



Ukraine: Geopolitics and Emissions

NACAA Spring Membership Meeting

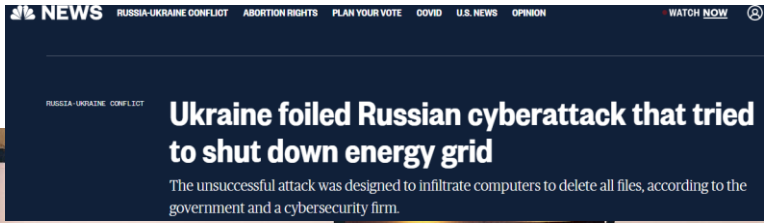
May 18, 2022

Miles Keogh, Executive Director, NACAA
mkeogh@4cleanair.org * @WeAre4CleanAir

My agenda

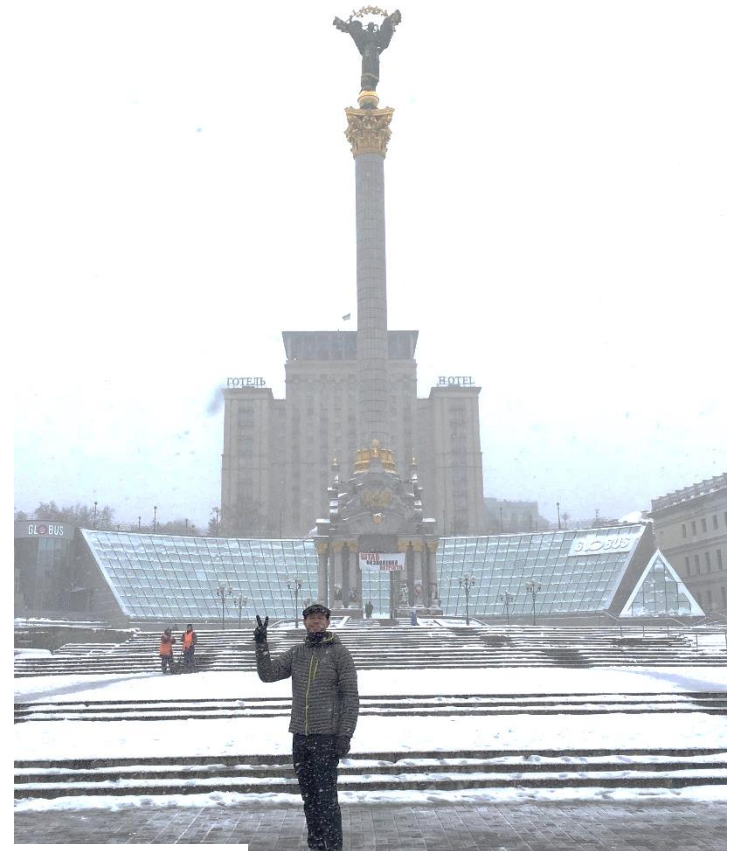
- ❑ How did we get here?
 - ◆ Gas and oil markets in 2021; Russian role
- ❑ Implications of the war
 - ◆ Gas transit, environmental issues
 - ◆ Sanction effects & Post-2027
- ❑ Implications for energy & emissions
 - ◆ Supply and price effects
 - ◆ LNG and gas infrastructure
 - ◆ GHG effects
- ❑ Implications for air agencies
- ❑ Long term vs. Near Term - fixes & uncertainties

A few things about me and Ukraine



TECHNOLOGY

The dire predictions about a Russian cyber onslaught haven't come true in Ukraine. At least not yet.



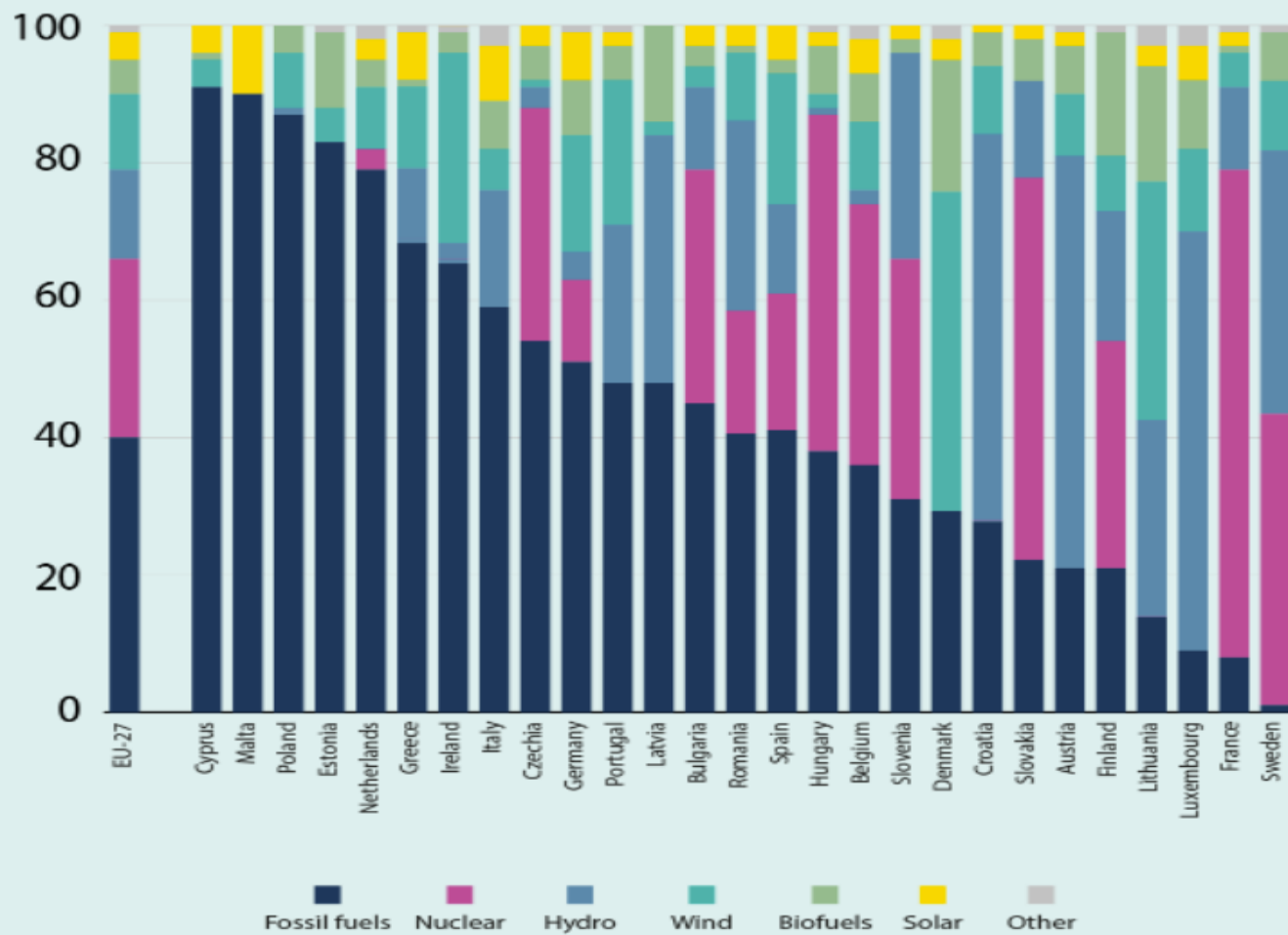
Menu Weekly edition Search

Europe | The digital war that wasn't, yet

Cyber-attacks on Ukraine are conspicuous by their absence



EU production of electricity by source, 2018 (%)



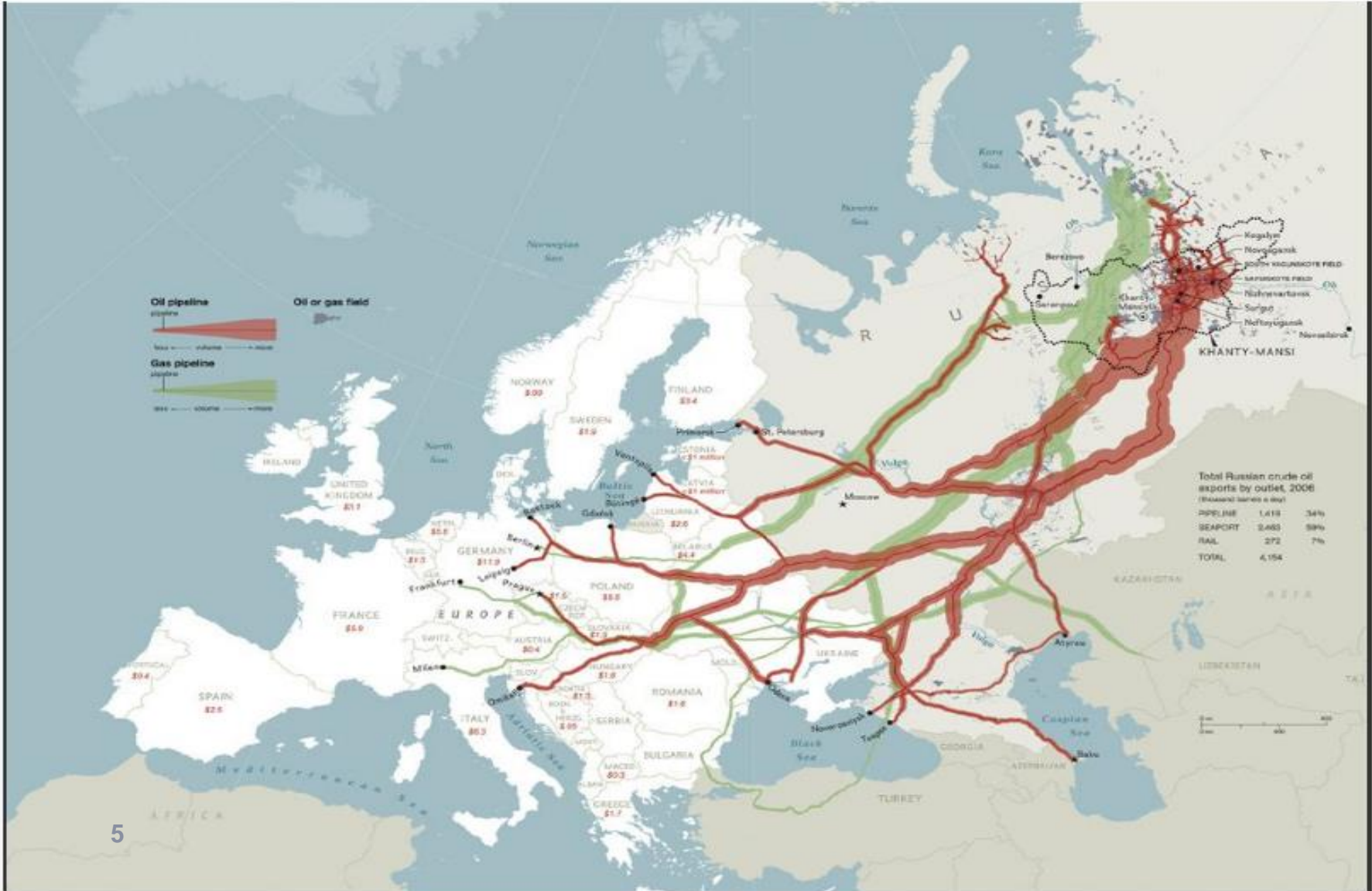
Fossil fuels include coal, gas and oil products.

Biofuels include solid (e.g. wood), liquid (e.g. biodiesel) and gaseous (e.g. biogas) biofuels.

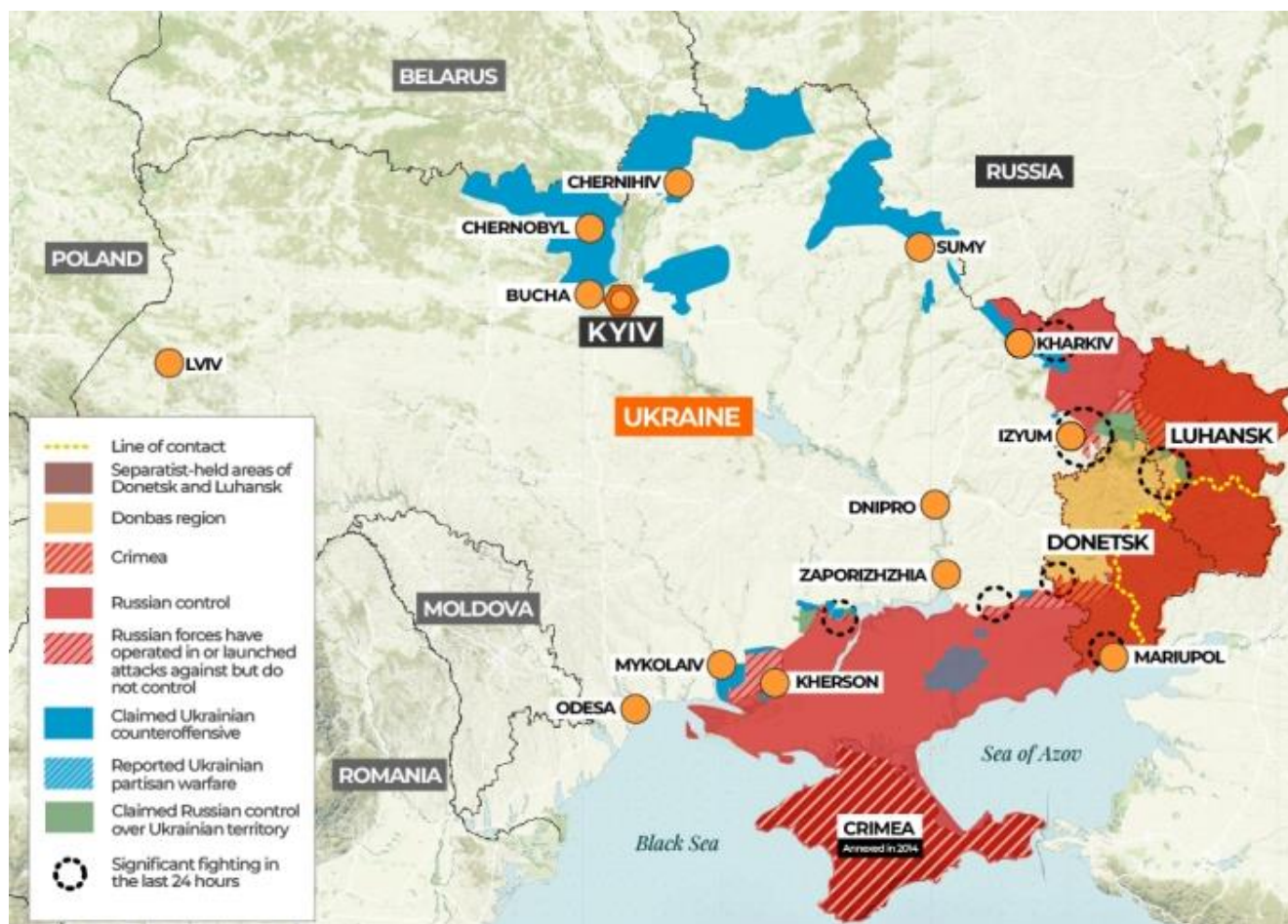
Other includes electricity from geothermal, non-renewable waste, heat from chemical sources and other sources.

Source: Eurostat

Gas and oil before the war

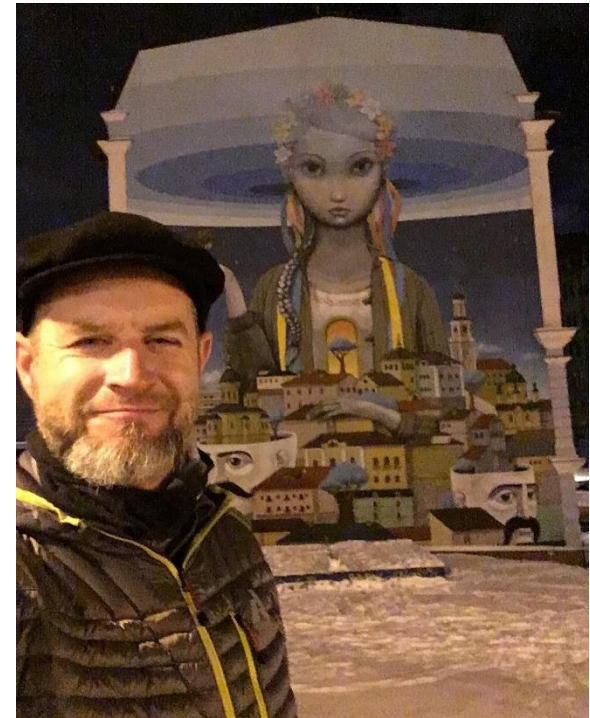


The 2022 Invasion by Russia



Direct implications of the war: gas transit, environmental effects

- ❑ Ukraine used to transit about 100 BcM of gas per year; down to about 41 BcM in January 2022.
- ❑ “We've seen fires at a nuclear facility. We've seen attacks and missiles striking ammonia pipelines and chemical plants, causing releases of highly toxic substances. Even beyond this, there are enormous impacts on agricultural lands as lands are mined, as unexploded ordnance and munitions accumulates on the cropland.”

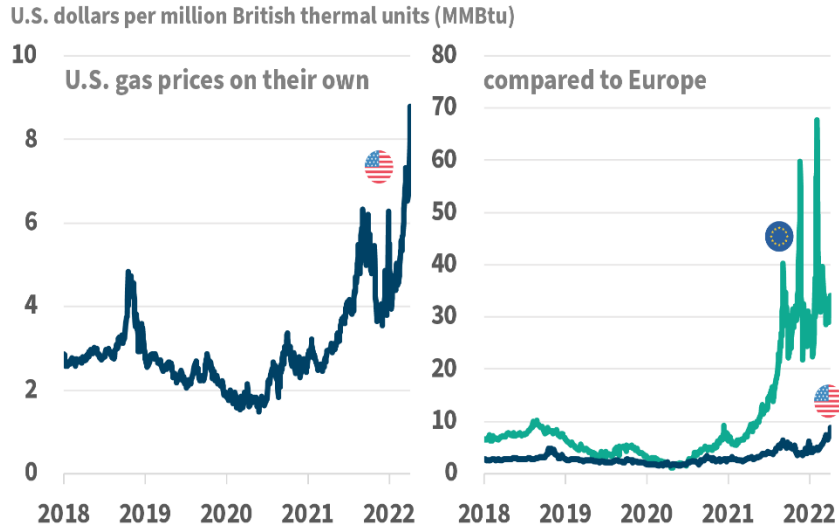


Sanction effects & post-2027

- ❑ 60% of Russian oil exports go to the EU (25% of EU supply)
- ❑ Russia supplied 40% of EU natural gas, 50% of coal
- ❑ Russia exports 150 BcM; Germany uses 100 BcM and sends about \$400M per day for energy / Russia earns about \$1B/day on O&G.
- ❑ EU will try to replace 101.5 BcM of Russian gas by 2023, replace 60% with LNG and pipeline gas (mostly LNG); 33% from new EE & RE. Germany advanced its 100% RE target 5 years to 2035.
- ❑ Plans to wean off Russia by 2027 may accelerate green transition IF winter isn't too cold, and other market conditions enable it

Implications for the US: Prices, LNG, & Production

Natural gas prices in the United States and Europe

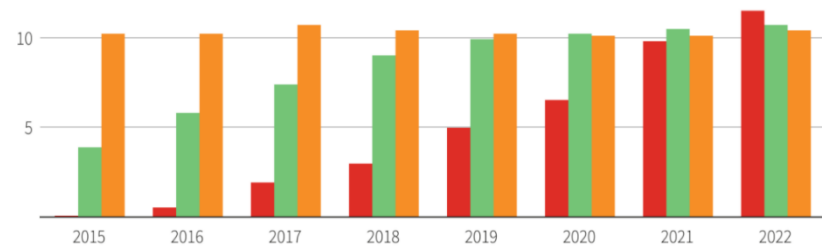


Source: Bloomberg. Prompt month contract prices to May 5, 2022. Henry Hub for the United States. Title Transfer Facility (TTF) for Europe.

U.S. soon to be top dog in LNG export race

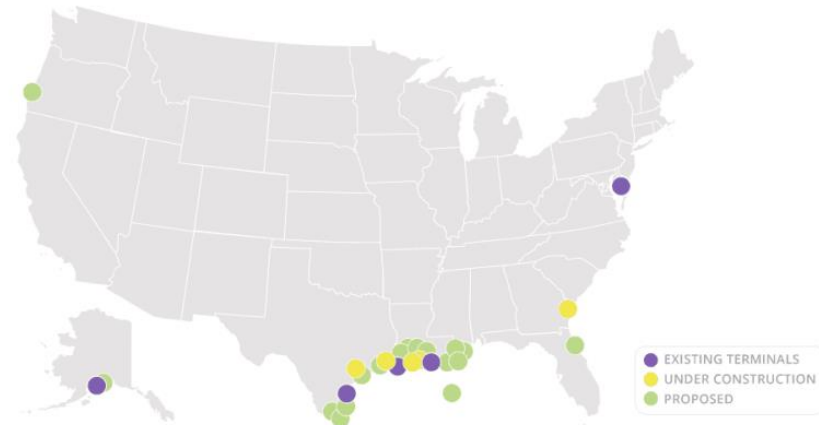
The United States is expected to become the largest exporter of liquefied natural gas (LNG) by 2022, surpassing Australia and Qatar.

United States Australia Qatar



Note: 2021 and 2022 figures are estimates

Sources: U.S. EIA, International Gas Union, Goldman Sachs



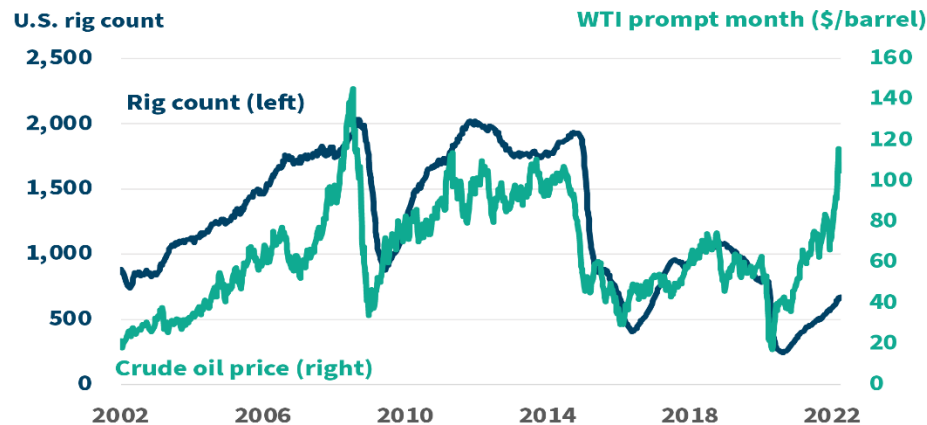
Implications for Greenhouse Gases

- ❑ Domestically, production may increase driven by prices; markets opened by strategic goals; pressure on LNG as committing to fossil fuels; “associated” O&G production
- ❑ Asia, others could be priced out of LNG and turn to coal. Will Russian O&G find other markets?
- ❑ Russia itself, 5% of global emissions, may be excluded from global GHG regime
- ❑ Long-term goal of fossil fuel reduction may be in a new place since Middle Eastern conflicts, or may not
- ❑ Is there a pathway to reducing GHGs and sanctioning Russia?

Implications for Our Agencies (?)

- Oil markets are global so demand/supply imbalances anywhere have price effects everywhere
- Huge latent demand for shale-to-LNG gas production (20% capacity increase coming online); LNG can link global price pressures. Many “shovel ready” permitted projects just need contracts
- O&G has methane, VOC, toxics implications; emissions at combustion
- Production, midstream, LNG facilities have emissions and need a lot of power
- Wellhead emissions; opportunity for “high quality” gas w/ low emissions
- Permitting, inspection, enforcement pressures
- Environmental justice, infrastructure, and LNG

U.S. oil and gas rig count vs. crude oil prices



Source: Baker Hughes, North America Rotary Rig Count (Jan 2000 - Current), U.S. Energy Information Administration, Cushing, OK, Prompt Month (NYMEX).

Back to Boom Shale drillers launch largest expansion in years



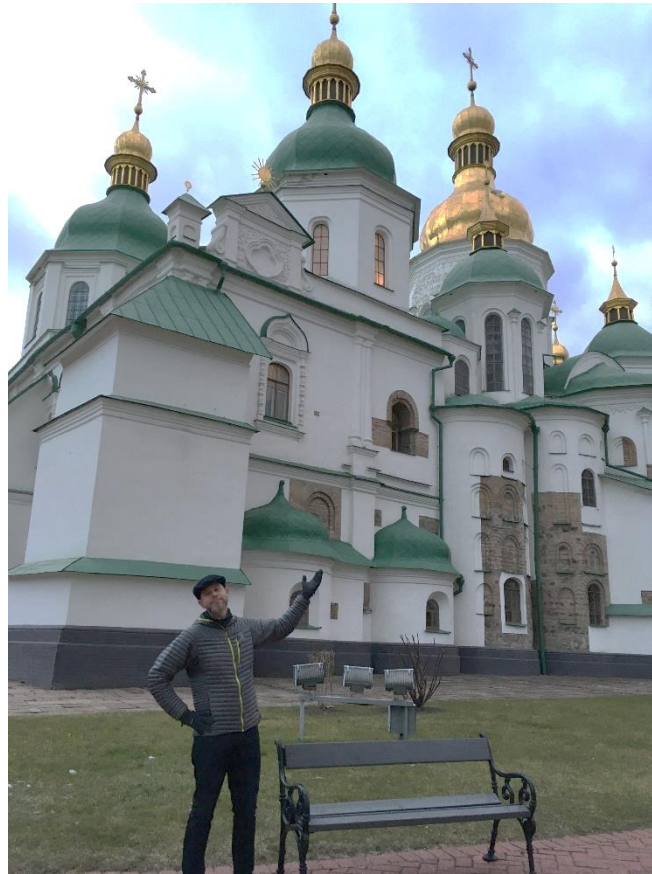
Source: Baker Hughes

Bloomberg

Competing goals and timeframes

- ❑ Market analysts see huge near term price and supply challenges in Europe; durable high prices in US (new high gasoline process set in March, May)
- ❑ Europe is putting €200B into green energy, industry & transport
- ❑ Near term fixes and long term fixes may have contradictory results
- ❑ Many unknowns:
 - ◆ Is there sufficient alternate supply?
 - ◆ What will winter 2022-2023 be like?
 - ◆ What happens with inflation & the rest of the economy?
 - ◆ Will EJ and climate concerns outweigh infrastructure pressure?
 - ◆ Will the war escalate?

If you've got questions...



I'll try to answer them!