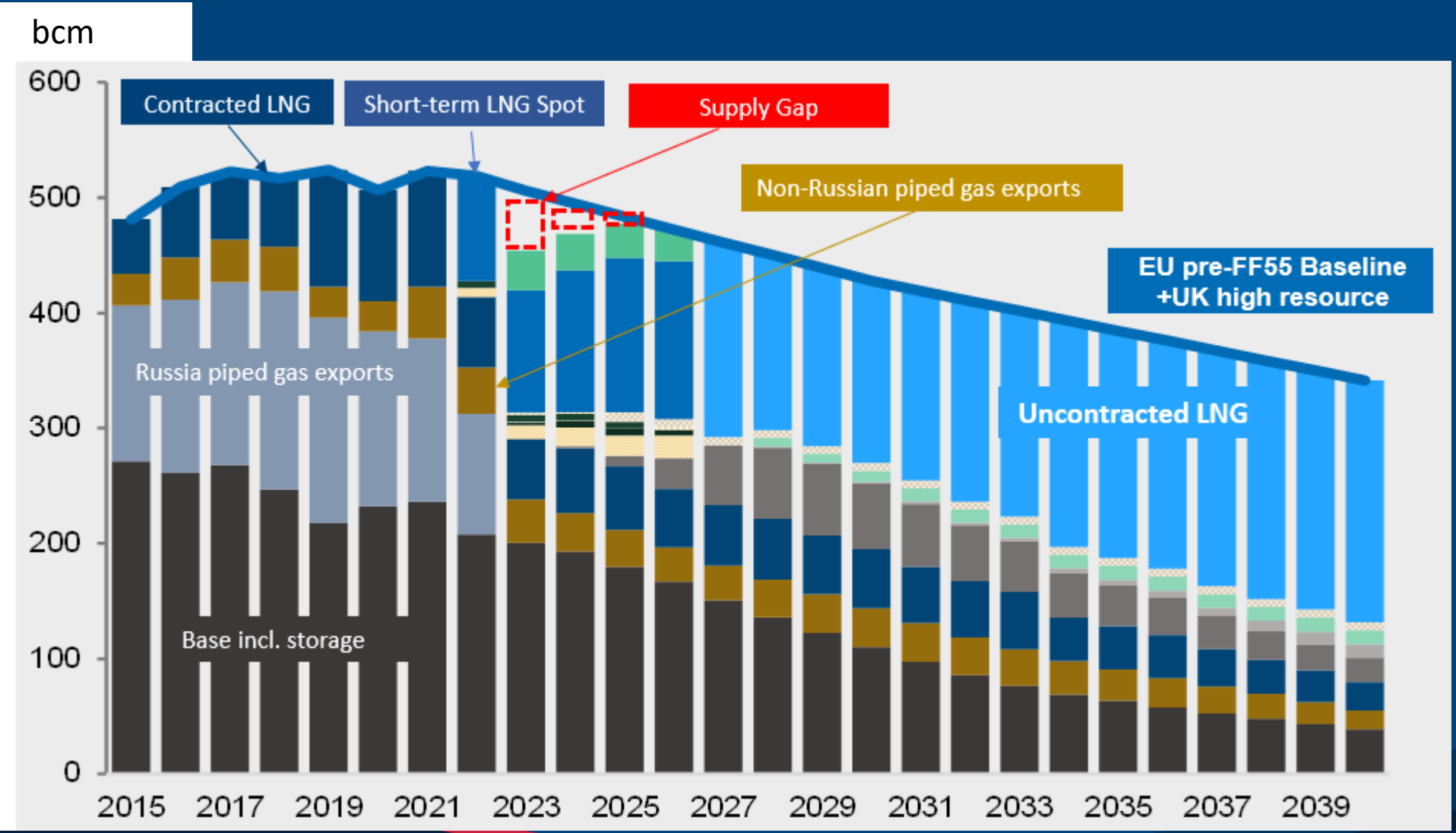
Source: API using Energy Ventures Analysis, Inc., data

- European storage at ~90%
- Strong storage enabled by LNG imports
- Countries with limited access to LNG trail those with good access

- HOWEVER, spring/summer injections were mainly Russian pipeline gas
- What does this mean?
  - Next year will be very tough as LNG will be the main source of gas to Europe

American Petroleum Institute

Near-term supply gap will be difficult to fill



- Supply gap could be ~20% in 2023
- Global LNG spot market provides short-term supplies but at high cost
- US supply is most competitive long term
- **Need for additional 19 BCFD LNG imports to 2040**

American Petroleum Institute

How is the EU responding to high prices?

Options now being considered by European leaders:

		What is it?	Why is it unlikely to work?
1	**Price caps for gas & power**	Setting a maximum price level for both electricity and natural gas	Utilities will still incur high costs but can't pass them to customers. Who pays and for how long? What if other countries "outbid"?
2	**Windfall profits tax**	Taxing the "excessive" profits of utilities and sellers of gas and electricity	Will have a chilling effect on investment; high prices don't always mean high profits
3	**Limiting profits of low-cost generators**	Artificially reducing the revenues of low-cost generators like renewables and nuclear	Not unreasonable, but difficult to implement and pass savings to consumers
4	**Forced demand reductions**	Incentivizing users to reduce demand for gas & electricity	Who do you cut first? Efficiency investments take time

*****Bottom line: this is not a market design failure, but rather the accurate pricing of two extremely scarce, in-demand commodities.*****

American Petroleum Institute

US gas market update

American Petroleum Institute

Henry Hub has surged amid strong demand, flat production

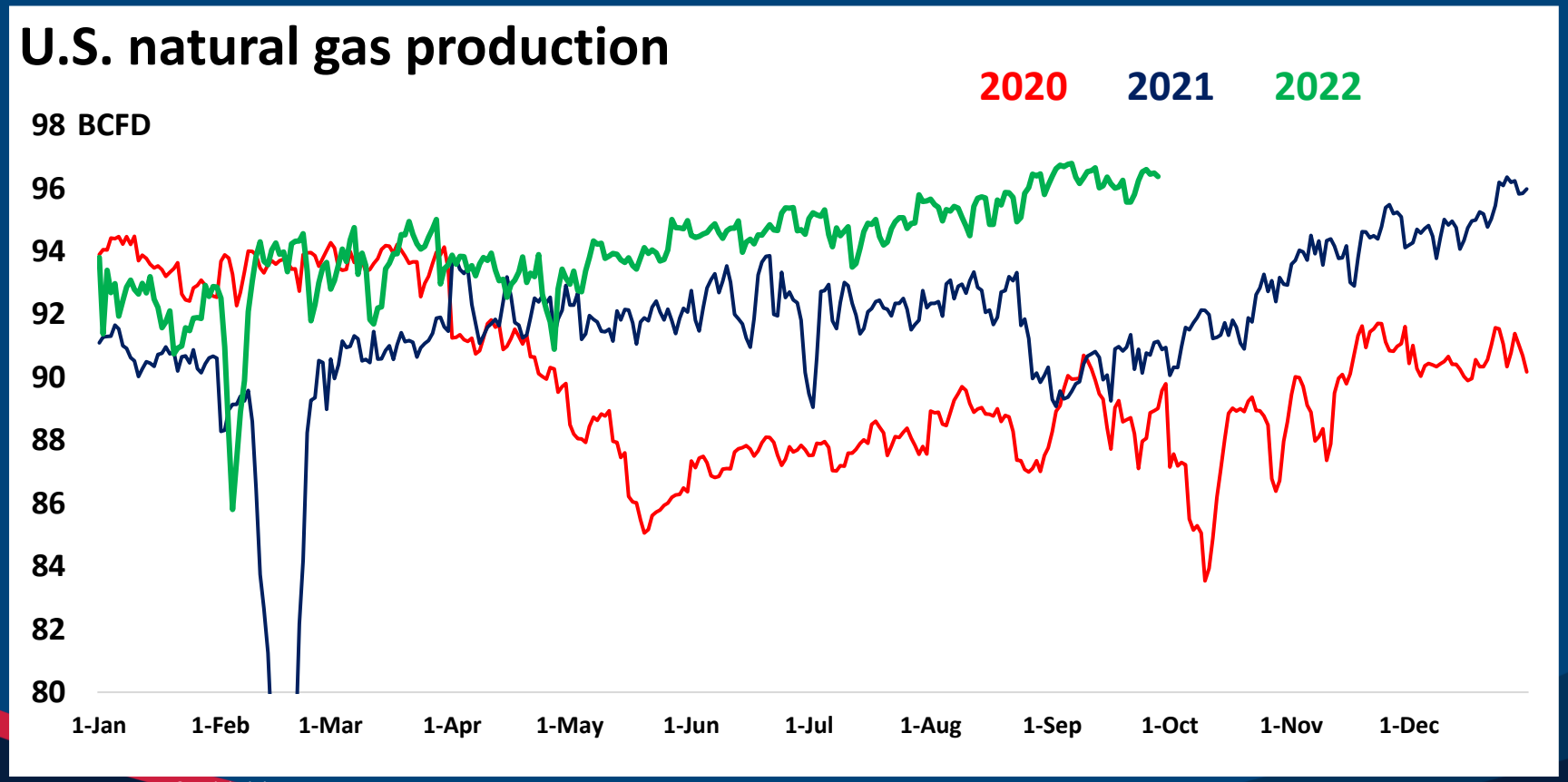
- Strong gas demand, flat production, and high coal prices have sent prices soaring
- Fundamental supply-demand mismatch – not enough gas going into storage

Source: API using EIA data

American Petroleum Institute

Production growth has been sluggish

- Capital discipline combined with infrastructure, labor, and financial challenges have slowed production growth



Source: API using S&P Global data

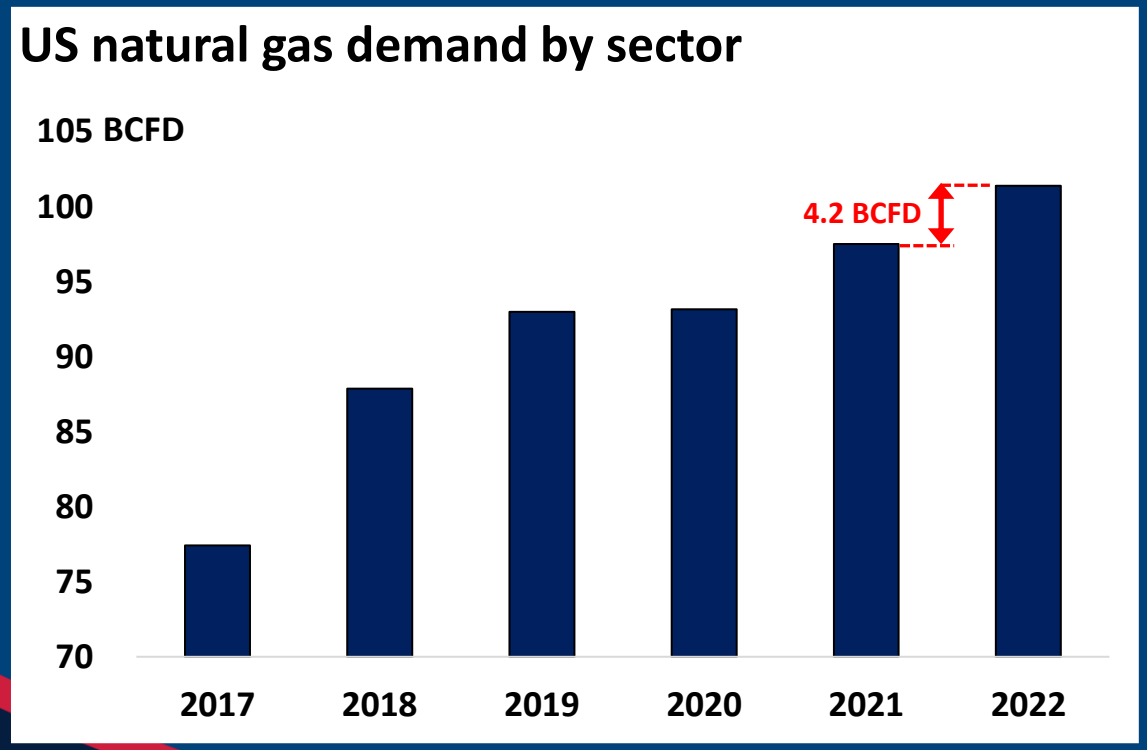
Just last month, we reached our EOY production level.

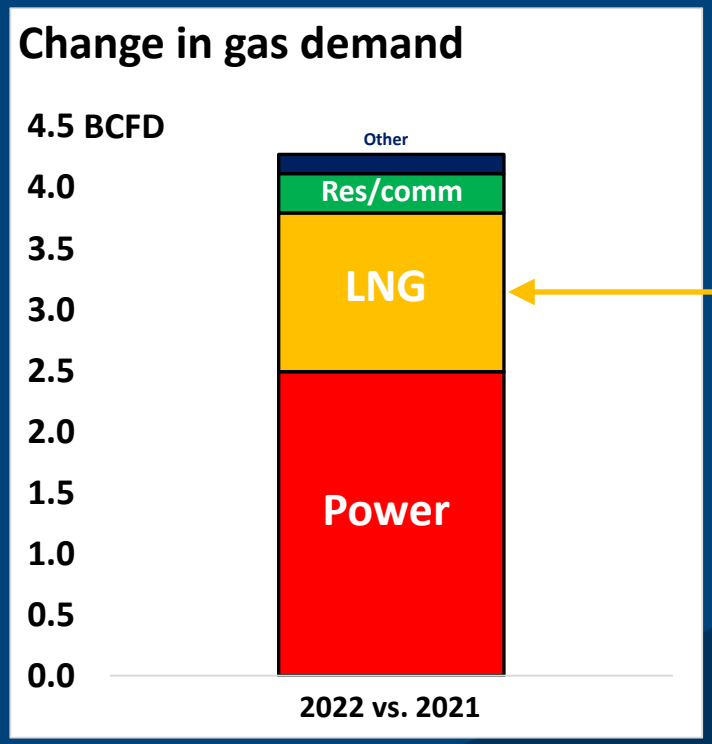
Growth has been focused in Texas.

American Petroleum Institute

Demand has surged amid high temps, LNG exports

- Demand has surged by 4 BCFD on the year, led by power and exports
- New LNG export terminals, plus less seasonality (70% vs. 90% utilization)



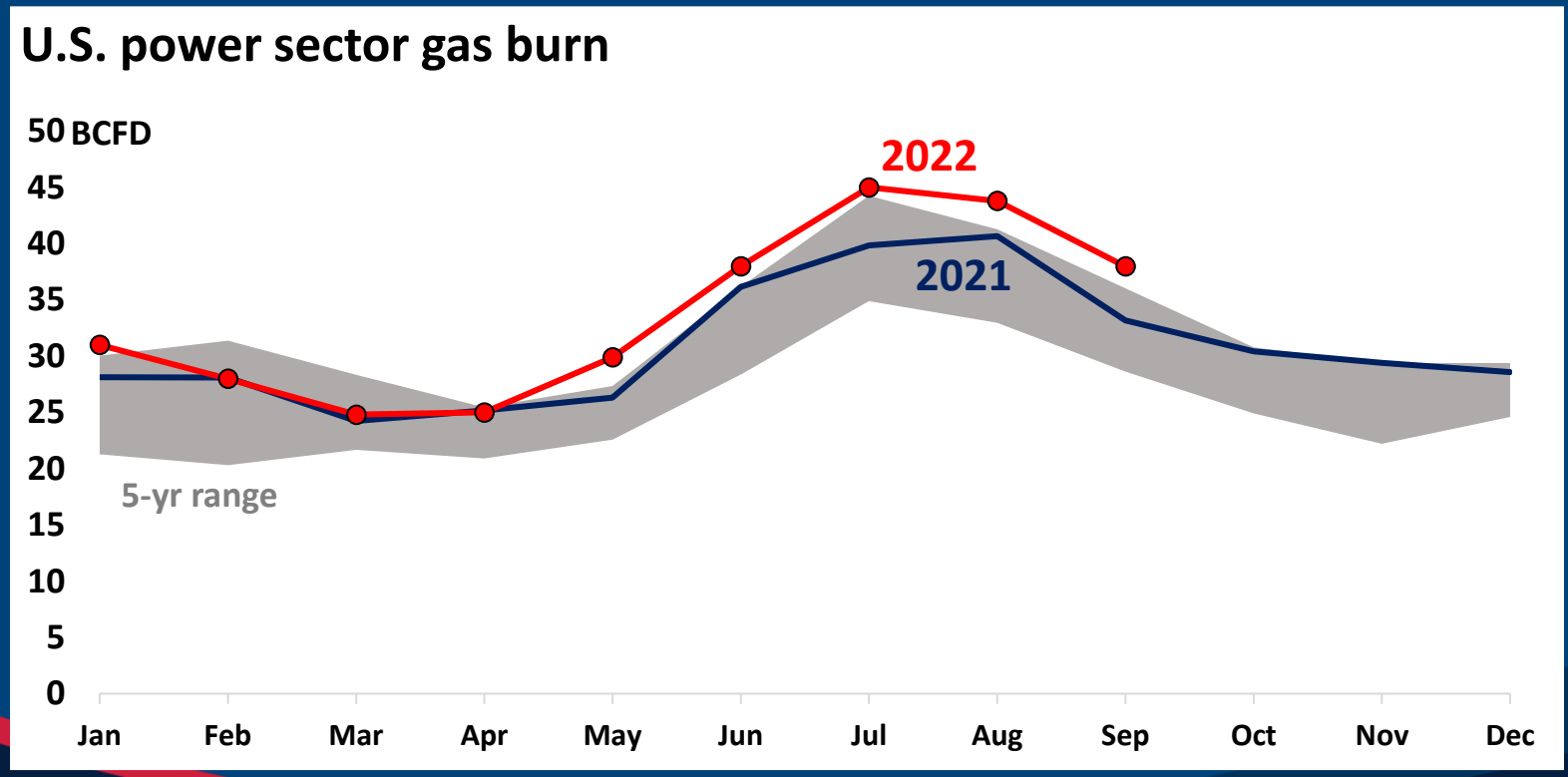


Source: API using S&P data
Note: data is through Sep 30

American Petroleum Institute

Just how strong has power burn been?

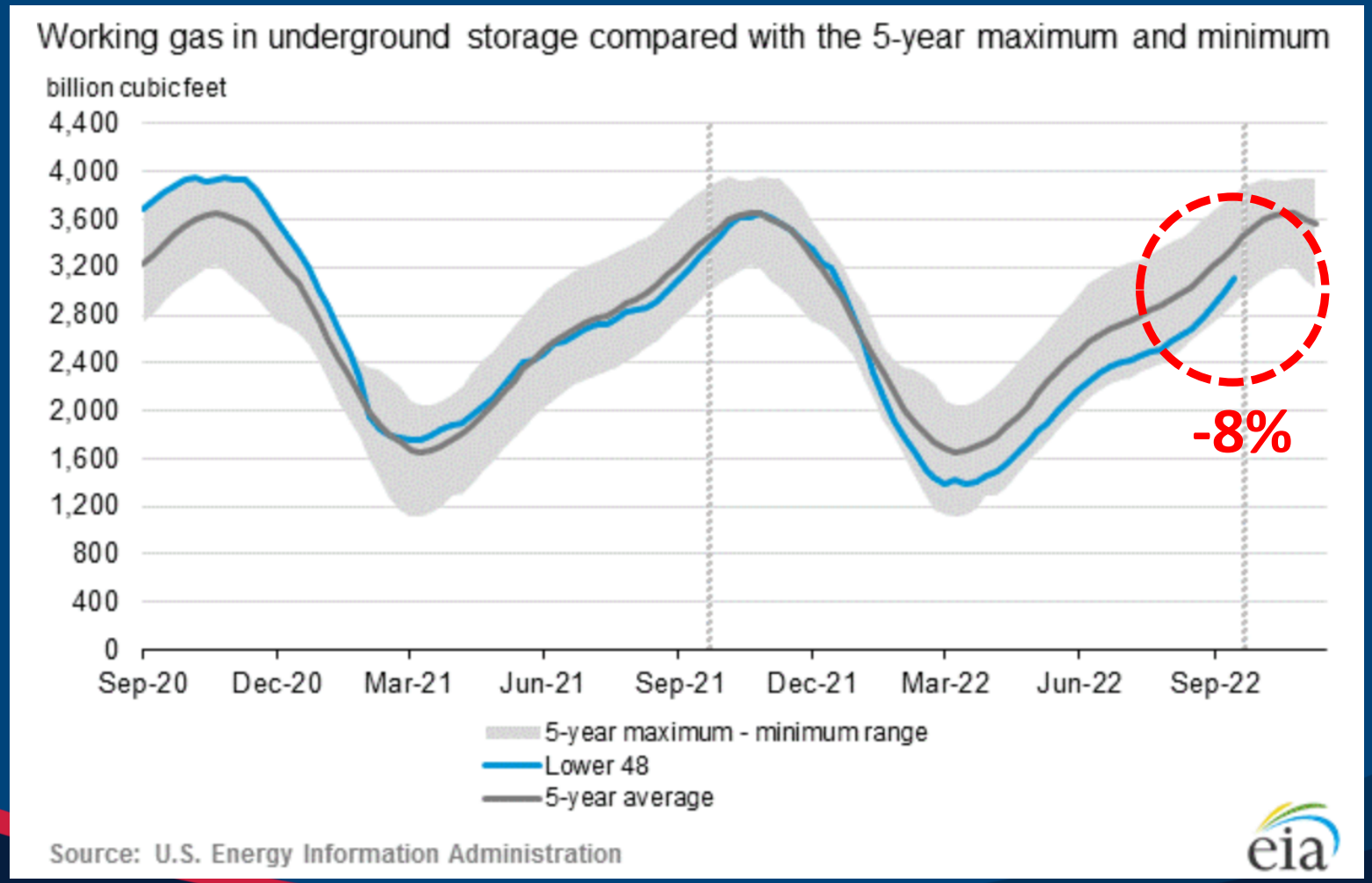
- Summer burn was through the roof due to high temps
- Five consecutive record-setting months, and six of nine on the year
- **High coal prices have limited gas-to-coal switching**



Source: API using S&P Global data

American Petroleum Institute

So where does this leave us? With low storage.



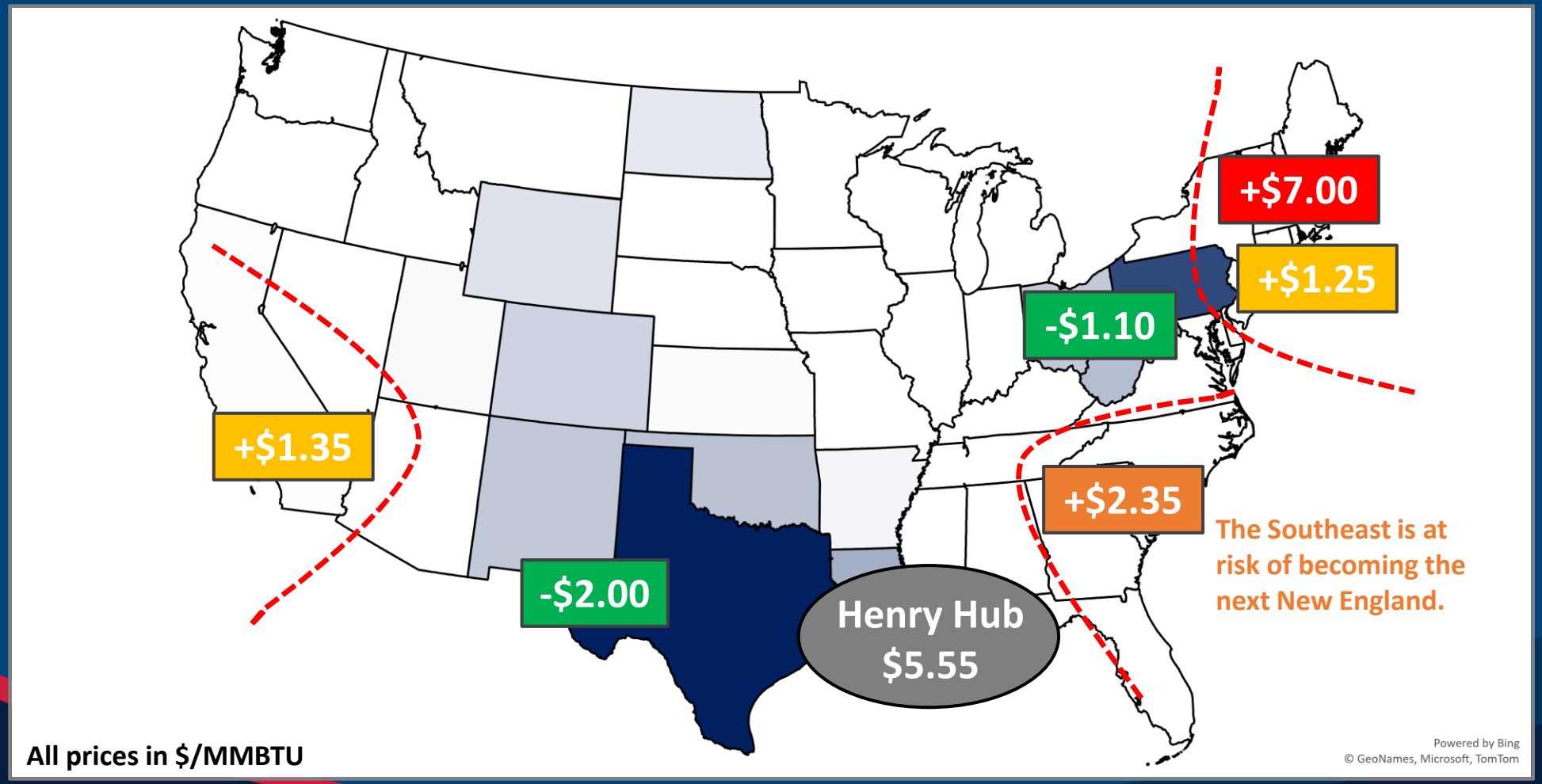
If you have to point to one reason for elevated prices – this is it.

Recent narrowing of the deficit is likely the reason for ~$2.50 decline in September.

American Petroleum Institute

New infrastructure constraints are emerging

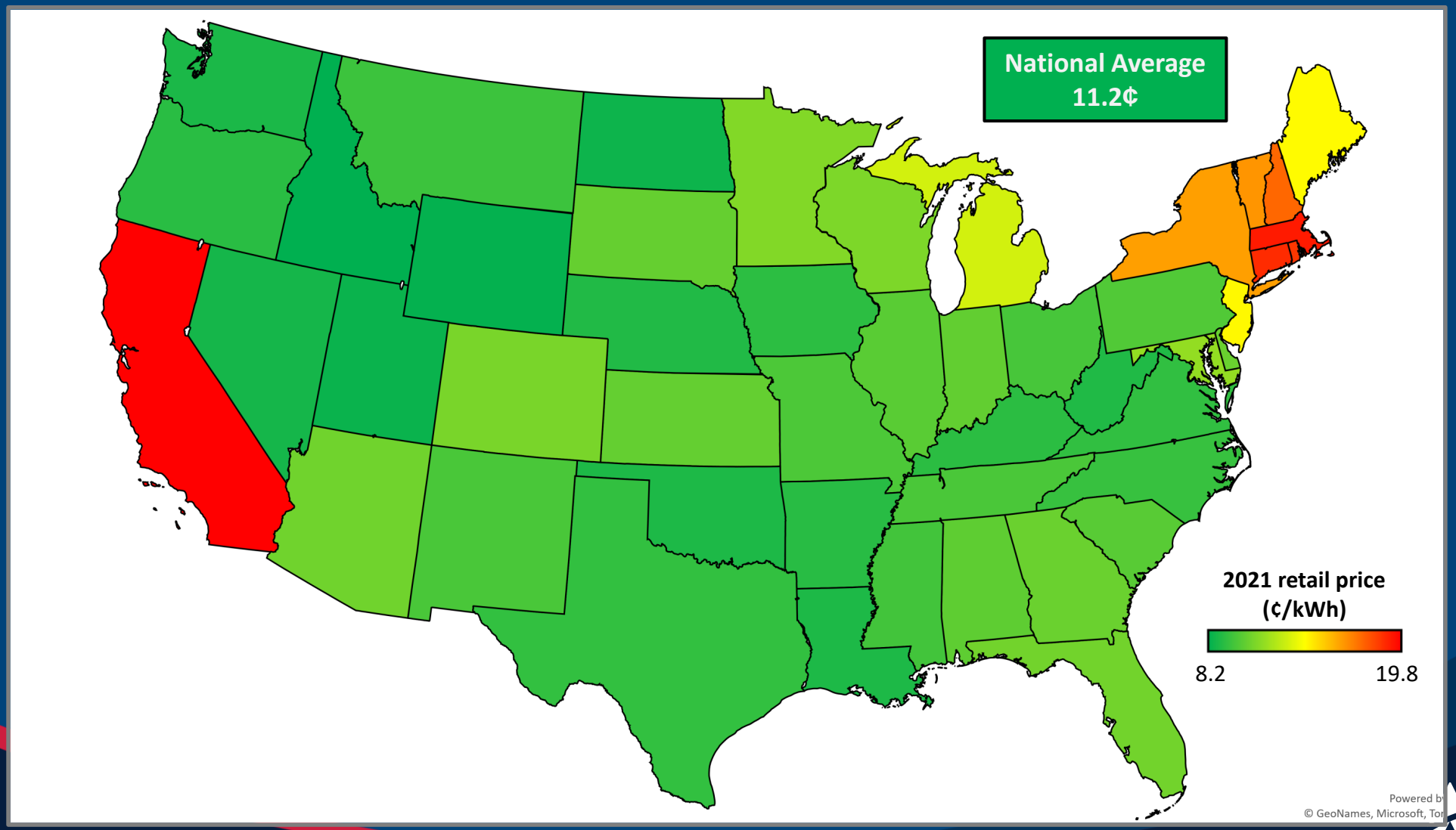
Forward prices reflect pipeline constraints between producing and consuming regions



Source: API using EVA, Inc. data
Prices reflect market forwards for cal-2023 as of Sep 26, 2022, and are not a forecast.
The state colors indicate 2021 natural gas production.

American Petroleum Institute

Lack of infrastructure evident in electricity rates

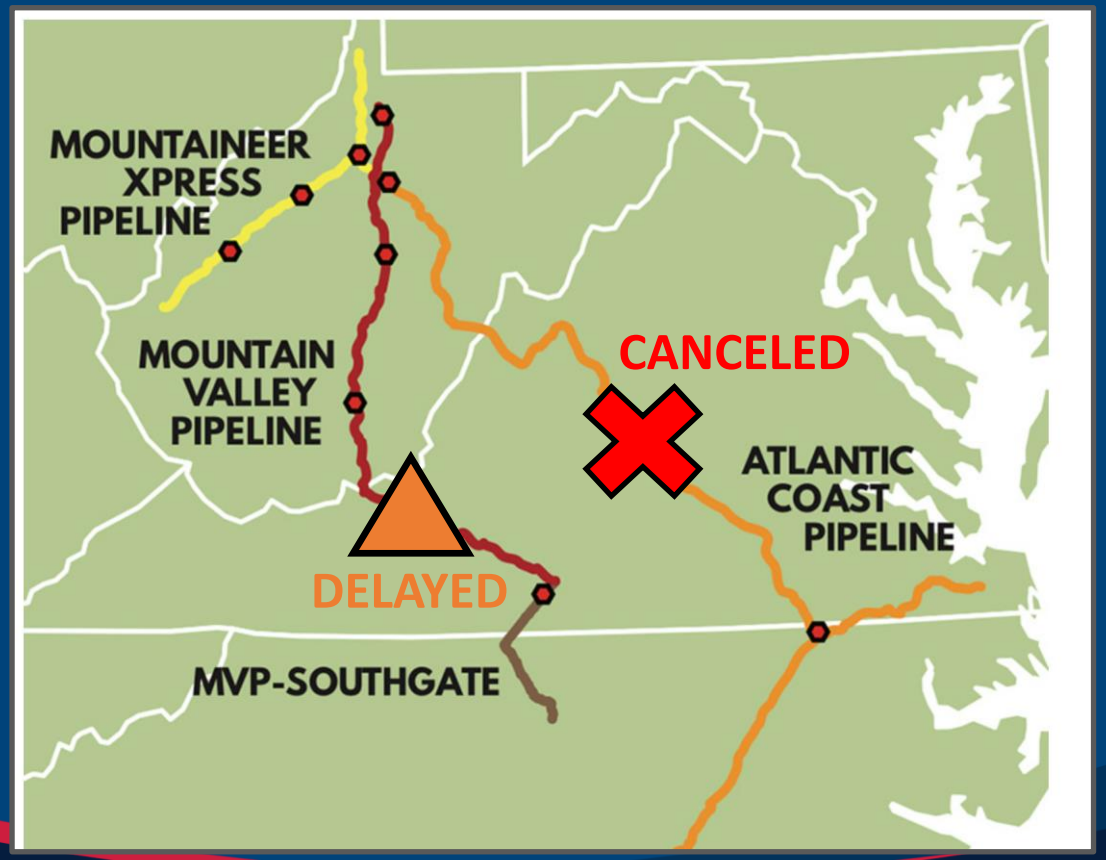


Source: API using EIA data

American Petroleum Institute

Infrastructure constraints plague Appalachia

- Needed pipelines out of Appalachia have been delayed or canceled
- Appalachian production is bumping up against pipeline capacity
- Mid-Atlantic market isn't a bottomless sink

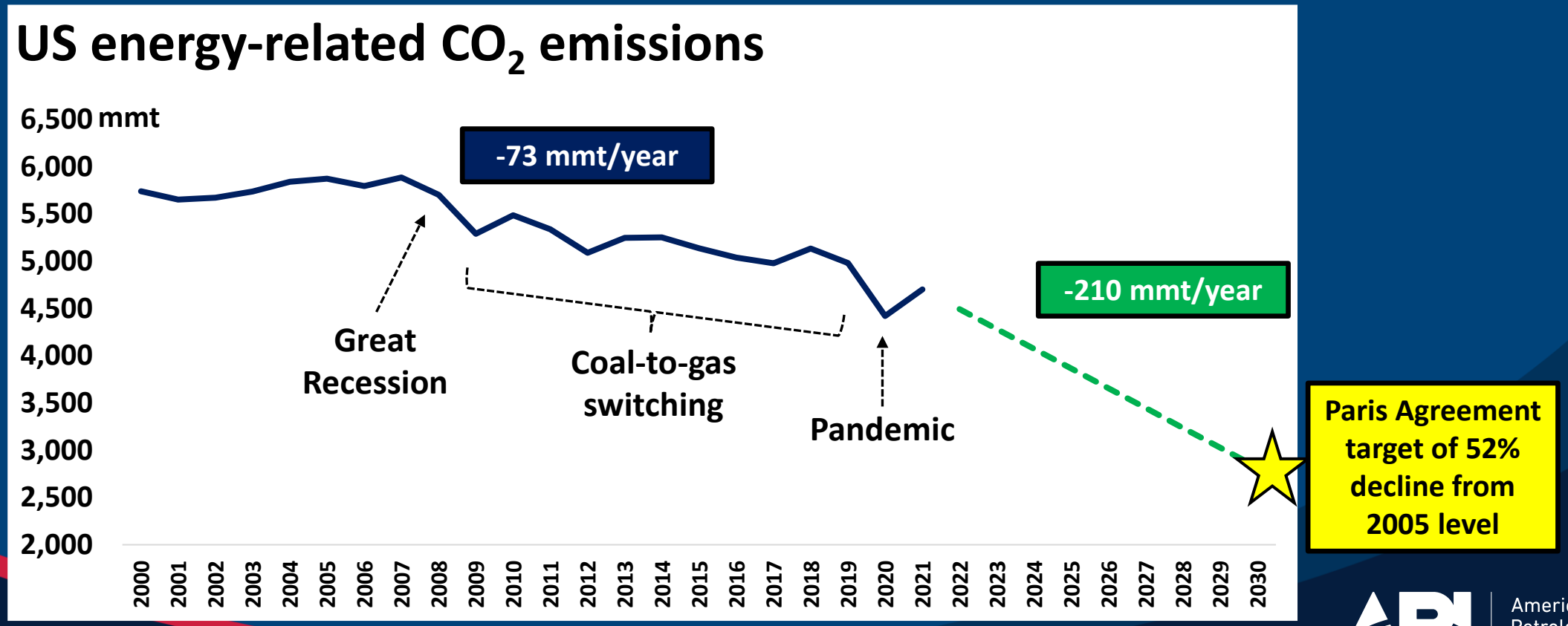


Source: AppVoices

American Petroleum Institute

US carbon emissions have fallen dramatically

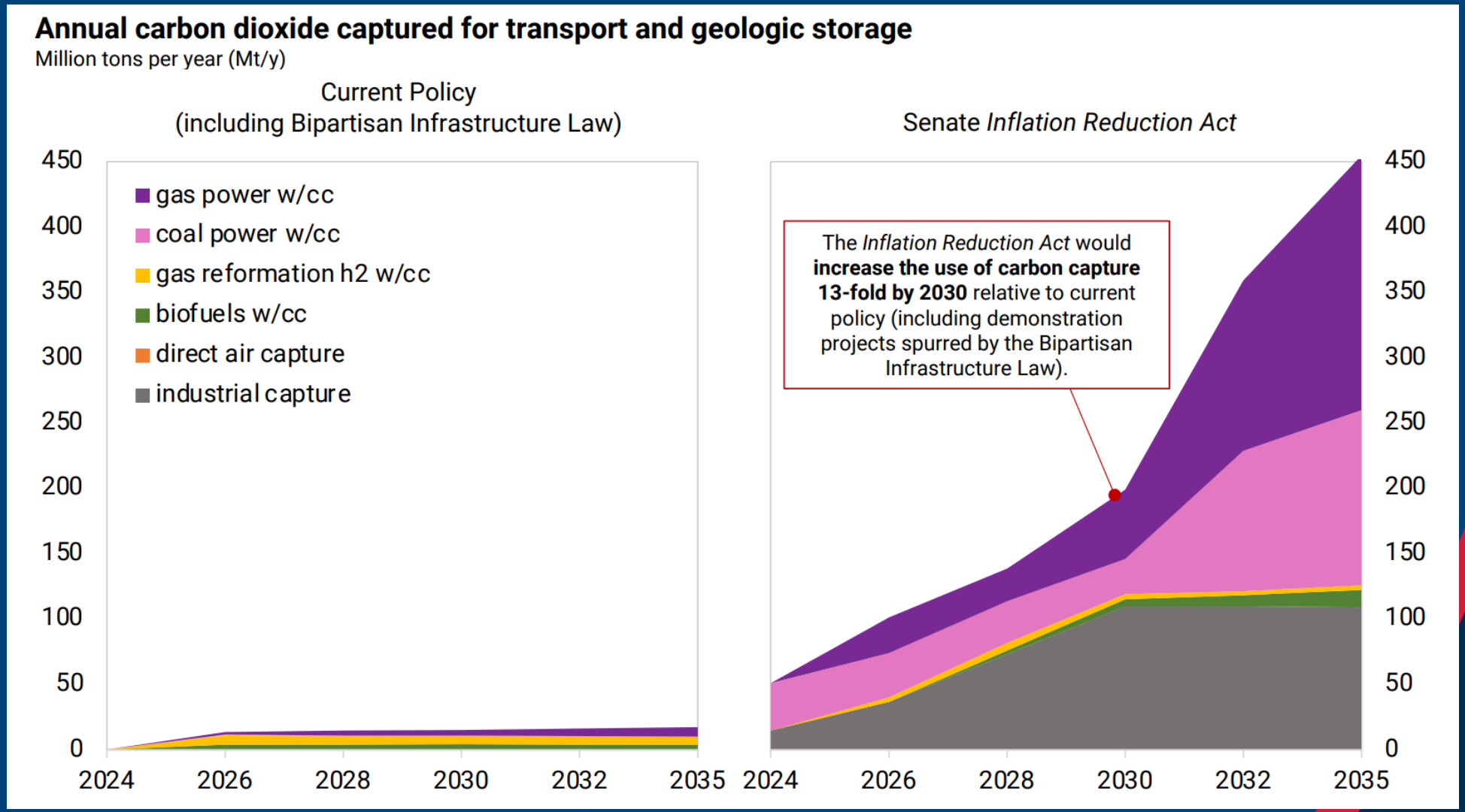
- Carbon emissions have fallen 20% since 2005
- The switch from coal to natural gas in the power sector has been the major driver
- The pace of reductions needs to triple to meet Paris Agreement goals



Source: API using bp and White House data

American Petroleum Institute

Inflation Reduction Act of 2022 – CCS & H_2



American Petroleum Institute

Key takeaways & API advocacy

- **Infrastructure, infrastructure, infrastructure.** We need the ability to build energy infrastructure to alleviate bottlenecks and send the proper signal to producers.
- **Market volatility.** The market is likely to continue to be volatile – this is a generational shake-up.
- **Policy certainty.** Consistent messaging from the administration around the role of natural gas will be key to re-establishing stability.
- **New opportunities?** While low-carbon solutions are promising, achieving true scale will be extremely challenging.

Questions?

American Petroleum Institute

Appendix

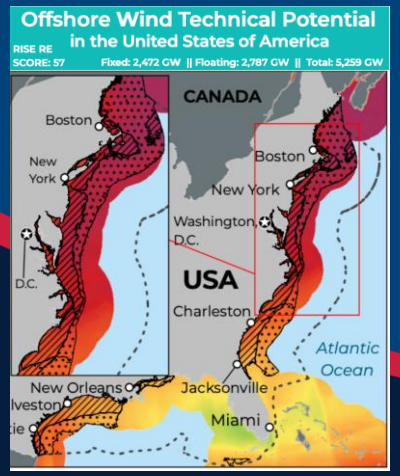
American Petroleum Institute

Enormous amount of offshore wind capacity

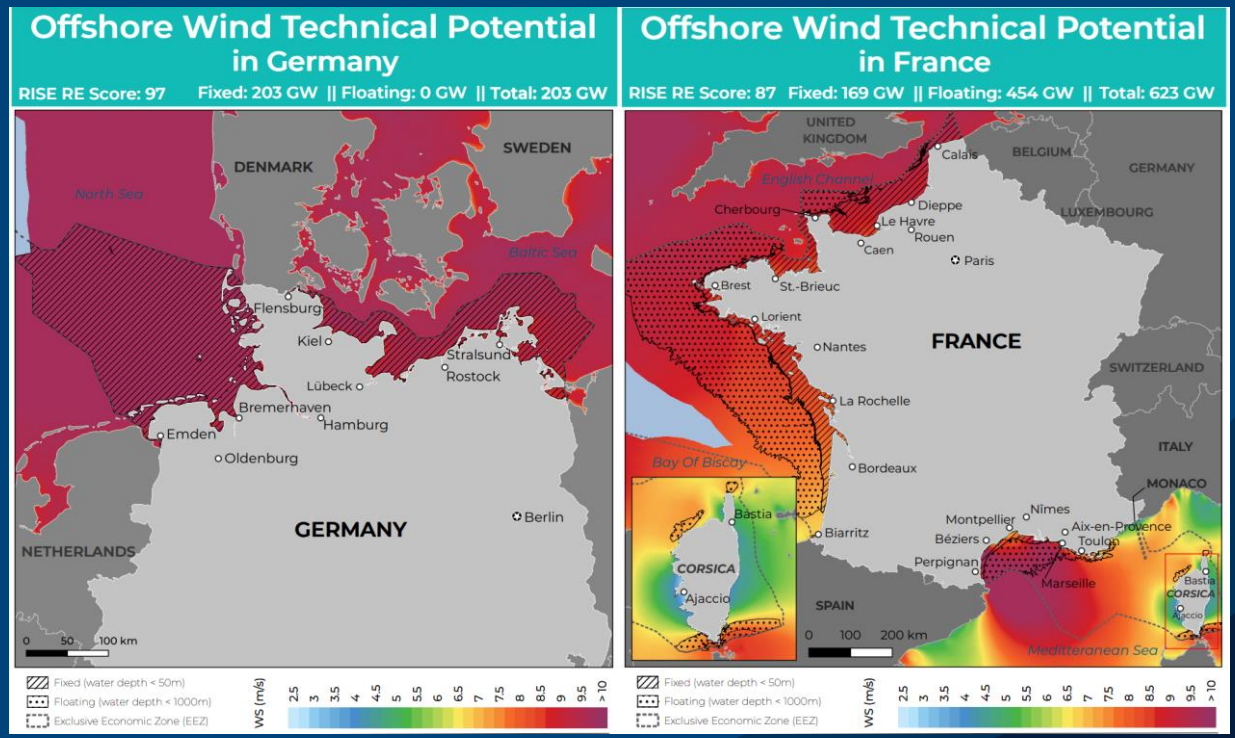
1 Million Metric Tonnes of Hydrogen = 11 GW offshore wind installed capacity

** That's 110 GW of offshore wind to achieve EU's goal of 10 MMT of Renewable Hydrogen by 2030; 550GW by 2050*

- Hornsea 2 in England is the largest offshore wind farm in the world at an installed capacity of 1,300 MW
- The EU would need 84 offshore wind farms of this size to meet its 2030 goals with offshore wind alone
- The EU currently has 25 GW of offshore wind installed capacity dedicated to the power sector



..or nearly all of the US East Coast's technical potential to meet the DOE goal of 50 MMT 'Clean Hydrogen' by 2050



American Petroleum Institute

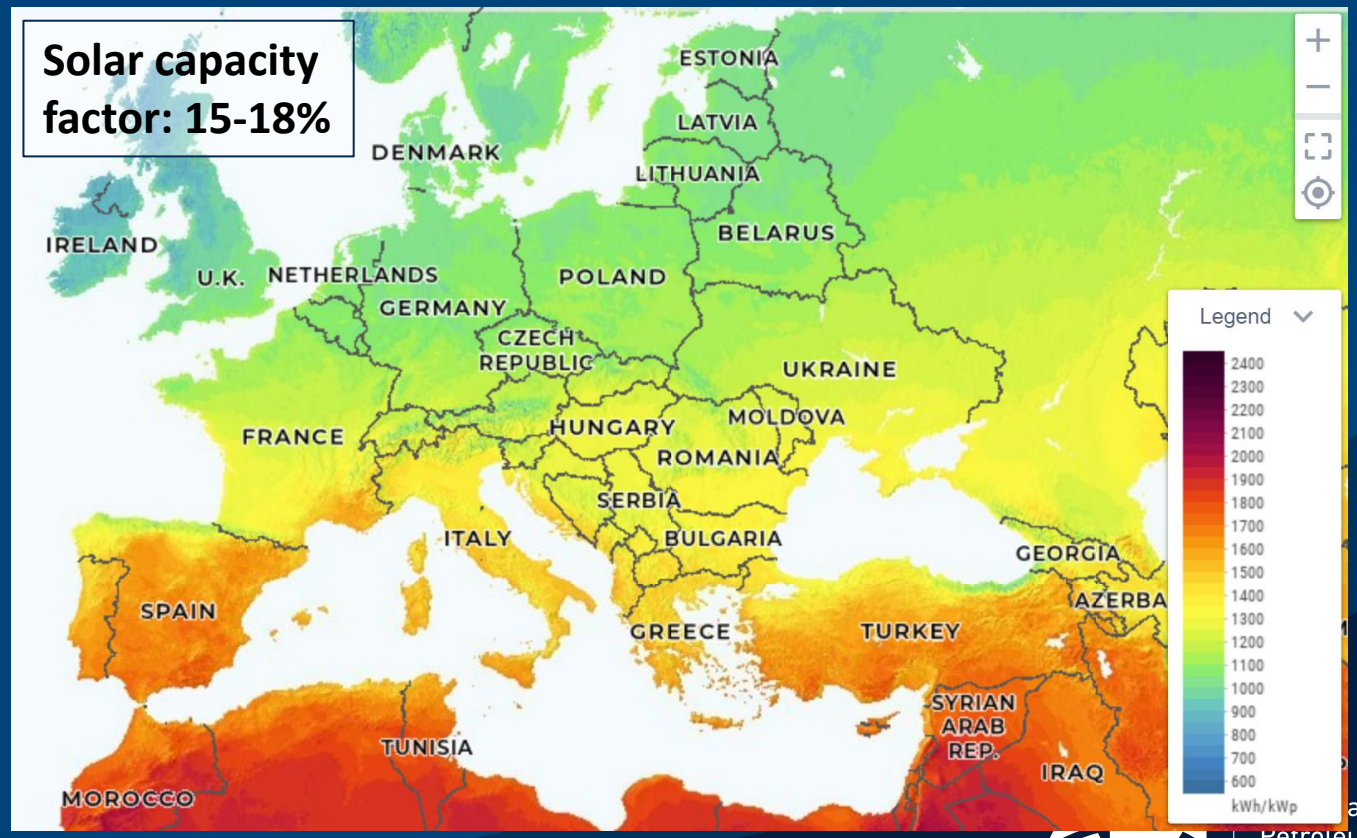
With Solar the challenges get steeper

1 Million Metric Tonnes of Hydrogen = 32 GW solar installed capacity

**That's 320 GW of solar to meet EU's goal of 10 MMT of Renewable Hydrogen by 2030; 1,600 GW by 2050*

- The EU currently has 160 GW of solar installed capacity
- This is in *addition* to goals to build over 1,000 GW of new solar capacity for power sector generation

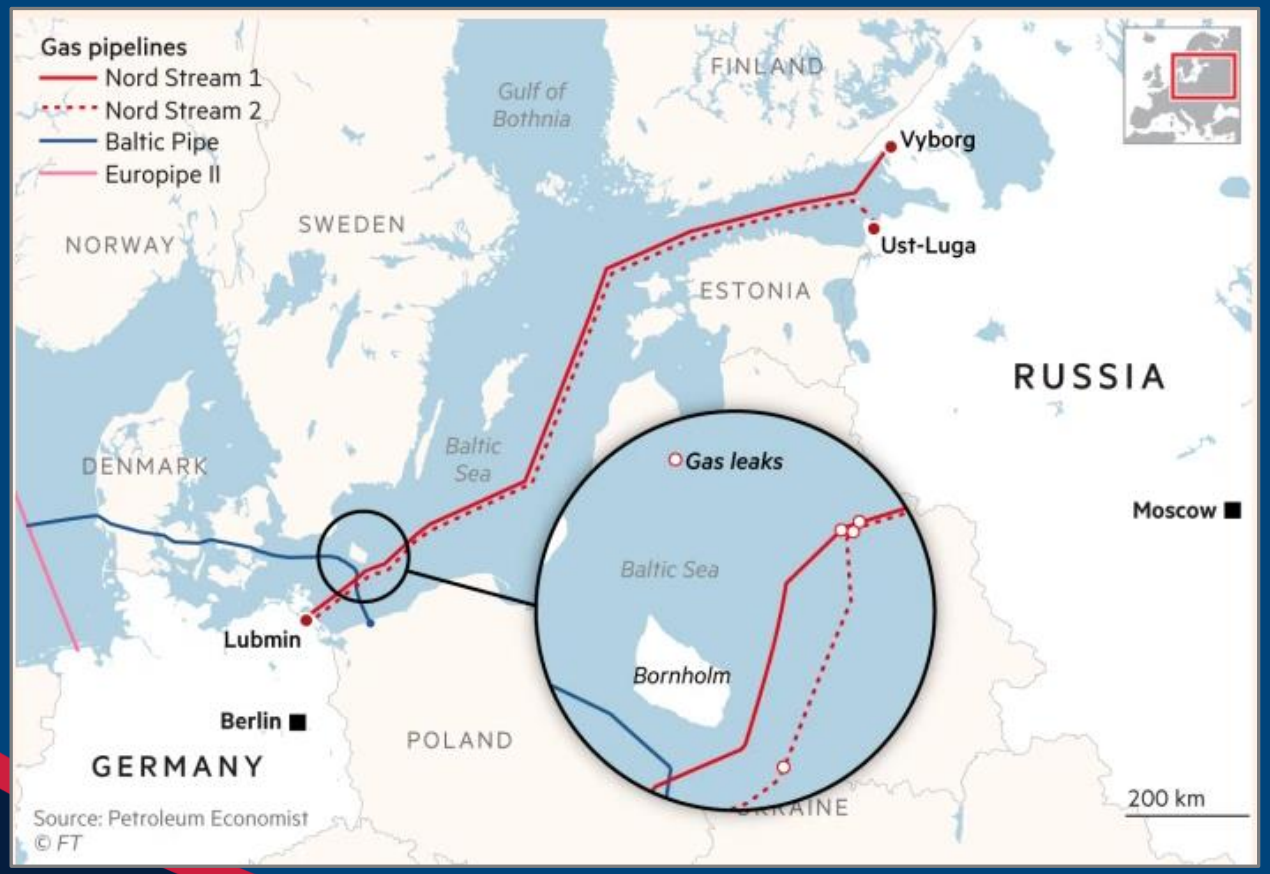
How much grid electricity would need to be 'renewable' to achieve emissions reductions?..



Source: Global Solar Atlas

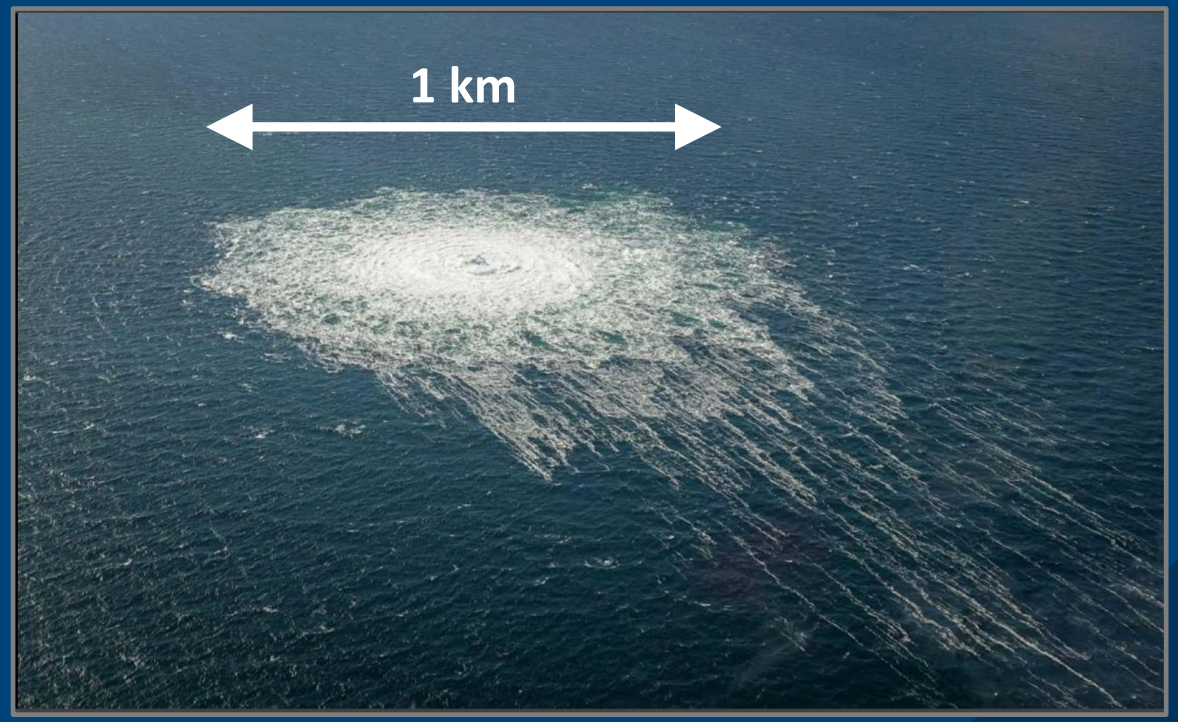
Sabotage? Simultaneous leaks strike NS1 & 2.

Map of Nord Stream pipeline leaks



Source: Financial Times

Gas bubbling up from the Baltic Sea

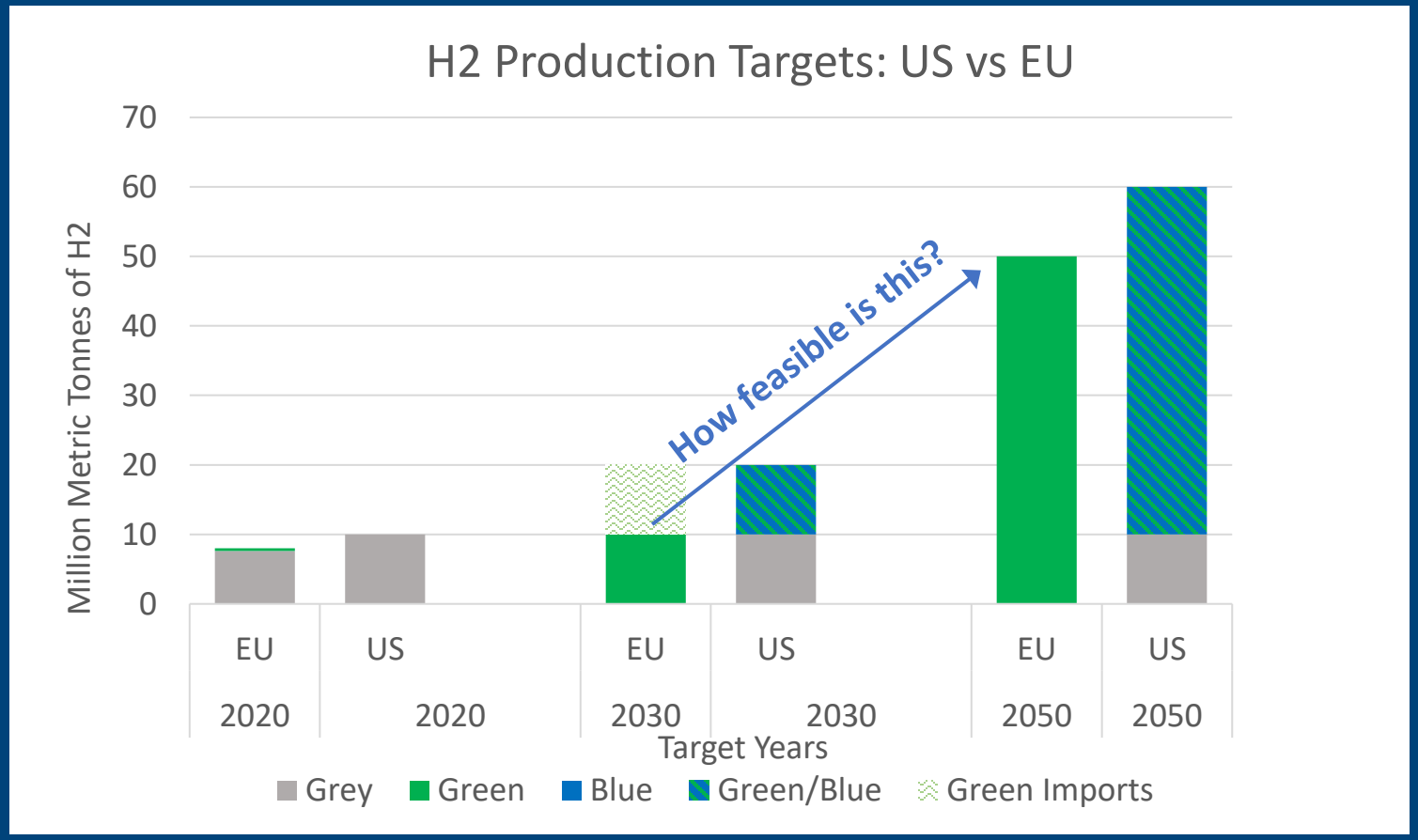


Source: Reuters

<u>Takeaway</u>: the loss of these pipelines reduces Europe's gas supply options and makes US LNG more valuable.

American Petroleum Institute

What role can Low-Carbon Hydrogen play?



Cost of production

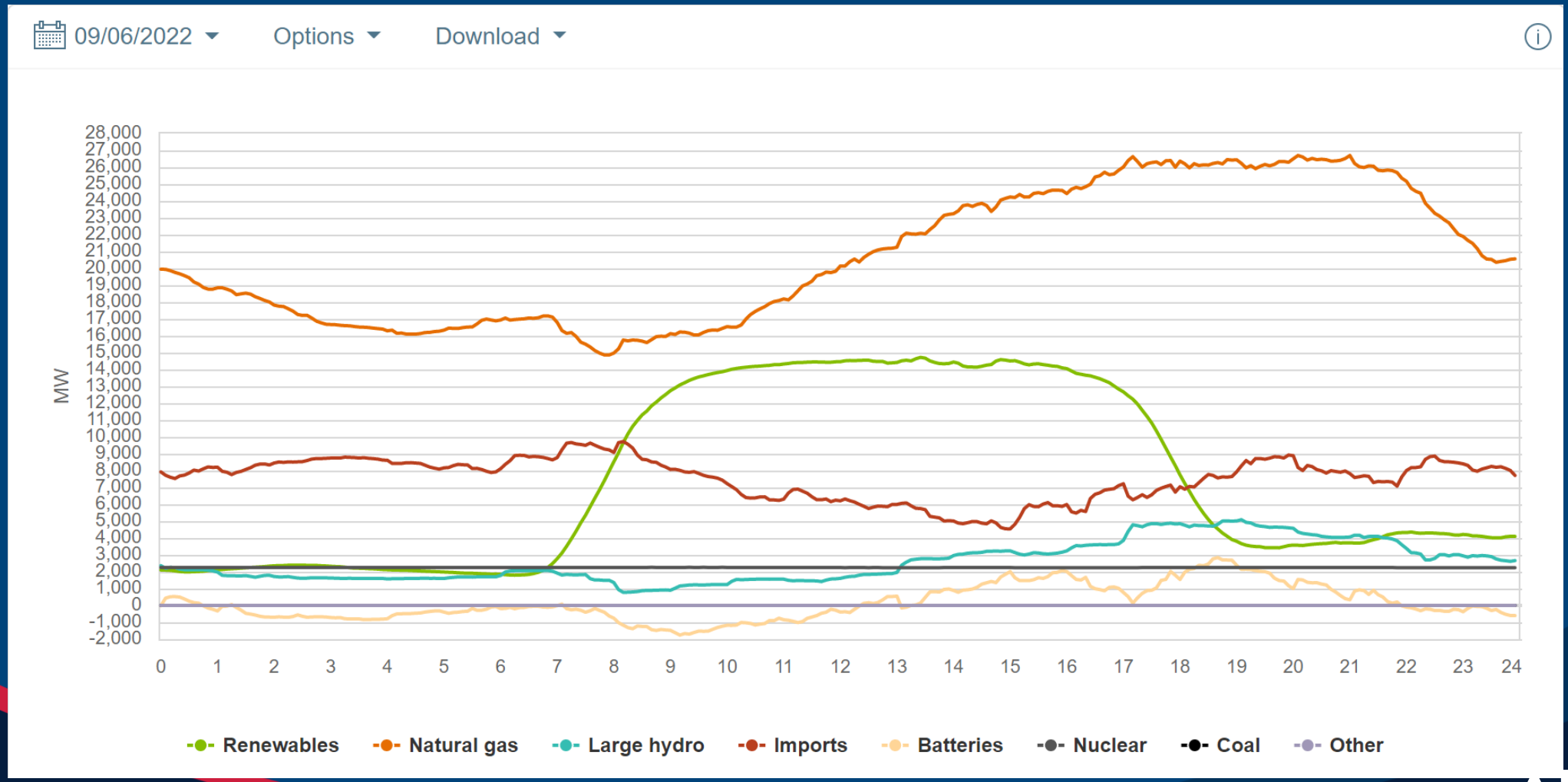
Grey: **$1.50 - $2.25/kg**
Blue: **$5 - $8/kg**
Green: **$6 - $13/kg**

Source: DOE Hydrogen Roadmap, REPowerEU

How much renewable capacity would be needed to meet these goals?..

American Petroleum Institute

Gas critical to reliability during CA heat waves



Source: California ISO

American Petroleum Institute

Where does this leave us?

- **Growing reliance on intermittent resources will require more flexible, dispatchable resources**

PJM's *Energy Transition* report (May 2022)

3. Market Reforms Needed to Incentivize Flexibility

The operational flexibility needs of the system increase with the integration of renewable resources, requiring on average up to 7.5 GW of synchronous reserves to maintain reliability. Under high renewable penetration, energy storage resources supplied more than 80% of the reserve requirements. There is an opportunity for PJM and stakeholders to explore the participation of renewable resources in the reserves market.

4. Balancing Resources Needed for Ramping

The study shows an increasing need for balancing resources to meet ramping requirements, with frequent slopes in excess of 10 GW/hour and extremes in excess of 20 GW/hour. The geographical diversity of the PJM footprint smooths out the net variability of renewable resources. Net-load ramping requirements are more severe in winter due to the adverse alignment between the native-load ramping and the variability of renewable resources. Thermal resources supplied 50% of the ramping needs; the remaining 50% was delivered by a combination of hydro, storage and regional interchange.

ISO New England's *Future Grid Reliability Study* (May 2022)

Key Takeaways

***Energy Adequacy* is a challenge under the studied scenarios.**

- The future grid scenarios explored in this study may require a significant amount of gas or stored fuels to support variable resources. When coupled with expected demand growth, this may be impossible under current infrastructure. The stored fuels in this future grid do not need to be carbon-emitting, but they must be dispatchable.
- Adding relatively small, targeted amounts of dispatchable units to the most renewable-heavy scenario explored in this study would significantly reduce the necessary new units of wind, solar, and storage, illustrating the importance of dispatchable resources to the future grid.

- **The IRA's provisions fail to recognize gas's critical role in the energy transition, and regulators need to understand that continued out-of-market support will likely accelerate grid challenges**
- **Mixed message from policymakers: US gas more important now than ever… BUT wholly excluded from policy support?**

American Petroleum Institute