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Russia/Ukraine and the Geopolitics of Energy

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Two Challenges: Russia/Ukraine and the Energy Transition

- **Expectations for commodities are challenged, transformed by the military activities under way in Ukraine – and have become more bullish** given Russia's central role in global commodities, upsetting supplies and supply chains.
 - **One thing is certain: the world is undergoing two challenges that affect commodities at the same time: the current geopolitical and economic transformation on top of this winter's seeing the first crisis of the Energy Transition, which is also having revolutionary consequences on politics and markets and it too will be impacted by today's geopolitical turmoil.** The Transition is not just a bumpy road: We view it as revolutionary.
 - **Given huge uncertainties there is a need to review the road ahead under 4 if not 5 scenarios.** A base case takes into account the knowable impacts on supply and demand to date and incorporates lower supply and demand with a quick resolution of fundamental issues of disruptions/dislocations and a return of Russian supply. The bear case is recessionary given the impacts of high prices on economies. We add bull and superbull cases, and could add a super-duper bull case as well.
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Background: A 'Hot' Winter emerges with low oil inventories

Base case absolute inventories vs. Brent flat price



Base case inventories in days of demand cover vs. Brent flat price(inverted)

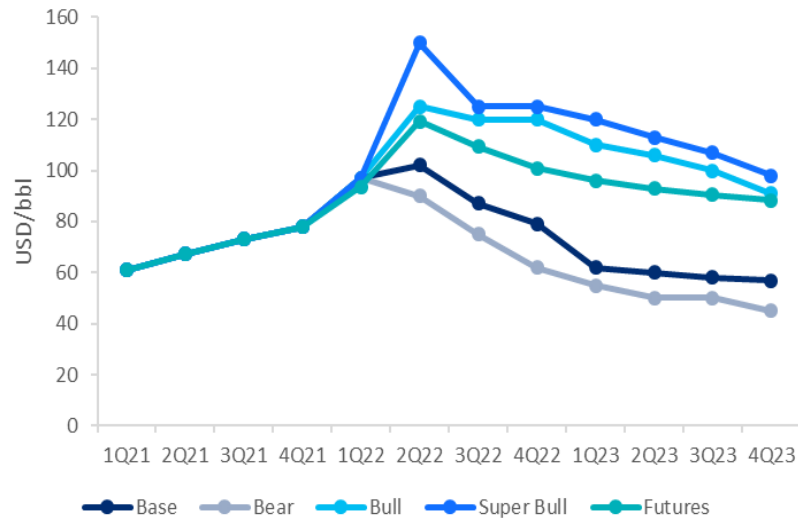


- Winter started with OPEC+ 'success' in driving down inventories...but they abandoned "central banker role" as inventories fell to extremely low levels
- Meanwhile, demand was higher than expected – due to milder COVID outbreak, cold winter weather, significant gas to oil switching: Plus 0.5-1 m b/d
- And supply was constrained by disruptions and weather – Libya, Ecuador, US and others: Minus 0.5-1 m b/d
- Tight inventories spell higher volatility and higher price risk premia
- And then came Russia/Ukraine, adding further risk premia and higher prices

Russia-Ukraine conflict threatens oil exports amid critically low inventories

Oil market impacts are binary, depending on whether a de-escalation happens soon or is prolonged or spreads beyond Ukraine. Longer-term, the shift in NATO-Russian relations may have wide-ranging impacts, including on relations with China. Meanwhile, Iran sanctions relief and non-OPEC+ supply growth could be on the way.

Oil price scenarios (\$/bbl)



Inventories in days of cover vs. Brent timespreads

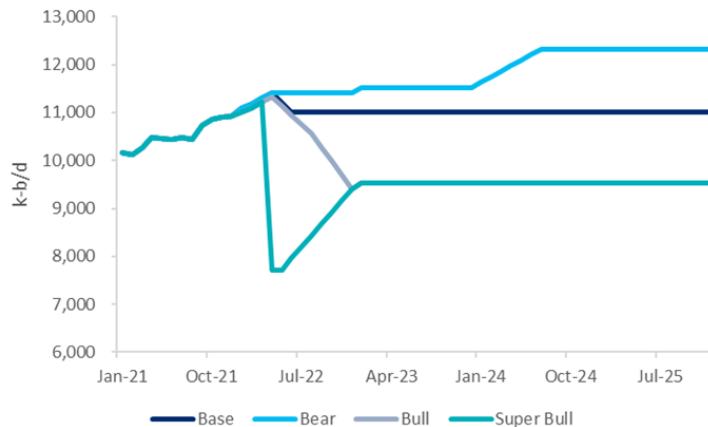


Citi revised oil price outlook and base, bull, bear scenarios (\$/bbl, 2021-26E)*

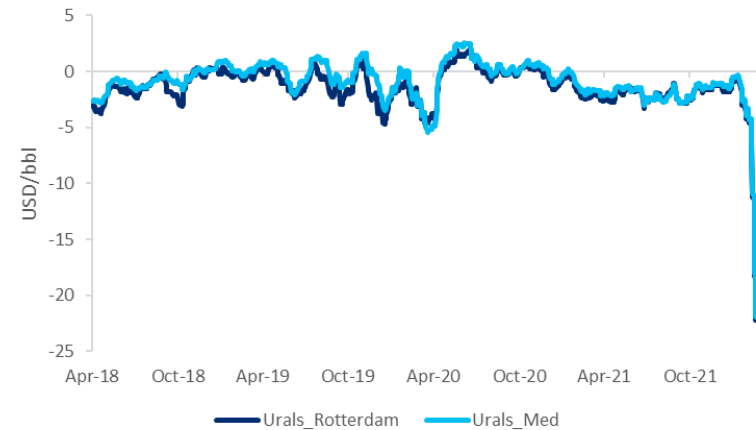
Price Deck																		
Citi	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	2021	2022	2023	2024	2025	2026
Brent	61	67	73	78	97	102	87	79	62	60	58	57	70	91	59	52	51	51
WTI	58	64	70	74	93	99	84	76	59	57	55	54	67	88	56	49	48	48
Brent-WTI	3	3	3	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3
Super Bull	61	67	73	78	97	150	125	125	120	113	107	98	70	124	110	96	94	94
Bull	61	67	73	78	97	125	120	120	110	106	100	91	70	116	102	89	88	88
Base	61	67	73	78	97	102	87	79	62	60	58	57	70	91	59	52	51	51
Bear	61	67	73	78	97	90	75	62	55	50	50	45	70	81	50	45	45	45
Futures	61	67	73	78	94	120	110	101	96	93	90	88	71	94	92	84	79	75

Russian oil exports are at the frontier of risk, pushing up expected prices

Russian oil production assumptions driving oil price scenarios (2021-24, k b/d)



Urals discount to Brent shows trade dislocations

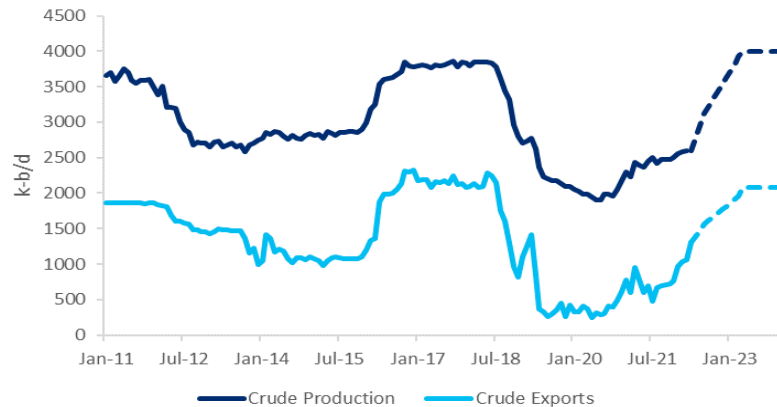


- **R/U conflict presents high probability, multiple oil disruption risks:** damage to infrastructure (pipelines, ports) incl. cyberattacks, US/EU/UK financial sanctions and buyers shifting away from Russian crude and products, export frictions (access to L/Cs, insurance, higher tanker rates, tanker access to ports), US bans on imports to US, IOCs departing Russia, risk of Russia restricting oil exports, etc.
- **Exports of Russian crude oil and gasoil are being shunned,** driving massive discounts for Urals vs. Brent of up more than \$30/bbl; some unsold exports could struggle to find a home, with limited storage, limited floating storage, and ultimately shutting-in production; Russian oil capacity could also plateau and even decline.
- **Five plausible scenarios emerge.**

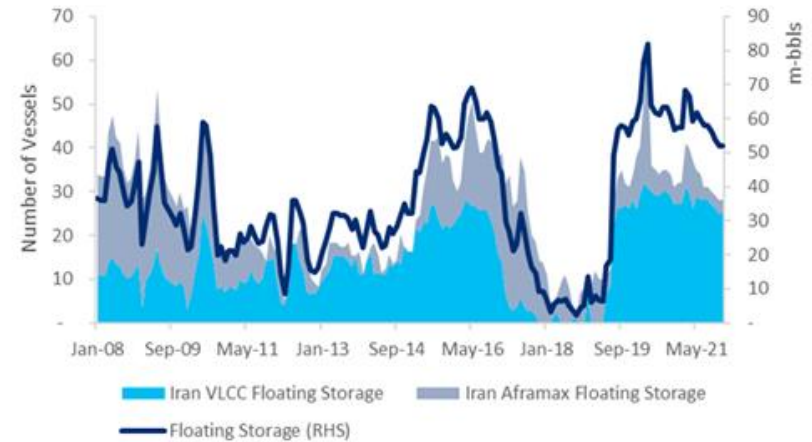
But supply-demand balance should keep loosening, structurally...

...due to fast growth from a wide swathe of producers. Iran sanctions relief could be around the corner, adding 0.5-m b/d in May, and another 0.8-m b/d through the rest of the year. US shale supply should grow more rapidly given high prices and a potential shift in views on capital discipline, with supportive US government policy possible too.

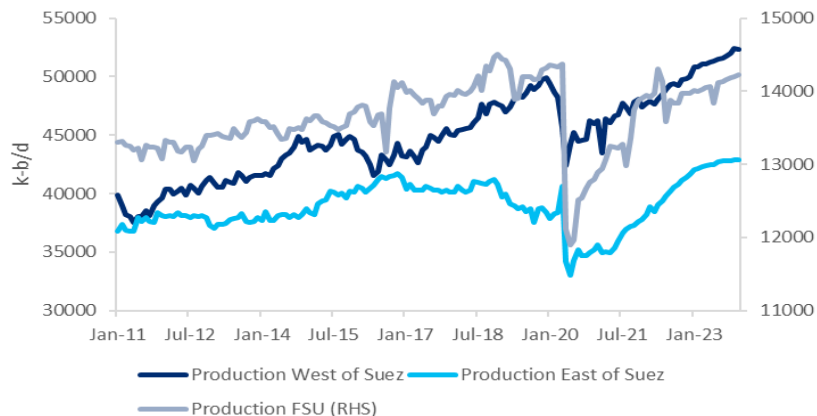
Iranian crude production and exports, historical and projected



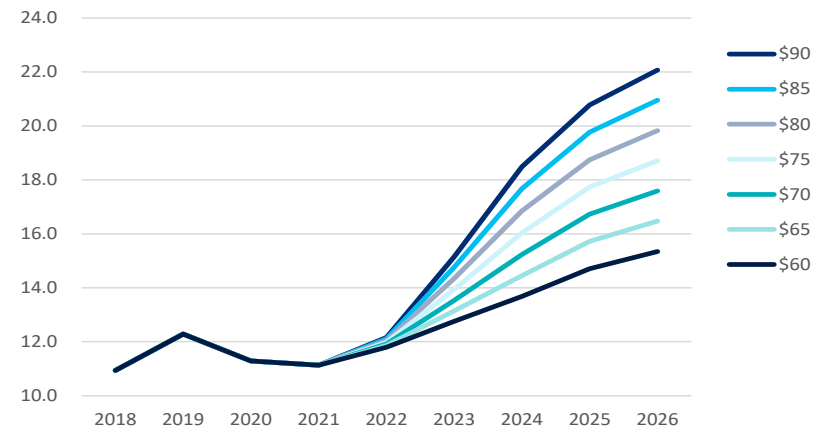
Iran floating oil inventories could soon hit the market



Oil production growth may decelerate in FSU, but it is set to remain strong West of Suez



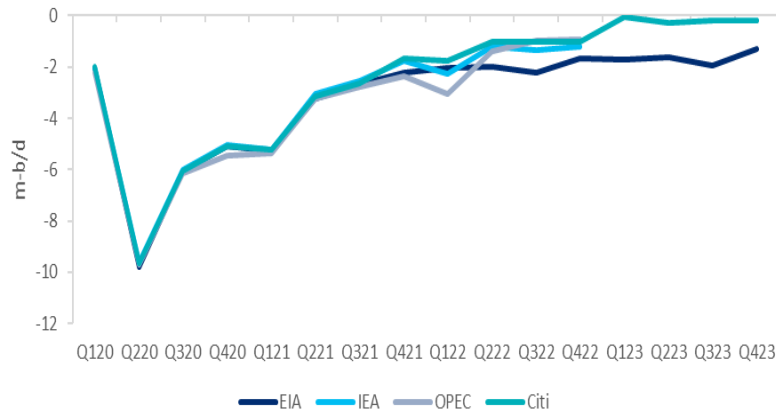
US crude production at sustained price levels*



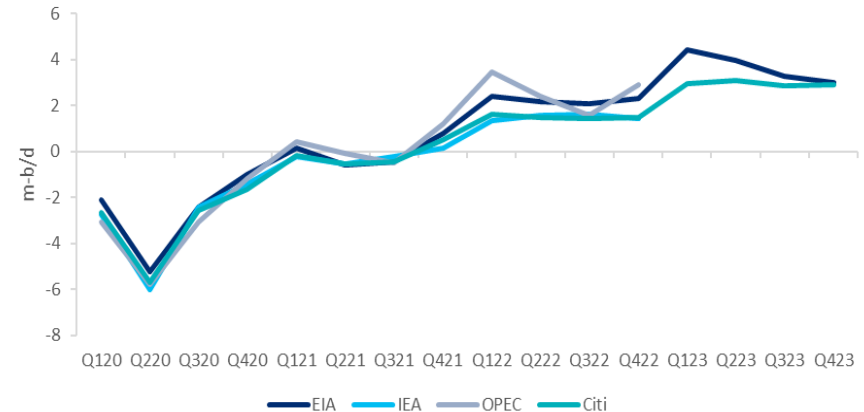
Demand should slow, but high gas prices boost diesel demand for now

2021's lack of seasonality in global oil demand was a non-recurring aberration that should come back to bite by year end. So far, robust demand growth occurred to get back to pre-pandemic levels, but going forward, oil demand like GDP are likely to slow quickly, even as gas-to-oil switching boosts demand temporarily.

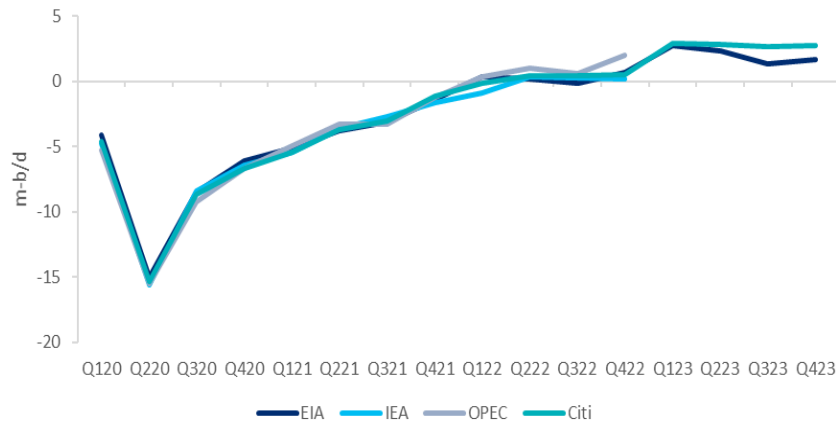
OECD oil demand impact compared to 2019 levels, official agencies and Citi, baseline



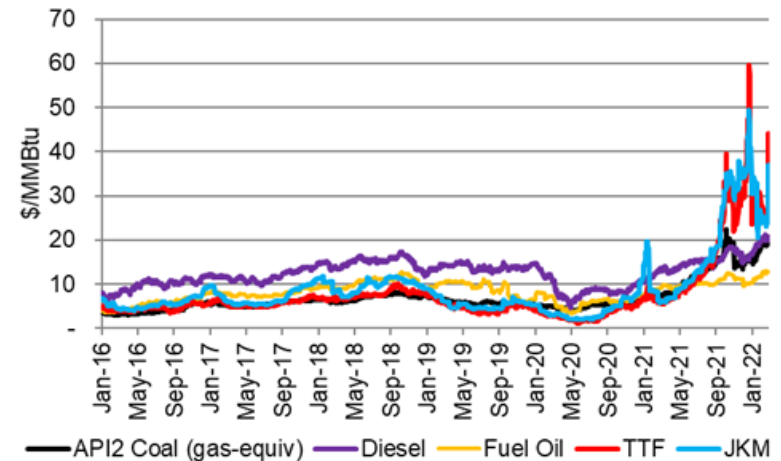
Non-OECD oil demand impact compared to 2019 levels, official agencies and Citi, baseline



Global oil demand impact compared to 2019 levels, official agencies and Citi, baseline



But extra temporary boost to diesel demand as natural gas prices are well above diesel prices



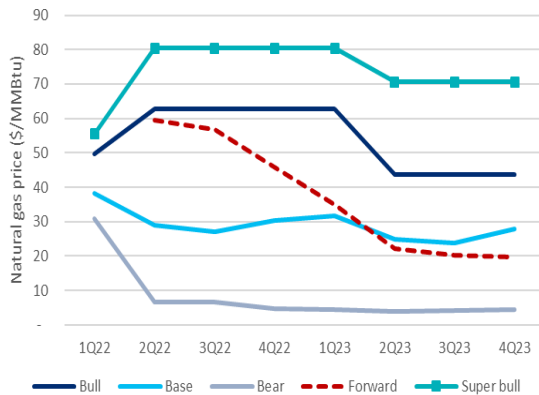
Nat Gas: Into the uncharted territory for price discovery mechanisms

	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	2021	2022	2023
Citi price outlook (USD/MMBtu)															
US (Henry Hub)	2.7	3.0	4.3	4.8	4.0	3.8	4.0	4.2	4.2	4.0	3.5	3.5	3.7	4.0	3.8
Bull	2.7	3.0	4.3	4.8	6.5	6.0	6.0	6.5	5.5	5.0	4.5	3.5	3.7	6.3	4.6
Bear	2.7	3.0	4.3	4.8	3.3	3.5	3.5	3.0	3.0	2.7	2.7	2.7	3.7	3.3	2.8
Asia (JKM LNG)	9.1	9.7	17.7	35.0	36.5	25.0	25.4	28.4	29.3	23.1	22.1	26.0	17.9	28.8	25.1
Bull	9.1	9.7	17.7	35.0	47.8	61.7	61.0	60.7	61.2	42.3	42.1	41.8	17.9	57.8	46.8
Super Bull	9.1	9.7	17.7	35.0	53.6	79.3	78.6	78.3	78.8	69.1	68.9	68.6	17.9	72.4	71.3
Bear	9.1	9.7	17.7	35.0	29.0	7.3	7.4	7.2	5.0	4.4	4.7	6.8	17.9	12.7	5.2
Europe (TTF)	6.5	8.8	16.9	32.3	38.2	28.9	27.1	30.4	31.6	24.9	23.8	27.8	16.1	31.2	27.0
Bull	6.5	8.8	16.9	32.3	49.6	62.8	62.8	62.8	62.8	43.8	43.8	43.8	16.1	59.5	48.5
Super Bull	6.5	8.8	16.9	32.3	55.4	80.4	80.4	80.4	80.4	70.6	70.6	70.6	16.1	74.2	73.0
Bear	6.5	8.8	16.9	32.3	30.8	6.6	6.5	4.7	4.5	4.0	4.2	4.3	16.1	12.2	4.2
Europe (TTF) - US	3.8	5.8	12.6	27.5	34.2	25.1	23.1	26.2	27.4	20.9	20.3	24.3	12.4	27.2	23.2
Asia - US	6.4	6.7	13.4	30.2	32.5	21.2	21.4	24.2	25.1	19.1	18.6	22.5	14.2	24.8	21.3
Asia - Europe (TTF)	2.6	0.9	0.8	2.7	(1.8)	(3.9)	(1.7)	(2.0)	(2.3)	(1.8)	(1.6)	(1.9)	1.7	(2.3)	(1.9)

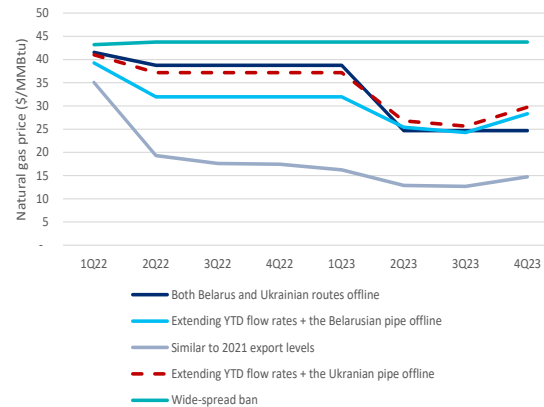
- **Current forward curves suggest that market is pricing in a further escalation in the conflict that could spill over into the energy space, so that cuts to Russian energy exports are real possibilities.**
- **The shape of forward price forecasts has gone from being a periodic wave, with high prices in winter and low prices outside of winter, to more of a stepwise formation.** With very tight fundamentals, prices are results of optimizations that free up LNG supply for Europe and cut enough demand, so that gas inventory levels at the end of winter would be ample.
- **Further, since Europe needs to attract LNG supply to refill inventory in nearly all cases, European TTF prices would be higher than Asian JKM prices by at least the shipping arbitrage from Asia to Europe in all but the bearish case.**
- **China's acceleration of coal production by 100 mt could be an unexpected gift.**

Citi price forecast scenarios vs. the forward curves

TTF: market appears to be pricing in a risk premium of further escalation cutting Russian energy exports



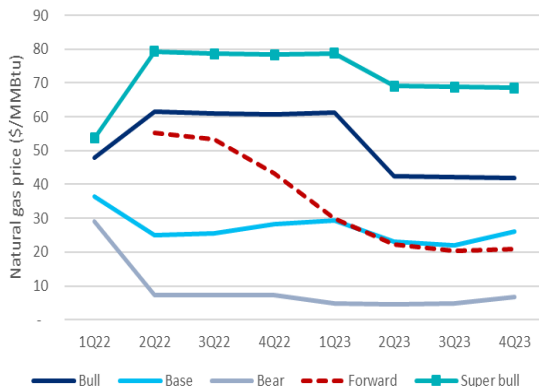
TTF: other intermediate cases consider various Russian pipeline gas exports via Belarus/Ukraine as well as European LNG imports



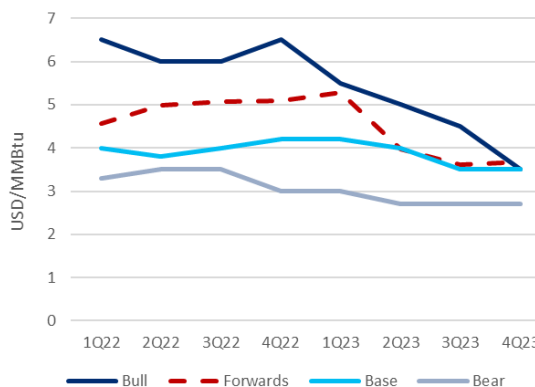
German peakload power: power prices are often set by the marginal generation costs of gas power plants, with EUA carbon costs



JKM: pricing below TTF by at least the shipping arbitrage from Asia to Europe in all but the bearish case



Henry Hub: relatively independent from TTF and JKM as US LNG exports are maxed out

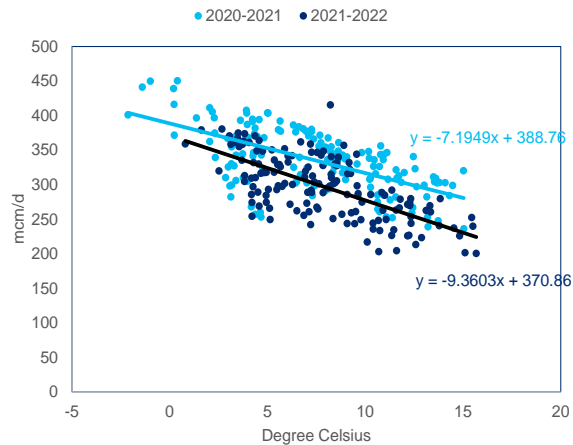


How much supply could be made available in Europe?

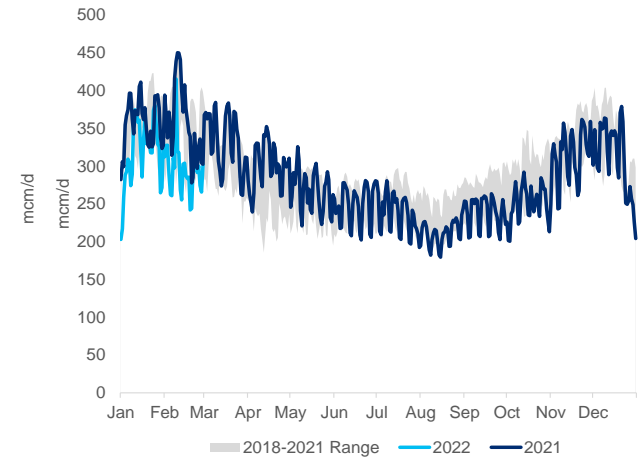
- **Europe imported 155 bcm (15 bcf/d) of gas from Russia in 2021.**
 - Two critical issues: (a) how much Russian natural gas could there be and (b) how much more LNG could arrive in Europe.
- **In theory, the world could free up a whopping 8.4-bcf/d of LNG, for Europe.**
 - Oil switching could free up about 3.6-bcf/d by raising oil product demand by about 0.6-mb/d.
 - Coal switching could free up about 4.8-bcf/d by raising coal demand by about 96-mt/y
- **US LNG capacity is rising about 20% this year to about 12-bcf/d.**
Already the US exported 10% of its oil to Europe in Jan/Feb 2021, but 60% in Jan 2022.
 - Depending on circumstances, the US could be sending more than half of its LNG exports to Europe sustainably
- **If China is actually increasing coal use by 100mt in 2022, the outlook for gas volumes and gas prices could be impactful, assuming Russia maintains 2021 export levels to Europe this year**

Note: High European gas prices have driven down industrial/power demand

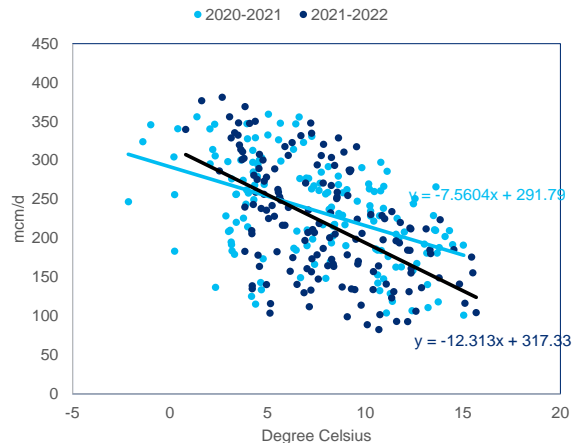
Weather-adjusted gas demand in the industrial sector in the 2020-21 winter vs the 2021-22 winter



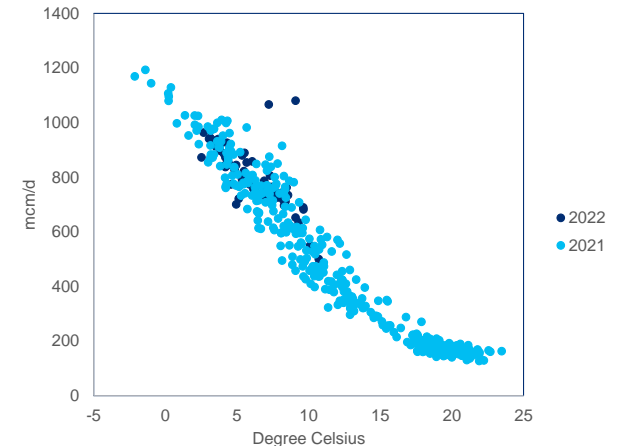
Natural gas demand from the industrial sector showing lower demand this year vs. last year



Weather-adjusted gas demand in the power sector in the 2020-21 winter vs the 2021-22 winter



Weather-adjusted demand in the residential/commercial sector looks to be similar y/y, which likely reflect minimal impacts from prices





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