Energy Tidbits

March 27, 2022

Produced by: Dan Tsubouchi

Liberals to Unveil the Hard Emissions Reduction Targets For 2025 (Only 3 Years Away) For Oil & Gas Sector

Welcome to new Energy Tidbits memo readers. We are continuing to add new readers to our Energy Tidbits memo, energy blogs and tweets. The focus and concept for the memo was set in 1999 with input from PMs, who were looking for research (both positive and negative items) that helped them shape their investment thesis to the energy space, and not just focusing on daily trading. Our priority was and still is to not just report on events, but also try to interpret and point out implications therefrom. The best example is our review of investor days, conferences and earnings calls focusing on sector developments that are relevant to the sector and not just a specific company results. Our target is to write on 48 to 50 weekends per year and to post by noon mountain time on Sunday.

This week's memo highlights:

1. The Liberals are announcing their hard emissions reduction targets for 2025 for the oil and gas sector this week and we remind 2025 is only 3 years away (Click Here)
2. Will Biden's "*For God's sake, this man cannot remain in power*" cause Russia to put JCPOA in limbo? (Click Here)
3. LNG supply gap will be sooner and larger with uncertain length delays to Novatek under construction Arctic LNG-2 project. (Click Here)
4. More Asian LNG buyers lock up long term LNG supply (Click Here)
5. Wiill Biden's reported 1st version wealth tax open the flood gates to future wealth taxes in states and Canada? (Click Here)
6. Please follow us on Twitter at [LINK] for breaking news that ultimately ends up in the weekly Energy Tidbits memo that doesn't get posted until Sunday noon MT.
7. For new readers to our Energy Tidbits and our blogs, you will need to sign up at our blog sign up to receive future Energy Tidbits memos. The sign up is available at [LINK].

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Natural Gas – Natural gas draw of 51 bcf, storage now -366 bcf YoY deficit

YoY storage at -366 bcf YoY deficit

Its's middle of March so winter is mostly over and shoulder season is about to start ie. big winter storage draws are past. On Thursday, the EIA reported a 51 bcf draw (vs 57 bcf draw expectations) for the Mar 18 week, which was less than the 5-yr average draw of 62 bcf, and above last year's draw of 32 bcf. Storage is 1.389 tcf as of Mar 18, increasing the YoY deficit to -366 bcf, from 344 bcf last week and storage is 293 bcf below the 5-year average vs 304 bcf below last week. Below is the EIA's storage table from its Weekly Natural Gas Storage Report [LINK].

Figure 1: US Natural Gas Storage

	Stocks billion cubic feet (Bcf)				Historical Comparisons			
					Year ago (03/18/21)		5-year average (2017-21)	
Region	03/18/22	03/11/22	net change	implied flow	Bcf	% change	Bcf	% change
East	268	290	-22	-22	310	-13.5	303	-11.6
Midwest	318	337	-19	-19	408	-22.1	395	-19.5
Mountain	87	87	0	0	112	-22.3	99	-12.1
Pacific	157	155	2	2	194	-19.1	173	-9.2
South Central	559	571	-12	-12	731	-23.5	712	-21.5
Salt	156	159	-3	-3	212	-26.4	216	-27.8
Nonsalt	404	412	-8	-8	519	-22.2	496	-18.5
Total	**1,389**	**1,440**	**-51**	**-51**	**1,755**	**-20.9**	**1,682**	**-17.4**

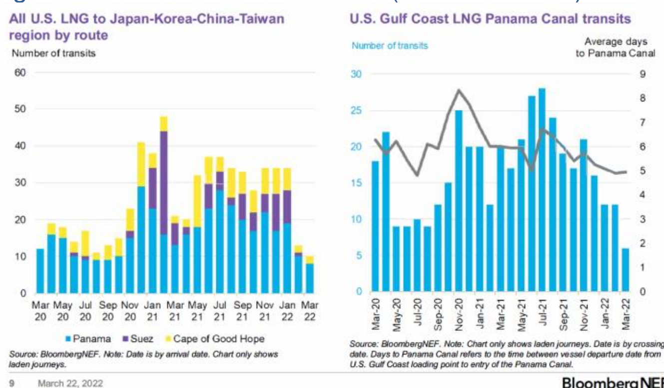
Source: EIA

Natural Gas – US LNG continues to move to Europe

US LNG continues to push to Europe

On Tuesday, BloombergNEF posted its "*LNG Trade Weekly: Northwest Europe Spot Deliveries Continue to Rise*". BNEF confirms the continued big trend that US LNG is pushing to Europe. BNEF wrote "*Northwest Europe and Italy received 1.6 million tons of LNG from March 14-20, almost 39% higher than the same period in the previous month. Supply from the U.S. surged to 58% of the total weekly imports, compared to 29% from the same week in February as deliveries to France almost tripled.*" This US LNG push to Europe shows in the massive drop in US LNG tankers to Asia and thru the Panama Canal. Our Supplemental Documents package includes excerpts from the BNEF report.

Figure 2: US LNG Transit Routes (as of March 20)



Source: EIA

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Natural Gas – Another LT Asian LNG Deal, Guangdong locks in NextDecade supply

Another long-term LNG deal

There has now been 21 deals of Asian LNG buyers locking up long term LNG supply past 2030 since we began tracking in Jul 2021. There continues to be more long-term LNG contracts signed as rampant price appreciation in gas markets continues to boost demand for American LNG. NextDecade announced Thursday [LINK], a "binding" heads of agreement with China's Guangdong Energy Group. The deal will see 0.2 bcf/d of LNG be shipped from NextDecade's Rio Grande LNG export facility in Brownsville, Texas. The LNG supply will initially be from train one of Rio Grande LNG, which is expected to start commercial operations in 2026. The HOA also provides that Guangdong Energy and NextDecade will complete the sale and purchase agreement in the second quarter of 2022. With the assumption of more LNG contracting and financing, NextDecade commented *"We are honored to have Guangdong Energy as the second foundation customer of our Rio Grande LNG project and our first Chinese customer. Guangdong Energy is one of the largest power generation enterprises in Guangdong and we are pleased they have entrusted us to supply their rapidly growing business."* NextDecade anticipates making a positive FID on a minimum of two trains of the Rio Grande LNG project in the second half of 2022. This is Guangdong Energy's second LT LNG supply deal, which our December 12, 2021, Energy Tidbits noted the 15 year, 0.13 bcf/d agreement with Qatar Energy. Our Supplemental Documents package includes the NextDecade release.

Rest of world has a long way to go to catch up to Asia

Last week's (March 20, 2022) Energy Tidbits memo noted that Europe LNG buyers are 9 months behind Asian LNG buyers in locking up long term LNG supply. It was clear to many that there was a major change in LNG outlook. We turned very bullish on LNG outlook for the 2020s once TotalEnergies went force majeure on its Mozambique LNG in April 2021. We posted our April 28, 2021 blog *"Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?"* as we thought the market had overlooked that this force majeure backed up 5.0 bcf/d of Mozambique LNG that was originally planned to start in phases in 2024. And that this would create an earlier and larger LNG supply gap in the mid 2020s. Then we started to see validation of this view when Asian LNG buyers in July made an abrupt change to their LNG contracting and pivoted to trying to lock in long term LNG supply. On July 14, 2021 we posted our 8-pg "*Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs".* Here is an excerpt from the blog "*The last 7 days has shown there is a sea change as Asian LNG buyers have made an abrupt change in their LNG contracting and are moving to lock in long term LNG supply. This is the complete opposite of what they were doing pre-Covid when they were trying to renegotiate Qatar LNG long term deals lower and moving away from long term deals to spot/short term sales. Why? We think they did the same math we did in our April 28 blog "Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?" and saw a much bigger and sooner LNG supply gap driven by the delay of 5 bcf/d of Mozambique LNG that was built into most, if not all LNG supply forecasts. Asian LNG buyers are committing real dollars to long term LNG deals, which we believe is the best validation for the LNG supply gap. Another validation, Shell, Total and others are aggressively competing to invest long term*

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capital to partner in Qatar Petroleum's massive 4.3 bcf/d LNG expansion despite plans to reduce fossil fuels production in the 2020s. And even more importantly to LNG suppliers, the return to long term LNG contracts provides the financing capacity to commit to brownfield LNG FIDs. The abrupt change by Asian LNG buyers to long term contracts is a game changer for LNG markets and sets the stage for brownfield LNG FIDs likely as soon as before year end 2021. It has to be brownfield LNG FIDs if the gap is coming bigger and sooner. And we return to our April 28 blog point, if brownfield LNG is needed, what about Shell looking at 1.8 bcf/d brownfield LNG Canada Phase 2? LNG Canada Phase 1 at 1.8 bcf/d capacity is already a material positive for Cdn natural gas producers. A FID on LNG Canada Phase 2 would be huge, meaning 3.6 bcf/d of Cdn natural gas will be tied to Asian LNG markets and not competing in the US against Henry Hub. And with a much shorter distance to Asian LNG markets. This is why we focus on global LNG markets for our views on the future value of Canadian natural gas." Our Supplemental Documents package includes our April and July blogs.

There have been 5.62 of long-term LNG supply deals since July 1, 2021

We first highlighted this abrupt shift to long term LNG supply deals in our July 14, 2021 8-pg "*Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs".* We included a table of the deals done in that short two-week period. We continue to update that table, which now shows 5.42 bcf/d of long term LNG deals since July 1, 2021. 84% of the deals have been by Asian LNG buyers, but we are now seeing rest of world long term deals post Russia/Ukraine. Below is our updated table of Asian and Europe LNG buyers new long term supply deals since July 1, 2021

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Figure 3: Long Term LNG Supply Deals since July 1, 2021

Long-Term LNG Buyer Deals Since July 1, 2021							
Date	Buyer	Seller	Country Buyer / Seller	Volume (bcf/d)	Duration Years	Start	End
Asian LNG Deals							
Jul 7, 2021	CNOOC	Petronas	China / Canada	0.30	10.0	2022	2032
Jul 9, 2021	CPC	QatarEnergy	Taiwan / Qatar	0.16	15.0	2022	2037
Jul 9, 2021	Guangzhou Gas	BP	China / US	0.13	12.0	2022	2034
Jul 12, 2021	Korea Gas	QatarEnergy	Korea / Qatar	0.25	20.0	2025	2045
Sept 29, 2021	CNOOC	QatarEnergy	China / Qatar	0.50	15.0	2022	2037
Oct 7, 2021	Shenzhen	BP	China / US	0.04	10.0	2023	2032
Oct 11, 2021	ENN	Cheniere	China / US	0.12	13.0	2022	2035
Nov 4, 2021	Unipec	Venture Global LNG	China / US	0.46	20.0	2023	2043
Nov 4, 2021	Sinopec	Venture Global LNG	China / US	0.53	20.0	2023	2043
Nov 5, 2021	Sinochem	Cheniere	China / US	0.12	17.5	2022	2040
Nov 22, 2021	Foran	Cheniere	China / US	0.04	20.0	2023	2043
Dec 6, 2021	Guangdong Energy	QatarEnergy	China / Qatar	0.13	10.0	2024	2034
Dec 8, 2021	S&T International	QatarEnergy	China / Qatar	0.13	15.0	2022	2037
Dec 10, 2021	Suntien Green Energy	QatarEnergy	China / Qatar	0.13	15.0	2022	2037
Dec 15, 2021	SPIC Guangdong	BP	China / US	0.03	10.0	2023	2033
Dec 20, 2021	CNOOC Gas & Power	Venture Global LNG	China / US	0.26	20.0	2023	2043
Dec 29, 2021	Foran	BP	China / US	0.01	10.0	2023	2032
Jan 11, 2022	ENN	Novatek	China / Russia	0.08	11.0	2024	2035
Jan 11, 2022	Zhejiang Energy	Novatek	China / Russia	0.13	15.0	2024	2039
Feb 4, 2022	CNPC	Gazprom	China / Russia	0.98	30.0	2023	2053
Mar 24, 2022	Guangdong Energy	NextDecade	China / US	0.20	20.0	2026	2046
Total Asian LNG Buyers New Long Term Contracts Since Jul/21				**4.73**			
Non-Asian LNG Deals							
Jul 28, 2021	PGNiG	Venture Global LNG	Poland / US	0.26	20.0	2023	2043
Nov 12, 2021	Engie	Cheniere	France / US	0.11	20.0	2021	2041
March 7, 2022	Shell	Venture Global LNG	US / US	0.26	20.0	2024	2044
March 16, 2022	NFE	Venture Global LNG	US / US	0.13	20.0	2023	2043
March 16, 2022	NFE	Venture Global LNG	US / US	0.13	20.0	2023	2043
Total Non-Asian LNG Buyers New Long Term Contracts Since Jul/21				**0.89**			
Total New Long Term LNG Contracts since Jul/21				**5.62**			
*Excludes Asian short term/spot deals							
*on Dec 20, CNOOC also agreed to buy an additional 0.13 bcf/d from Venture Global for an undisclosed shorter period							
Source: Bloomberg, Company Reports							
Prepared by SAF Group https://safgroup.ca/news-insights/							

Source: Company reports, SAF Group

Natural Gas – Indonesian energy firm to spend $500 mm on Woodfibre LNG

There looked to be a big positive for Woodfibre LNG on Tuesday, when Bloomberg reported [LINK], that Indonesian investor Sukanto Tanoto plans to spend $500 mm in the next year to back Woodfibre LNG – who has yet to announce its FID, though the commitment is expected to cover 31% of the projects $1.6 bn total cost. Woodfibre president stated, *"While we have not yet issued our final notice to proceed, this confirmed investment is indicative of our intent to start pre-construction work this year, and complete this critical low- emission energy project in 2027."* Woodfibre LNG's plan is to build the $31.8 bn LNG Canada project in Kitimat, BC which is 60% complete and set to open by the middle of the decade. Woodfibre is licensed to export about 0.27 bcf/d of gas chilled to a liquid so it can be shipped to faraway destinations on special tankers. Our Supplemental Documents package includes the Bloomberg report.

Large foreign investment in Woodfibre LNG

Natural Gas – Seemed like Biden was describing LNG Canada

We have been the only voice laying out our argument over the past 11 months why we expect Shell to FID LNG Canada Phase 2 in 2022. We couldn't help think about LNG Canada in seeing what the US and EC said about LNG projects on Friday in the "Joint Statement between the United States and the European Commission on European Energy Security" [LINK]. Because, by his description of the type of LNG projects needed seemed to

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best fit LNG Canada, moreso than any US Gulf Coast LNG project. The joint statement was all about increasing US and other international countries supply of LNG to Europe with the focus being on LNG *projects that can work towards Net Zero ie. the lowest carbon LNG possible. The US and EC "will undertake efforts to reduce the greenhouse gas intensity of all new LNG infrastructure and associated pipelines, including through the use of clean energy to power onsite operations, the reduction of methane leakage, and the construction of clean and renewable hydrogen ready infrastructure*" and that the added US LNMG supply until at least 2030 should "*be consistent with our shared net zero goals*." The bottom line is that the US and EC want the lowest carbon LNG possible. And if they want the lowest carbon LNG possible, then they really have to look at LNG Canada Phase 2. Our Feb 27, 2022 Energy Tidbits noted comments from Shell at its LNG Outlook 2022 that week. We then wrote "*Still seems Shell is showcasing LNG Canada as prelude to Phase 2 FID…. LNG Canada is the lowest emissions LNG project in industry. This is making the case that if there is any LNG to be done in a world of reducing emissions, it is the lowest emissions and Shell says LNG Canada is the best. Mgmt said "But the long term role of gas depends on efforts to abate emissions and develop cleaner pathways for gas. This is why we continually try to reduce the carbon intensity of our new projects. Take LNG Canada currently under construction. It will run on hydropower and is set to deliver the lowest carbon intensity in the entire industry."* Our Supplemental Documents package includes the transcript we made of Shell's LNG Canada comments at its Feb 21, 2022 LNG Outlook 2022 day.

Will Shell FID LNG Canada Phase 2?

Natural Gas – Biden EC LNG deal, EU needs abrupt shift to lock in long term LNG

On Friday morning, the US and EC released "*Joint Statement between the United States and the European Commission on European Energy Security"* [LINK]. (i) It is important to note that this isn't a formal deal or treaty, rather a framework of intentions. Ie. there are no guarantees of LNG deliveries. (ii) However, the intentions in this framework are positive for US LNG but we are not convinced it is anything that wasn't or wouldn't necessarily be happening. But that's because we have been bullish on LNG markets since Mozambique a year ago caused the emergence of the LNG supply gap. For those who didn't believe in the LNG Supply Gap, this will reflect a big change to outlook. (iii) The way we look at this is EU knows if they want to reduce EU reliance on Russia natural gas, they have to do what they have deliberately not done but rather do what Asia has been doing for the past 9 months – EU has to change and commit to long term LNG supply deals. It's why we tweeted [LINK] *"#1 takeaway from #Biden LNG deal with EC. EC admits to get rid of RUS #NatGas, means an abrupt shift to long term LNG supply deals. Basically what Asian LNG buyers started July 2021, see SAF 07/07/21 blog. #LNGSupplyGap is coming, #LNG #NatGas will be stronger for 2020s. #OOTT*". (iv) Help get more LNG to Europe in 2022. "*The United States will strive to ensure, including working with international partners, additional liquified natural gas (LNG) volumes for the EU market of at least 15 bcm in 2022 with expected increases going forward.*" Note this is an example that this is not a deal, rather this is the US will "*strive to ensure*" at least 1.45 bcf/d. (v) Back to the long term. The EC is effectively recognizing the issue that started a year ago – LNG deals are moving long term. Europe moved away from wanting to do long term deals years ago and now effectively knows it must go back there and if they want more US LNG, the US LNG needs long term deals or they can't go FID. "*The European Commission will also support long-term contracting mechanisms and partner with the U.S. to encourage relevant contracting to support final investment decisions on both LNG export and import infrastructure."* (vi) This next one is linked to the long term. EC saying they

EU needs to get back in long term LNG supply deals

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will work to ensure stable (long term) demand for an "*additional*" 4.8 bcf/d of US LNG. Again, they know they must do long term deals and they are noting formula's including HH ie. Cheniere type deals. "*The European Commission will work with EU Member States toward ensuring stable demand for additional U.S. LNG until at least 2030 of approximately 50 bcm/annum, on the understanding that the price formula of LNG supplies to the EU should reflect long-term market fundamentals, and stability of the cooperation of the demand and supply side, and that this growth be consistent with our shared net zero goals. In particular, price formula should include consideration of Henry Hub Natural Gas Spot Price and other stabilising factors*". (vii) The positive for US LNG approvals is that "*The United States commits to maintaining an enabling regulatory environment with procedures to review and expeditiously act upon applications to permit any additional export LNG capacities*". This is the item that from earlier this week with the reports FERC was backing off their proposed review process. And so it was, in theory, already defeated. But it is Biden pledging to move to support future LNG expansion. Our Supplemental Documents package includes the US/EC joint statement.

Asian LNG buyers made their abrupt in July to lock in long term LNG supply

Our Biden/EC tweet noted that Europe LNG buyers will be playing catch up to Asian LNG buyers who made an abrupt change last July to long term LNG contracts. In July, we wrote tha the best validation for a LNG supply gap in the 2020s was that Asian LNG buyers made an abrupt change to their LNG contracting and pivoted to trying to lock in long term LNG supply. On July 14, 2021 we posted our 8-pg "*Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs*". Here is an excerpt from the blog "*The last 7 days has shown there is a sea change as Asian LNG buyers have made an abrupt change in their LNG contracting and are moving to lock in long term LNG supply. This is the complete opposite of what they were doing pre-Covid when they were trying to renegotiate Qatar LNG long term deals lower and moving away from long term deals to spot/short term sales. Why? We think they did the same math we did in our April 28 blog "Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?" and saw a much bigger and sooner LNG supply gap driven by the delay of 5 bcf/d of Mozambique LNG that was built into most, if not all LNG supply forecasts. Asian LNG buyers are committing real dollars to long term LNG deals, which we believe is the best validation for the LNG supply gap. Another validation, Shell, Total and others are aggressively competing to invest long term capital to partner in Qatar Petroleum's massive 4.3 bcf/d LNG expansion despite plans to reduce fossil fuels production in the 2020s. And even more importantly to LNG suppliers, the return to long term LNG contracts provides the financing capacity to commit to brownfield LNG FIDs. The abrupt change by Asian LNG buyers to long term contracts is a game changer for LNG markets and sets the stage for brownfield LNG FIDs likely as soon as before year end 2021. It has to be brownfield LNG FIDs if the gap is coming bigger and sooner. And we return to our April 28 blog point, if brownfield LNG is needed, what about Shell looking at 1.8 bcf/d brownfield LNG Canada Phase 2? LNG Canada Phase 1 at 1.8 bcf/d capacity is already a material positive for Cdn natural gas producers. A FID on LNG Canada Phase 2 would be huge, meaning 3.6 bcf/d of Cdn natural gas will be tied to Asian LNG markets and not competing in the US against*

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Henry Hub. And with a much shorter distance to Asian LNG markets. This is why we focus on global LNG markets for our views on the future value of Canadian natural gas."

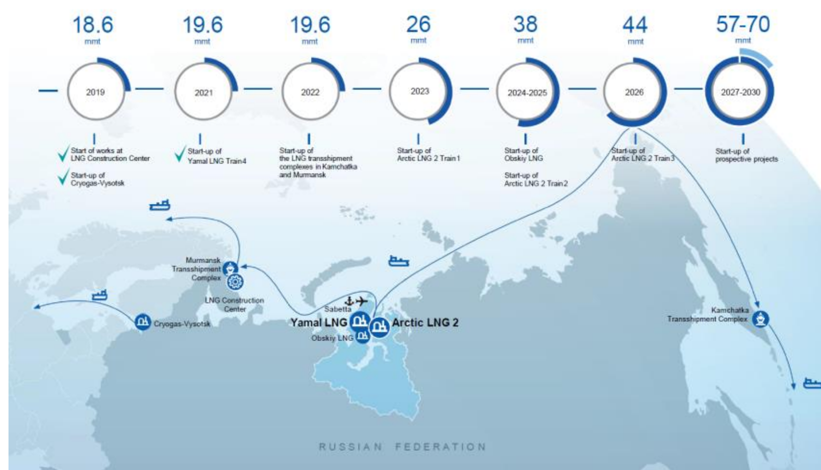
Natural Gas – Sooner & larger LNG supply gap, Novatek RUS Arctic LNG delays

Sooner and larger LNG supply gap

The LNG supply gap should now hit sooner and larger. There was an overlooked LNG story on Thursday amidst all the crazy items going on in the world and markets. Probably because it wasn't a press release or on TASS but on Kommersant. But it was a story that was significant to LNG markets, which is why we tweeted [LINK] "*Buckle up. #LNGSupplyGap will be sooner & larger. #Novatek Arctic LNG-2 delays. Line1 0.87 bcfd should still be 2023, but timing no longer clear for Line2 0.87 bcfd in 2024 & Line3 0.87 bcf/d in 2025 as #TotalEnergies halted RUS spending. Positive for #LNG #NatGas in 2020s. #OOTT*". Novatek's Arctic LNG-2 is an under construction LNG project so is in all LNG supply growth forecast for 2022 thru 2025. But faces delays with TotalEnergies stopping all capital investing in Russian LNG projects and also sanctions impacting external financing on some of the participants. Arctic LNG-2 has 3 lines, each line has LNG capacity of 0.87 bcf/d. Line 1 at 0.87 bcf/d is supposed to be in 2023, Kommersant says there are delays but it sounds like it is far enough along the construction cycle to get completed but will be delayed ie.later in 2023. Line 2 at 0.87 bcf/d was scheduled for 2024 in service and Line 3 at 0.87 bcf/d for 2025 in service. Kommersant wrote "*The fate of the second and third lines is less clear due to TotalEnergies' refusal to continue investing in the project, as well as possible difficulties in obtaining equipment*." The problem for LNG markets is that there is no way to make up for delays in under construction LNG projects. Can't decide to move on a new LNG project today and fill in this gap. Our Supplemental Documents package includes the Kommersant report.

Figure 4: Novatek's May 2021 LNG Production Timelines

NOVATEK's LNG Production Timeline



Source: Novatek May 2021

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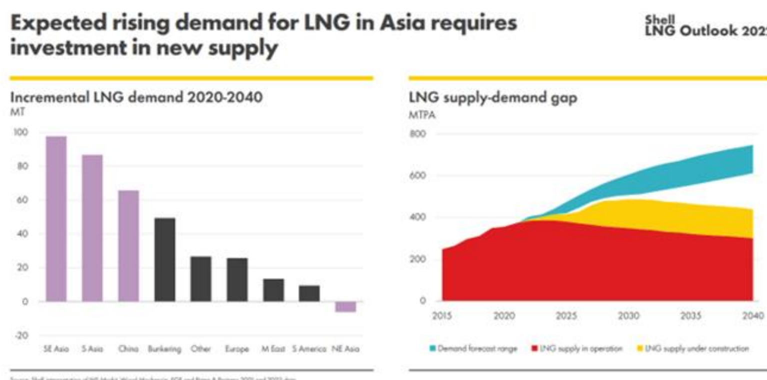
Shell now forecasts a LNG supply gap ie. its now part of their planning
Our Novatek tweet included our March 10 tweet [LINK] "*Prior to this, #Shell fcast #LNGSupplyGap in mid-2020s. EU wants +4.9 bcfd this yr, so more in 2023. Approx equal to KOR #LNG imports, approaching @qatar_energy massive 6.4 bcf/d expansion. As @SStapczynski notes, a global #NatGas fight, EU will have to go long term deals. #OOTT"* We pasted Shell's new LNG supply gap forecast from its Feb 21, 2022 LNG Outlook 2022. In our Feb 27, 2022 Energy Tidbits, we then wrote "*The most important takeaway is that Shell is now planning their strategies and capital allocation on a forecast of a LNG supply-demand gap to emerge in the mid-2020s. They are clearly telling markets that this is their business planning case, not an upside scenario. As soon as we saw the new slide deck, we tweeted [LINK] "1/2. Buckle up for strong #LNG & #NatGas prices for 2020s. Clear warning from @Shell, now "forecast" #LNGSupplyGap to "emerge" in mid-2020s & "focuses attention" on need for more investment to increase supply. Yr ago, were bullish but not as certain, expected vs forecast #OOTT". This is significant as there is a big difference between forecasting a LNG supply gap vs their 2021 LNG outlook that said "a supply-demand gap is expected to open in the middle of the current decade". Because it says that their planning scenarios on what they do for LNG is based on their view there is a supply gap. There was no change to Shell's forecast for LNG demand to almost double and hit ~92 bcf/d (700 MTPA) by 2040. But the issues on LNG supply mean that there is a LNG supply gap and investment in new supply is needed.*

Figure 5: Shell LNG Outlook 2022 – Feb 21, 2022



Source: Shell

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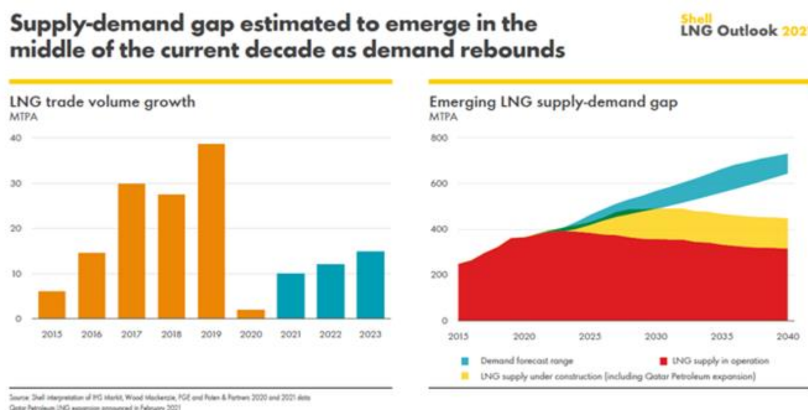
Figure 6: Shell LNG Outlook 2021 – Feb 25, 2021



Source: Shell

Natural Gas – Gunvor defaults again on LNG deliveries to Pakistan, will pay penalty

Unfortunately, it's the same narrative for Pakistan and trying to get LNG. They just can't catch a break on LNG cargos this winter. They didn't buy enough spot LNG in the fall because spot prices were too high and, they have had multiple situations of some LNG providers saying they will pay the 30% penalty by not delivering a contracted LNG cargo because the provider can make substantially more by paying the penalty to Pakistan and selling the LNG cargo on the spot market. Yesterday, The News (Karachi) reported "*Singapore-based Guvnor has decided not to honour its contract to deliver four LNG term cargoes to Pakistan, which would force the dollar-starved country to purchase costly LNG from the spot market to fulfill its energy needs." "This is a gigantic blow that will force authorities concerned with no option but to purchase costly LNG cargoes at higher prices currently oscillating in global spot market in the range of $32-38 per MMBTU instead of over $10 per MMBTU under term agreement," a senior official in the Energy Ministry privy to the development told The News." "Guvnor has defaulted three times. The company backed out from delivering a cargo on November 19, 2021, then it backed out from the delivery of cargo on January 10, 2022, and then again a delivery for March 11, 2022 never arrived. Guvnor was to provide Pakistan four LNG cargoes each in April, May and two in June, but the trading company has informed Islamabad that that it would not be able to provide LNG cargoes in its remaining tenure of the term agreement."* The News also reported "*In 2017, PLL also inked a 15-year term agreement with Italy-based ENI, which has defaulted four times. The first default happened in January 2021, when ENI delivered half the cargo. Next it defaulted in November 2021, with the latest cargo cancellation happening in March 2022. The official record available with The News shows that with the latest defaults, Guvnor has defaulted on seven cargoes whereas ENI defaulted on four cargoes."* Our Supplemental Documents package includes The News report.

Pakistan loses more LNG cargoes

Natural Gas – India Feb natural gas production +12.79% YoY to 3.28 bcf/d

One of the key themes for India in the last year is that it looks like they have turned the corner on a decade of declining domestic natural gas production, which is even more important given the stronger than expected LNG prices in 2021-2022. The key India natural gas theme for the past decade was that India's natural gas production declined, which meant

India natural gas production +12.79% YoY

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that increases in natural gas consumption had to be met by increased LNG imports. India's domestic natural gas production peaked in 2010 at 4.6 bcf/d. but it now looks like we are seeing modest return to growth. On Tuesday, India's Petroleum Planning and Analysis Cell released their monthly report for February natural gas and oil statistics [LINK]. India's domestic natural gas production was up 12.79% YoY from 2.31 bcf/d in February 2021 to 3.28 bcf/d, up from 3.26 bcf/d in January. India has consistently struggled to grow domestic natural gas production with 2018-2019 production averaging 3.18 bcf/d, declining to 3.02 in 2019-2020 and averaged 2.78 bcf/d 2020-2021. Our Supplemental Documents package includes excerpts from the PPAC monthly package.

Natural Gas – India Feb LNG imports down 0.52% YoY to 3.16 bcf/d, up 15.27% MoM

India LNG imports +15.27% MoM

There is no surprise that the above noted modestly increasing India domestic natural gas production means reduced need for LNG imports. India is always viewed as an extremely price sensitive buyer in terms of its LNG imports, which was exemplified in their 2020-2021 import data. India had ramped up imports from June to October 2020, taking advantage of low LNG prices to fill their stocks. Imports began to decline in November 2020 as LNG prices began to rise, with the price trajectory ramping up in late Dec and reaching record levels January. This resulted in India LNG imports declining from a 2020-2021 peak of 3.84 bcf/d in Oct 2020 to just 2.85 bcf/d in Jan 2021. Despite LNG imports normalizing in March and April to 3.06 bcf/d and 3.12 bcf/d, respectively, they have fluctuated slightly with Feb increasing from a Jan 2022 decline to 2.74 bcf/d, Feb increased 15.27% MoM to 3.18 bcf/d down 0.52% YoY due to abnormally high spot prices. India has been trying to avoid high spot LNG prices. Note, imports in February were up by 15.27% MoM despite the MoM increase in production.

Natural Gas – Japan's LNG stocks decline as earthquake knocks off coal plants

Japan LNG stocks below 5 yr avg

The colder than normal winter Japan had led to increased demand but also more LNG cargos to ensure Japan wouldn't be caught short to end winter. With the weather beginning to turn warmer as the shoulder season begins, Japan's METI data notes a sizeable increase in LNG stocks as demand for fuel has gone down across the country. The net impact was slightly higher WoW LNG stocks. Japan's METI data was released on Tuesday [LINK] and gave us insight into Japan's LNG stocks. LNG stocks decreased for the week ended Mar 20, from 1.72 mm tons the previous week, and are now at 1.68 mmt, likely reflecting the earthquake last week; this is below last year's levels of 2.41 mmt and below the 5-year average of 2.19 mmt. The decrease is likely a result of the earthquake last week that knocked several coal-fired power plants offline, forcing utilities to boost gas generation and increase consumption of LNG. We have been noting that Japanese LNG buyers returned to the spot market after weeks of absence to resupply the quickly dwindling stockpiles of LNG. We expect continued draws to LNG stocks in the coming weeks as Japan's timeline to return coal plants is uncertain. Japan is expected to experience warmer weather during March which is likely to mitigate some demand as the nation exits winter. Below is a chart depicting Japan's LNG stocks.

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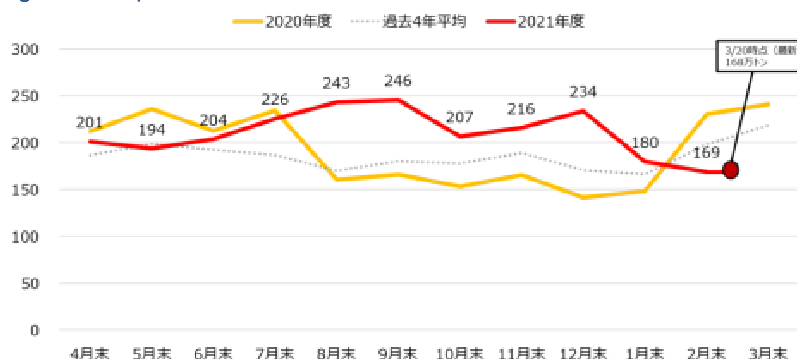
Figure 7: Japan's LNG Stocks



Source: METI

Natural Gas – Germany finally agrees to look at long term LNG deals with Qatar

Qatar/Germany in long term LNG talks

There were many reports this week following Germany's meetings in Qatar on how Germany had locked up Qatar LNG. We don't think that is the case. It doesn't mean it won't happen, but, at least for now, its really a confirmation that the commercial parties within Germany and Qatar will re-engage on a potential contract. And note that Qatar Energy is clear that this would be on a long-term LNG supply deal, not a short term or spot deal. And Qatar Energy made a point of highlighting that they have been speaking to Germany for years but only recently has Germany prepared to engage on a long term deal. This is consistent with what they have said on Europe, they are always ready to engage on long-term contract discussions. Last Sunday, Qatar Energy released [LINK] "*QatarEnergy has been discussing the supply of Qatari LNG to Germany for a number of years with German companies. However, until recently, such discussions did not materialize into definitive agreements due to the lack of clarity on the long-term role of gas in Germany's energy mix and the requisite LNG import infrastructure. In a meeting held today between His Excellency Mr. Saad Sherida Al-Kaabi, the Minister of State for Energy Affairs, the President and CEO of QatarEnergy, and His Excellency Mr. Robert Habeck, the Vice Chancellor and the Minister for Economic Affairs and Climate Action in the Federal Republic of Germany, the German side confirmed that the German Government has taken swift and concrete actions to fast-track the development of two LNG receiving terminals in Germany as a matter of priority to allow for the long term import of LNG to Germany and that such scheme has the full support of the German government. Based on the foregoing, the two sides agreed that their respective commercial entities would re-engage and progress discussions on long term LNG supplies from Qatar to Germany.".*

Qatar has always been focused on long term supply deals

The Qatar Energy comments on the Germany meetings are in line with the prior public statements from Qatar that always remind Qatar does long term supply deals and not spot deals. Our Feb 27, 2022 Energy Tidbits wrote *"Qatar's energy minister Al Kaabi reminded this week that Qatar really can't help much if Russia natural gas supplied to Europe get interrupted. In fact, he noted that no one can replace Russia's dominant supply to Europe. There were three other key reminders in his*

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comments at the GECF press conference. (i) He didn't hesitate to remind that Qatar is in the long term contract business. (ii) Only 10-15% of Qatar LNG that could be diverted to Europe. The Qatar Peninsula reported ""Russia provides I think 30-40 percent of the supply to Europe. There is no single country that can replace that kind of volume, there isn't the capacity to do that from LNG," he said. "Most of the LNG is tied to long-term contracts and destinations that are very clear. So, to replace that sum of volume that quickly is almost impossible," he said. Minister Al Kaabi said that for Qatar the amount of divertable contracts that can be shipped to Europe is only 10-15 percent. "It's not that something is not contracted, the question is, is it divertible or not? And the majority is tied up to long term contracts. The divertible volume is probably 10-15 percent," he said." (iii) He reminds the issue is the lack of investment, not Russia-Ukraine. The Qatar Peninsula wrote "The steep rise in the natural gas prices in the global markets are caused by the lack of investment and not due to Russian-Ukrainian crisis, said Minister of State for Energy Affairs H E Eng. Saad bin Sherida Al Kaabi. He said Qatar wants to meet European Union (EU) demands for additional LNG supplies, but most of its exports are already tied to long-term contracts. "Everything that is going on today on pricing is fundamentally because of lack investments and that will take time to catch up. Supply demand has a tendency to correct itself over time so hopefully this will be corrected, it will take time."

Natural Gas – Europe storage YoY deficit is now only 4.27% ie. 25.71% full vs 29.98%

Europe storage up to 25.71% full

Europe avoided natural gas shortages this winter with the combination of warmer weather, strong wind generation and a massive increase in US LNG imports. As a result, the YoY Europe storage gap continues to narrow since the start of the winter natural gas season. Europe gas storage started down 18.52% YoY and is now down to a YoY deficit of 7.82%. Draws to European gas storage units continued this week. It was a smaller draw due to the warmer weather. The YoY deficit is narrowing but, even still, Europe inventories are at their lowest level at this time of the year in more than a decade. Europe gas storage started last winter (Nov 1/20) at basically full levels at 94.66% and had dropped by 65.77% to be 28.89% at Apr 1/21. Europe storage levels bottomed in late Apr at 29%, which was the lowest level since Apr 2018. This winter began (Nov 1/21) with gas storage at 77.14% capacity, down 18.52% YoY. The YoY deficit has tightened since Nov 1. Despite the warm weather and US LNG, storage as of Mar 24 is still only at 25.71%, which is -4.27% less than last year levels of 29.98% and are -8.44% below the 5-year average of 34.15%. As winter draws to an end we expect to see a decline in demand for LNG as less is used to heat homes as we enter the injection season. Below is our graph of Europe Gas Storage Level.

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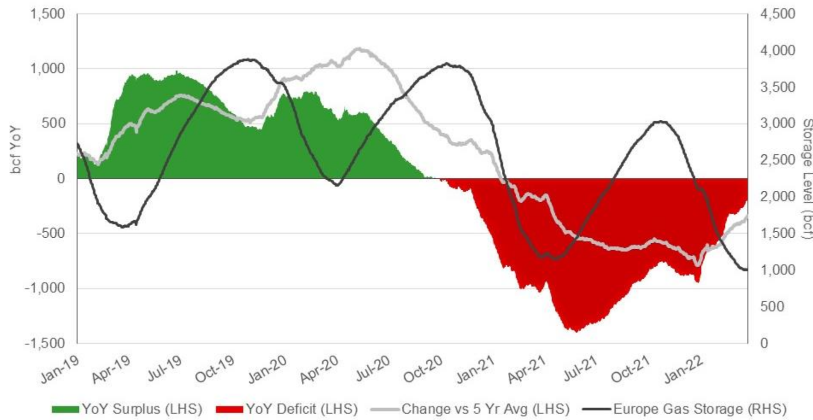
Figure 8: Europe Gas Storage Level



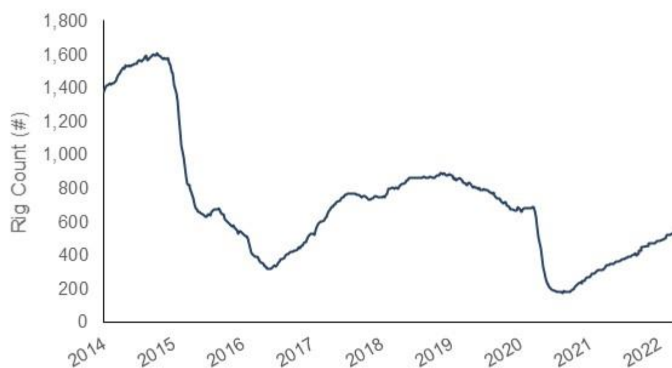
Source: Bloomberg
Prepared by SAF Group https://safgroup.ca/news-insights/

Oil – US oil rigs +7 WoW at 531 oil rigs at Mar 25

Baker Hughes released its weekly North American drilling activity data on Friday. We expected another increase given the ~$100/bbl WTI and producers have ramped up production with the elevated prices. There is still strong oil, NGLs and natural gas prices and industry has fresh 2022 capex budgets and is still just catching up in 2021 from an extremely low 2020 activity level. This week US oil rigs were +7 WoW at 531 oil rigs, with all major oil and gas basins up slightly. Oil rigs are +359 off the bottom of 172 in Aug14/2020 week. There were modest basin changes this week; Permian was up 3 at 318 rigs this week while Bakken was +1 at 33 rigs after both Basins declined last week. US oil rigs hit their 2020 peak at 683 on March 13 and have since fallen by 157 to 531 oil rigs (-14%). US gas rigs were flat WoW though still higher than normal with increases in the Marcellus basin reflecting the heightened $4 HH. Below is our graph of US oil rigs since January 1, 2014.

US oil rigs +7 WoW

Figure 0: Baker Hughes Total US Oil Rigs



Source: Baker Hughes

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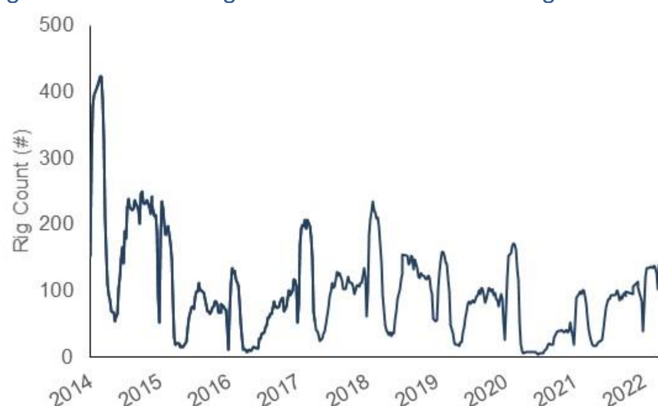
SAF GROUP

Oil – Total Cdn rigs -36 to 140 total rigs, +59 rigs YoY

Cdn rigs -36 WoW

Total Cdn rigs were down -36 this week to 140 total rigs. Cdn oil rigs were -27 at 76 rigs. Cdn gas rigs were -9 at 64 gas rigs. This decline is expected as winter drilling season has come to an end and we expect continued declines this week. Total rigs are now +127 since the June 26, 2020 all-time low. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 31 and Cdn gas rigs were 50 for a total Cdn rigs of 81, meaning total Cdn rigs are +59 YoY and total rigs are +35 vs 2019.

Figure 10: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production flat at 11.6 mmb/d

US oil production flat WoW

It was the 7th consecutive week of flat US weekly oil production at 11.6 mmb/d for the week ended Mar 18. Lower 48 production drove total production and was flat from last weeks level at 11.2 mmb/d this week, Alaska was also basically flat this week. US oil production is up YoY at +0.6 mmb/d from last year's February freeze and is still down significantly at -1.5 mmb/d since the 2020 peak of 13.1 mmb/d on March 13. Absent weather impacts, we would expect US oil production to remain relatively flat if not inch up a little higher in Q1/22.

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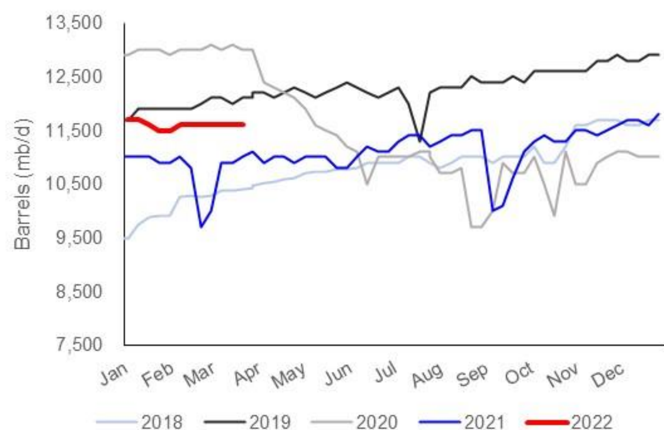
Figure 11: EIA's Estimated Weekly US Oil Production

Year-Month	Week 1		Week 2		Week 3		Week 4		Week 5	
	End Date	Value	End Date	Value	End Date	Value	End Date	Value	End Date	Value
2019-Jan	01/04	11,700	01/11	11,900	01/18	11,900	01/25	11,900		
2019-Feb	02/01	11,900	02/08	11,900	02/15	12,000	02/22	12,100		
2019-Mar	03/01	12,100	03/08	12,000	03/15	12,100	03/22	12,100	03/29	12,200
2019-Apr	04/05	12,200	04/12	12,100	04/19	12,200	04/26	12,300		
2019-May	05/03	12,200	05/10	12,100	05/17	12,200	05/24	12,300	05/31	12,400
2019-Jun	06/07	12,300	06/14	12,200	06/21	12,100	06/28	12,200		
2019-Jul	07/05	12,300	07/12	12,000	07/19	11,300	07/26	12,200		
2019-Aug	08/02	12,300	08/09	12,300	08/16	12,300	08/23	12,500	08/30	12,400
2019-Sep	09/06	12,400	09/13	12,400	09/20	12,500	09/27	12,400		
2019-Oct	10/04	12,600	10/11	12,600	10/18	12,600	10/25	12,600		
2019-Nov	11/01	12,600	11/08	12,800	11/15	12,800	11/22	12,900	11/29	12,900
2019-Dec	12/06	12,800	12/13	12,800	12/20	12,900	12/27	12,900		
2020-Jan	01/03	12,900	01/10	13,000	01/17	13,000	01/24	13,000	01/31	12,900
2020-Feb	02/07	13,000	02/14	13,000	02/21	13,000	02/28	13,100		
2020-Mar	03/06	13,000	03/13	13,100	03/20	13,000	03/27	13,000		
2020-Apr	04/03	12,400	04/10	12,300	04/17	12,200	04/24	12,100		
2020-May	05/01	11,900	05/08	11,600	05/15	11,500	05/22	11,400	05/29	11,200
2020-Jun	06/05	11,100	06/12	10,500	06/19	11,000	06/26	11,000		
2020-Jul	07/03	11,000	07/10	11,000	07/17	11,100	07/24	11,100	07/31	11,000
2020-Aug	08/07	10,700	08/14	10,700	08/21	10,800	08/28	9,700		
2020-Sep	09/04	10,000	09/11	10,900	09/18	10,700	09/25	10,700		
2020-Oct	10/02	11,000	10/09	10,500	10/16	9,900	10/23	11,100	10/30	10,500
2020-Nov	11/06	10,500	11/13	10,900	11/20	11,000	11/27	11,100		
2020-Dec	12/04	11,100	12/11	11,000	12/18	11,000	12/25	11,000		
2021-Jan	01/01	11,000	01/08	11,000	01/15	11,000	01/22	10,900	01/29	10,900
2021-Feb	02/05	11,000	02/12	10,800	02/19	9,700	02/26	10,000		
2021-Mar	03/05	10,900	03/12	10,900	03/19	11,000	03/26	11,100		
2021-Apr	04/02	10,900	04/09	11,000	04/16	11,000	04/23	10,900	04/30	10,900
2021-May	05/07	11,000	05/14	11,000	05/21	11,000	05/28	10,800		
2021-Jun	06/04	11,000	06/11	11,200	06/18	11,100	06/25	11,100		
2021-Jul	07/02	11,300	07/09	11,400	07/16	11,400	07/23	11,200	07/30	11,200
2021-Aug	08/06	11,300	08/13	11,400	08/20	11,400	08/27	11,500		
2021-Sep	09/03	10,000	09/10	10,100	09/17	10,600	09/24	11,100		
2021-Oct	10/01	11,300	10/08	11,400	10/15	11,300	10/22	11,300	10/29	11,500
2021-Nov	11/05	11,500	11/12	11,400	11/19	11,500	11/26	11,600		
2021-Dec	12/03	11,700	12/10	11,700	12/17	11,600	12/24	11,800	12/31	11,800
2022-Jan	01/07	11,700	01/14	11,700	01/21	11,600	01/28	11,500		
2022-Feb	02/04	11,600	02/11	11,600	02/18	11,600	02/25	11,600		
2022-Mar	03/04	11,600	03/11	11,600	03/18	11,600				

Source: EIA

Figure 12: US Weekly Oil Production



Source: EIA, SAF

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Oil – CP Rail stoppage ended after 2 days, parties agree to binding arbitration

CP Rail stoppage ended after 2 days

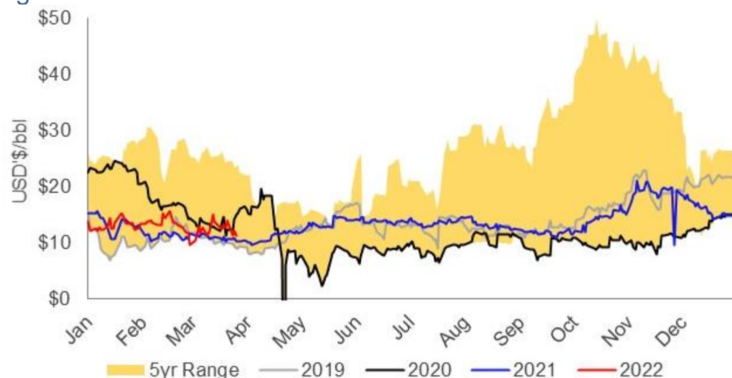
One of the big breaking news last Sunday morning was the announced that a CP Rail stoppage started when CP announced early Sunday morning they were shutting down their rail operations across Canada in light of the lockout of all the essential people needed to operate trains – locomotive engineers, conductors, trainpersons, yardperson represented. No surprise, it became the business story and the worry in Canada. As expected, there was no indication from the Liberals govt that they would step in with back to work legislation. So it was the parties either negotiating to a deal or, what happened, the parties agreeing to final and binding arbitration. We suspect the pressure was on both parties to move to arbitration. On Tuesday, the parties announced the work stoppage was over, and the union members were returning to work. The good news it was only two days stoppage so the time to catch up shouldn't be too long. Our Supplemental Documents package includes the Teamsters Rail Conference announcement. [LINK]

Oil – Moving into spring season when WCS-WTI differentials normally narrow

WCS-WTI differentials normally narrow in the spring

It continues to be a great March for WCS prices with narrow WCS-WTI differentials. The setup continues to be strong for WCS (Western Canadian Select) heavy oil prices, which hit over $100 on Mar 2, peaking on Mar 8 at US $110.96, and this week closing at US $101.64, exacerbated by supply shocks prevailing from the war in Ukraine. As noted last week, Alberta oil inventories are still at low levels. There are many factors that impact Cdn heavy oil differentials, but we remind that we are just moving into the time of the year that normally sees Cdn heavy oil differentials narrow. This is the time of year, when refineries tend to maximize production of asphalt ahead of the annual summer paving season. As is said in Canada, there are two seasons in Canada – winter and paving season. Below is graph showing WCS-WTI differentials that shows this normal seasonal trend of narrowing WCS-WTI differentials thru May.

Figure 13: WCS-WTI Differential



Source: Bloomberg

Oil – Cdn crude by rail exports down MoM at 131,497 b/d in Jan, down 33% YoY

Cdn crude by rail exports

The Canadian Energy Regulator (successor to NEB) reported Canadian crude by rail exports were +273 b/d MoM in January to 131,497 b/d vs 131,224 b/d in December [LINK]. This puts Jan export volumes at -64,034 b/d YoY (-33%) vs Jan 2021 of 195,531 b/d. CBR volumes are +92,630 since the July 2020 bottom of 38,867 b/d, when COVID-19-fueled capital

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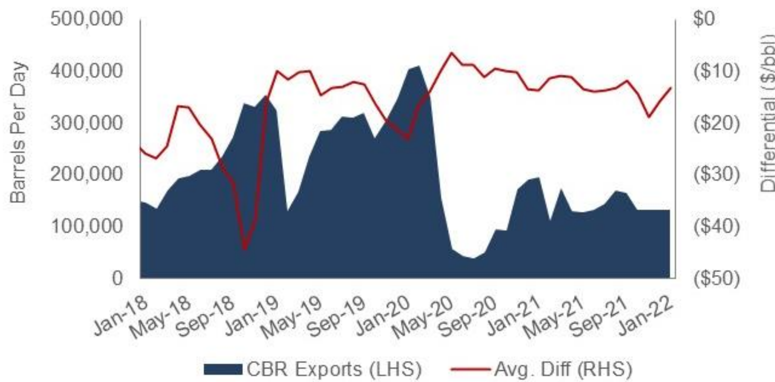
spending reductions and lower drilling activity in Western Canada were in full effect. January WCS-WTI differentials increased to -$13.23 as prices steadily increased over the course of the month. The start-up of Enbridge Line 3 additional export volumes is likely the key reason for the decline in exports by rail. Below is our graph of Cdn crude by rail exports compared to the WCS–WTI differential.

Figure 14: Cdn Crude by Rail Exports vs WCS Differential



Source: Canadian Energy Regulator, Bloomberg

Oil – Refinery inputs +0.277 mmb/d WoW at 15.878 mmb/d

Refinery inputs +0.277 mmb/d WoW

The EIA crude oil input to refinery data is for the week ended Mar 18. This is normally the seasonal period when crude oil inputs to refineries starts to come out of seasonal turnarounds and moves to increasing seasonal crude throughput. US refineries have also been impacted by unplanned outage that have been impacting crude oil inputs. This week, the EIA reported crude oil inputs at refineries, up 0.277 mmb/d this week to 15.878 mmb/d for the week ended Mar 18 and are +2.128 mmb/d YoY from last years February Freeze in the Permian. Refinery utilization was up at 91.1%, which is +9.5% YoY though is still below 5-year average utilization levels. Total products supplied (i.e., demand) decreased WoW, up 0.472 mmb/d to 21.124 mmb/d. Motor gasoline was down -0.307 mmb/d at 8.637 mmb/d from 8.944 mmb/d last week. Gasoline supplied, a proxy for demand, was up last week. Gasoline stockpiles are at their lowest levels with demand for gasoline at a 4-week high. The four-week average of production supplied decreased to 20.954 mmb/d, up from last year.

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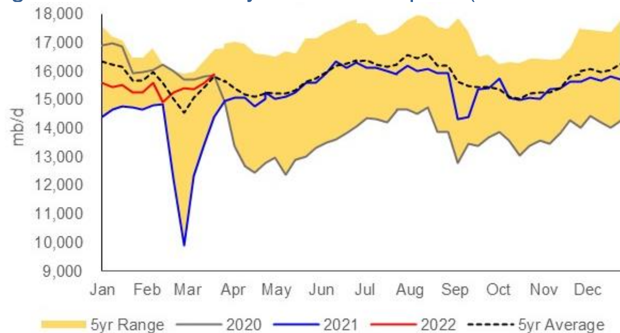
Figure 15: US Refinery Crude Oil Inputs (thousands b/d)



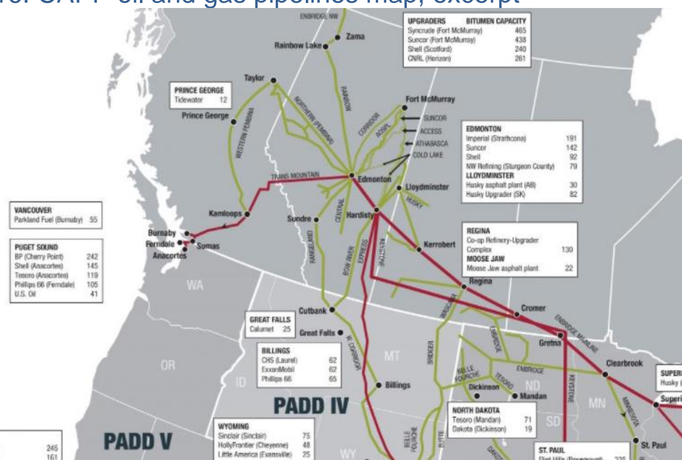
Source: EIA

Oil – Exxon's 61,500 b/d Billings refinery explosion/fire last night

Billings Montana explosion

Earlier this morning, we tweeted [LINK] on the overnight news of an explosion/fire at Exxon's 61,500 b/d Billings, Montana refinery. The Billings Gazette reported [LINK] "A*n explosion at the ExxonMobil oil refinery near Lockwood Saturday night brought a large emergency response from multiple agencies, according to witnesses and Gazette reporters at the scene. The fire was initially reported at around 10 p.m., and crews had the blaze contained within 40 minutes."* As of our 7am MT news cut off, we have not seen any formal report of the damage and what it will do to operations. Our tweet included Exxon's overview of the Billings 61,500 refinery that is supplied by Alberta and Wyoming oil and produces "*all grades of gasoline, conventional gasoline blendstocks for blending with ethanol, ultra low sulfur diesel fuels, asphalt, butane and propane*. *The distribution market includes Montana, Wyoming, Utah, Colorado, South Dakota, Washington, Idaho and parts of Nevada".* Just more to add to diesel problems. Our tweet also included an excellent CAPP oil and gas pipelines map for North America. Below, we clipped the portion relevant to Billings. Our Supplemental Documents package includes the full CAPP map.

Figure 16: CAPP oil and gas pipelines map, excerpt



Source: CAPP

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Oil – US "net" oil imports up +0.406 mmb/d WoW at 3.806 mmb/d

US "NET" imports were down -0.816 mmb/d to 2.642 mmb/d for the Mar 18 week. US imports were up +0.076 mmb/d to 6.496 mmb/d. US exports were up +0.908 mmb/d to 3.844 mmb/d. The WoW decrease in US oil imports was driven by US's Top 10 imports by country were down by 0.109 mmb/d from Top 10. Some items to note on the by country data. (i) Canada was up this week by +0.408 mmb/d to 3.806 mmb/d, which is now ~0.1 mmb/d above the average levels in Jan/Feb of 2020. (ii) Saudi Arabia was down 28,000 b/d to 0.534 mmb/d this week. (iii) Colombia was down -0.207 mmb/d to 0.072 mmb/d. (iv) Ecuador was down -0.102 mmb/d at 0.205 mmb/d. (v) Iraq was up 328,000 b/d to 489,000 b/d. (v) Venezuela remained at 0 due to US sanctions. (vi) Mexico was down by 4,000 b/d to 0.641 mmb/d.

US "net" oil imports up WoW

Figure 17: US Weekly Preliminary Oil Imports by Major Countries

(thousand b/d)	Jan 7/22	Jan 14/22	Jan 21/22	Jan 28/22	Feb 4/22	Feb 11/22	Feb 18/22	Feb 25/22	Mar 4/22	Mar 11/22	Mar 18/22	WoW
Canada	3,340	3,556	3,752	3,953	3,631	3,342	3,869	3,630	3,731	3,398	3,806	408
Saudi Arabia	294	381	596	613	383	250	358	520	701	562	534	-28
Venezuela	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	584	902	321	383	958	510	768	497	412	645	641	-4
Colombia	241	193	143	286	258	234	332	144	71	279	72	-207
Iraq	317	434	133	412	226	225	285	295	188	161	489	328
Ecuador	58	0	0	236	101	98	98	0	160	205	103	-102
Nigeria	0	0	43	9	144	182	25	43	96	0	2	2
Kuwait	0	0	0	0	0	0	0	0	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0	0	0
Top 10	4,834	5,466	4,988	5,892	5,701	4,841	5,735	5,129	5,359	5,250	5,647	397
Others	1,235	1,279	1,248	1,193	688	949	1,093	638	960	1,145	839	-306
Total US	6,069	6,745	6,236	7,085	6,389	5,790	6,828	5,767	6,319	6,395	6,486	91

Source: EIA, SAF

Oil – Chevron reportedly says could double Venezuela's 800,000 b/d within months US On Tuesday, we tweeted [LINK] on the WSJ report "*Chevron, Waiting It Out in Venezuela, Tells U.S. Now Is the Time to Pump Oil Company pledges to make up for fall in Russian exports*". [LINK]. Chevron reportedly is telling the administration they can double Venezuela's oil production within months. The WSJ wrote "*For months, Biden administration officials snubbed top executives and lobbyists for Chevron Corp. who had pressed officials in Washington to ease sanctions so the company could boost production in Venezuela, where the U.S. has banned such activities since 2019. Then Vladimir Putin invaded Ukraine. Now the Biden administration is listening closely to Chevron, say people familiar with the conversations, which says it can help double Venezuela's 800,000 barrels-a-day production within months. That could replace the loss of roughly 700,000 barrels a day the U.S. was importing from Russia before it attacked Ukraine. And it could help lower gasoline prices—a major concern for the Biden administration in a tough election year.*" Our Supplemental Documents package includes the WSJ report.

Could Venezuela double oil production ASAP?

Venezuela's opposition asks Biden to not let Venezuela increase oil

No surprise, Venezuela's opposition doesn't want Biden to let Chevron or others crank up Venezuela oil production because it would benefit Maduro. On Tuesday, Reuters reported [LINK] "*Venezuela's opposition presses U.S. to hold off its consideration of oil imports*". Reuters noted that the opposition was "sidelined" in the recent Biden officials meetings with Maduro's government and they are "*pressing Washington to condition any easing of oil sanctions on political concessions, three*

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people involved in the matter said, adding new hurdles to oil companies hoping to resume operations there. U.S. diplomats have sought to find energy supplies worldwide that can help replace Russian oil and gas as buyers steer clear of Russia's imports over its invasion of Ukraine. U.S. officials met Venezuelan President Nicolas Maduro in Caracas for the first bilateral talks in years earlier this month. The Venezuelan opposition request adds to the issues temporarily thwarting efforts by oil firms to win U.S. approvals to get access to the country's crude for unpaid debts. If accepted, the opposition's proposal will pause any consideration of U.S. imports of Venezuelan oil." And "*The opposition's stance, laid out in recent meetings between U.S. State Department officials and opposition leader Juan Guaido's envoys, undercuts a faction within President Joe Biden's administration seeking a new policy toward the country with the world's largest crude reserves."*

Is it doable for Venezuela do double production? We think likely yes
We saw a number of doubts that Venezuela could double oil production with months. The WSJ report doesn't say or speculate how Chevron plans to accomplish this. But our feeling is that it likely doable if we just think about the stories we have heard over the past few years. One of the key reasons for the recent increase in production is Iran reportedly getting tankers to Venezuela of diluent that can be blended with Venezuela extra heavy to make it movable. A steady access to diluent would likely be a key factor for added near term oil production. Venezuela has been short equipment and tool. Recall the reports from a couple years ago on how some PDVSA oil workers were selling their tools so they could put food on the table. We suspect there are hundreds of wells that are shut-in because of a pump jack went down and there are no replacement parts. We suspect there are hundreds of wells that could use workovers. Reliable power, oil and gas operations need power and Venezuela has been hit for several years with power outages and unreliable power. Theseare a just a few of the likely reasons why it's likely that Venezuela could double its oil production within months.

A return of Venezuela is negative for Cdn heavy/medium oil
Our tweet [LINK] was "*#Biden admin listening to #Chevron who can help double Venezuela 800 kbd #Oil production "within momths". Negative to Cdn heavy as b/d to PADD3 was due to VEN MEX decline. $CHV has 479,000 b/d PADD3 refining capacity. Thx @cmatthews9 @Jose_deCordoba #OOTT".* Our tweet included the below EIA crude oil imports in PADD 3 (Gulf Coast) graphs, which remind how Cdn heavy/medium crude was able to penetrate PADD 3 (Gulf Coast) because there was a need with declining Mexico and Venezuela crude oil. Conversely, if Venezuela increases, it will mean more crude to the Gulf Coast especially.

Especially since Chevron has 460,000 b/d of refining capacity in Gulf Coast
Chevron has two refineries in the Gulf Coast, one of which would take Venezuelan crude. (i) Pascagoula (Mississippi) refinery. [LINK] "*Chevron's Pascagoula Refinery processes 350,000 barrels (14.742 million gallons) of crude oil a day - an amount equivalent to the size of a football field covered to a depth of 41 feet. Chevron Pascagoula Refinery is primarily a fuels refinery, in that we mainly manufacture motor gasoline, about 130,000 barrels per day (BPD); jet fuel, 50,000 BPD; and*

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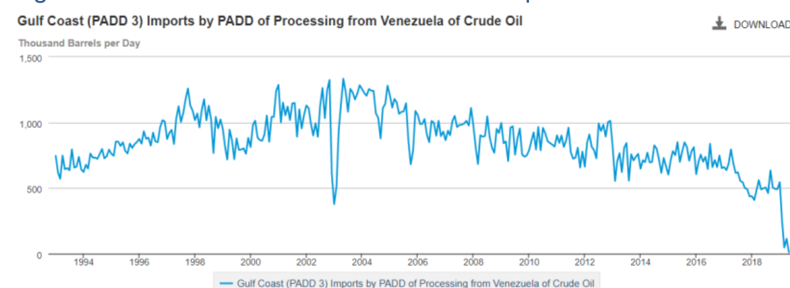
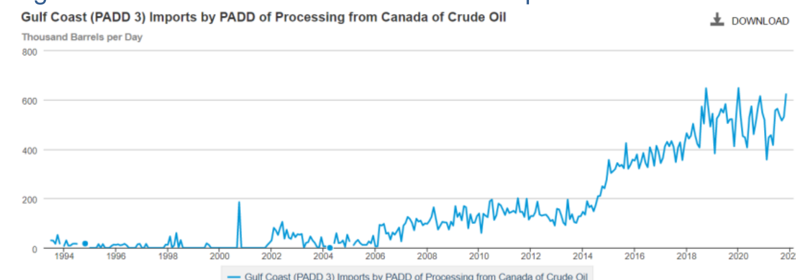
diesel fuel, 68,000 BPD. Our other products include fuel oils such as Liquefied Petroleum Gas (LPG), aviation gasoline, petroleum coke and sulfur." (ii) Pasadena Refinery (Texas) processes light sweet crude so would not process Venezuelan crude. [LINK] "*From gasoline, gasoline components, and distillate oils, to fuel gas and liquefied petroleum gas, the Chevron Pasadena Refinery manufactures products people use every day. Capable of processing up to 110,000 barrels of crude oil per day, we refine 100 percent Texas light, sweet crude, including Chevron-produced oil from the Permian Basin."*

Figure 18: Gulf Coast PADD 3 Crude Oil Imports From Venezuela



Source: EIA

Figure 19: Gulf Coast PADD 3 Crude Oil Imports From Canada



Source: EIA

Oil – Europe can't really cut off Russian oil from Druzhba pipeline

Russia's Druzhba oil pipeline

There are certainly realities to Europe being pushed by the US to cut off all Russian oil imports. Europe can't shut off oil imports from Russia's Druzhba oil pipeline. As noted below, we just don't believe it is possible to replace all the oil supply in the short term. And if the affected refineries can't keep oil inputs at the same levels as with Druzhba, then it would mean less produced gasoline, diesel, etc. On Tuesday, we tweeted [LINK] "*EU may be able to work around (with added cost) RUS #Oil that lands via tankers, but this map reminds why EU won't be able to ban RUS oil imports via #Druzhba pipeline. another good map courtesy of @business @JLeeEnergy. #OOTT"*. Our blog included the below Bloomberg map that shows the European refineries that are dependent on the Druzhba oil pipeline. Arguably, they could somehow get oil supply, but we doubt that they could replace Druzhba oil supply. The map was in an excellent Bloomberg report "*A Ban on Russian Oil Would Bring Eastern*

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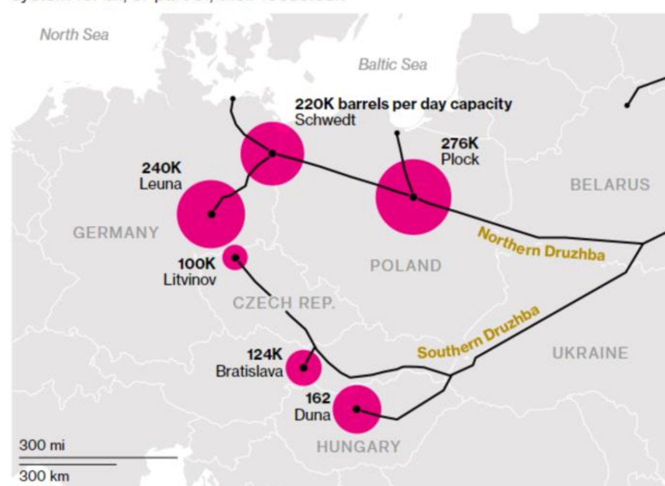
Germany to a Halt", which provides details on each refinery that is dependent on Russian oil via Druzhba. Our Supplemental Documents includes the Bloomberg report.

Figure 20: Europe refineries dependent on Druzhba oil pipeline



Source: Bloomberg

Oil – Can Germany really replace Russian oil with barges, rail and trucks?

Can Germany replace Druzhba pipeline oil?

Our view is unchanged – Europe's move against Russia is a game changer for energy for the 2020s and this is for the world, not just Europe. How they can go about replacing all the energy sourced from Russia is the game changer. They have clearly said to Russia, we are going to work to no longer need your products. And the challenge is how they do it quickly. The reality that it can't be done as quickly as Europe wants is what sets up the potential for massive spikes. On Friday, Bloomberg reported on comments from Germany Vice Chancellor (also head of the Green Party) Habeck "*Habeck said Germany wants to halve imports of Russian oil by mid-year and be "almost independent" by the end of 2022. It could be completely free of coal imports by the fall, he said. "Companies are letting contracts with Russian suppliers expire, they're not extending them and are switching to other suppliers," he added. "And at an insane pace." The government acknowledged it would be difficult to remove Russian oil quickly from supply chains, and is rushing to make complex plans to line up deliveries by sea, truck and train."* Our concern is less that they can't get oil tankers to German ports, but the logistics of getting that oil to inland refineries that are currently have Russian oil delivered right to the refinery via the Druzhba oil pipeline. See the above map. We tweeted [LINK] "*Cutting RUS #Oil means #DE "is rushing to make complex plans to line up deliveries by sea, truck & trains" reports @ArneDelfs. Rail track capacity aside, can't believe there are enough of these lying around to bring oil from ports inland to the #Druzhba pipeline refineries? #OOTT.* The "these" we referred to were crude oil by rail tankcars, truck oil tankers and oil barges. We said rail track capacity aside, but that is

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another big question mark, is there cargo rail line capacity to transport the oil. And then there are big logistics items like rail unloading logistics at the refineries and rail loading at ports. Trucks and barges are used in Germany right now, but these are normally for moving finished product from refinery to end users, and not oil input to refineries. Below is the crude by rail unloading logistics at the Phillips 66 refinery in Ferndale, Washington. Our Supplemental Documents package includes the Bloomberg report.

Figure 21: Phillips 66 Ferndale refinery, crude by rail unloading on the right side

Source: Google Maps, Whatcom TALK

Oil – Next OPEC+ ministerial meeting is Thursday March 31

OPEC+ meeting is March 31

We continue to see reports of how major oil importers like Germany and Japan continue ask key OPEC+ producers like UAE to produce more, but we also don't hear that those requests will be satisfied. The next OPEC and non-OPEC Ministerial Meeting (ONOMM) is set for Thursday, March 31 and we assume this will be like the March 2 meeting and be via videoconference. .

Oil – Heightened watch on terrorism as month long Ramadan starts on Apr 2

Monthly long Ramadan starts Apr 2

We are surprised that, as of our 7am MT news cut off, there haven't been any of the normal US Overseas Security Advisory Council security warnings about the risk of terrorism during Ramadan. We checked the OSAC alerts [LINK] this morning and no Ramadan terrorist warnings have been posted. We remind that the month long Ramadan is supposed to start earlier this year. The official start date gets officially declared in Saudi Arabia, but it is widely expected that it will start at dawn (Saudi Arabia time) on April 2. Every year, there is a heighted alert for terrorism during Ramadan and, normally, we we start to see warnings by the US Overseas Security Advisory Council in the week ahead of Ramadan. In prior years, our Energy Tidbits memos have noted the prior the US Overseas Security Advisory Council warning, referring to Ramadan, that *"martyrdom during the month may hold a special allure to some".* The OSAC normally warns of the increased potential for terrorism attacks during this period. It's not just for countries like Israel, but within African countries like Kenya and Niger, and for an overall warning of terrorist attacks in many parts of the Middle East.

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Oil – Saudi says west should step up in fight vs Houthis

Saudi says west should step up

We think everyone was surprised by the Saudi Arabia declaration on Monday after last weekend's Houthi drone attack on the YASREF refinery in Yanbu. Saudi Arabia The headlines were all on Saudis warning the west they have to take responsibility in defending against the Houthis and that Saudi can't accept responsibility for any oil shortages because of the Houthis attacks. Saudi Arabia [LINK] "*declares that it will not incur any responsibility for any shortage in oil supplies to global markets in light of the attacks on its oil facilities from the Iranian-backed terrorist Houthi militias. The Kingdom stresses the importance of the international community realizing the gravity of Iran's continued behavior of equiping the terrorist Houthi militias with the technology of the ballistic missiles, and advanced UAVs with which they target the Kingdom's production sites of oil, gas and refined products, resulting in serious consequences for upstream and downstream sectors affecting the Kingdom's production capability and it's ability to fulfill its commitments, undermining without a doubt, the security and sustainability of energy supplies to global markets. The official source highlighted the importance of the International community undertaking its responsibility to preserve the energy supplies and stand firm against the Iranian- backed Houthi terrorist militias, deterring their malicious attacks that represents direct threat to the security of oil supplies in these extremely sensitive circumstances witnessed by the global energy markets."* Basically Saudi is telling the world (in particular the US) they have a shared responsibility to stop the Houthis.

Was Saudi's statement meant to be forward or backward looking, or both?

We don't disagree with the headlines, but we wondered about the release. We assume this was precisely written such as "*the Kingdom of Saudi Arabia declares that it will not incur any responsibility for any shortage in oil supplies to global markets in light of the attacks on its oil facilities from the Iranian-backed terrorist Houthi militias*." This was widely viewed as a forward looking warning and not a warning based on what has happened. We wondered if this was more backward looking than what others were assuming in being forward looking. This was because of last weekend's attack at the YASREF refinery in Yanbu that Saudi Arabia said caused a "*temporary reduction in the refinery's production*". It's why we tweeted [LINK] "*Must read. Not the typical post #Houthi missile attack statement ie. doesn't impact #Aramco ability to be reliable supplier. So Why? Is Saudi warning on what could happen or inferring something did happen to abiltiy to deliver #Oil or #PetroleumProducts? Anyone know? #OOTT*" and [LINK] "*Recognize today's Saudi warning on supply has a big Houthi element, but it's hard not to wonder what happened at Riyadh refinery. And with the new "temporary" reduction in YASREF refinery production at Yanbu. It may well be a warning supply of products has been impacted. #OOTT"*

Houthis drone attack hit operations at Aramco 430,000 b/d refinery in Yanbu

Last week's (March 20, 2022) Energy Tidbits highlighted the breaking late Sat night news that Saudi Arabia confirmed drone hit a major Aramco refinery at Yanbu, which is Aramco's major Red Sea oil complex. And that it led to a "*temporary reduction in the refinery's production*". There was no indication on low or how big the impact was for this "temporary" item. Early March 20, we tweeted [LINK] "*KSA confirms #Aramco 430,000 b/d YASREF refinery in Yanbu hit by drone & led to temporary*

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reduction in refinery's production, compensated f/ inventory. Reminds just because supply is kept, doesn't mean operations aren't damaged. #Houthis have range to hit any #Oil facility #OOTT." The Saudi Press Agency reported "*An official spokesman at the Ministry of Energy said that yesterday, Saturday March 19, 2022, at around 11:30 PM a drone assault was made on the petroleum products distribution terminal in Jizan in the south east of the Kingdom. Two additional drone attacks were made today, Sunday March 20, 2022, at around 5:30 AM, on Yanbu's natural gas plant, and shortly after, on the facilities of Yanbu Aramco Sinopec Refining Company (YASREF). The assault on YASREF facilities has led to a temporary reduction in the refinery's production, which will be compensated for from the inventory. The assaults resulted in no casualties."* As everyone knows, for Saudi Arabia to admit there is an impact on a refinery operations has to raise a red flag question on how much damage or impact there will be on the refinery operations. And it is a reminder that there is a big difference between a refinery being able to maintain "supply" vs maintaining its "operations". All refineries have tanks for storing crude oil to be processed at the refinery and for storing finished petroleum products to be shipped/delivered. And in the case of a major refinery on the coast, the tankage for finished petroleum products will have large capacity as the products will be typically loaded on tankers. We will have to watch to see if we can get any clues on the actual impact on the refinery operations. Our Supplemental Documents package includes excerpts from the Saudi Aramco 2019 IPO prospectus on Saudi Aramco oil refineries.

Why did Saudi highlight Riyadh refinery when no one assumes a problem?
We still have questions on the March 10 attack on the Riyadh refinery. We recognize that we were the only ones to still question if the March 10 drone attack on the Saudi Aramco Riyadh refinery damaged operations. But the Saudi Press Agency report on the Yanbu missile attack raised, at least to us, questions on the Riyadh refinery attack. Maybe people don't read the full release after the headline paragraph, but it always stands out for us when someone has to use a specific for example. And in this case, the March 10 Riyadh refinery attack. Why mention did they feel the need to use this "for example" if that drone attack from 10 days ago had no impact. The SPA wrote "*In his statement, the spokesman stressed that the Kingdom strongly condemns these attacks and said that such acts of sabotage and terrorism, repeatedly committed against vital installations and civilian facilities, including, for example, the recent attack on the Riyadh refinery, are cowardly assaults that violate international laws and norms and do not just target the Kingdom alone, but the security and stability of energy supply to the world, therefore targeting the global economy."* They had no need to use the for example. Surely others have to at least want to question if the Riyadh refinery was impacted.

We still think Aramco's unusual actions point to Riyadh refinery impact
Actions speaking louder than words is the expression and we still believe Saudi Aramco's actions on global diesel markets and its delayed reporting of the drone attack are the best indicators that the drone attack impacted Riyadh refinery operations. Here is what we wrote in the March 13, 2022 Energy Tidbits. "*Oil – Did Aramco point to the Houthis drone impacting Riyadh refinery operations? We*

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*recognize that everyone is accepting the Saudi Press Agency Friday morning report [LINK] at face value that "An official spokesman at the Ministry of Energy stated that at around 04:40 AM of yesterday, the Riyadh oil refinery was attacked by a drone, resulting in a small fire that has been brought under control. The attack did not result in any injury or death nor was the supply of oil or its derivatives affected." Note that the SPA report was at 01:42 Riyadh time on Friday and the attack is being reported at 04:40 Riyadh time on Thursday. Also note that the SPA is confirming there was a drone hit on the Saudi Aramco Riyadh refinery, but is downplaying any impact. Our initial Thursday night tweet [LINK] noted the release but also said "no 3rd party reports on impact". As of our 7am MT news cut off, we still haven't seen a 3rd party report. However, we wonder if there is a distinction between any impact on "supply" vs operations. And we wonder if Saudi Aramco signaled there was a problem with the Riyadh refinery operations by their actions. It's why, early Friday morning, we tweeted [LINK] "Did drone hit Riyadh refinery production capability, even if no impact to "supply" of oil or its derivatives? Drone hit Thurs at 4:40 Riyadh time or 1:40 GMT. Note @iamsharoncho @elizabethlow Thurs 3:47 GMT report #Aramco seeks unusually large amount of diesel in rare move. #OOTT". We remembered a Bloomberg Thursday morning report that was written a day before any reports of the drone attack. The timing was that the Bloomberg report was posted about two hours after when SPA said the drone hit. But again, SPA did not say this until a day later. We were going to write up the Bloomberg anyway because of the title "OIL TENDER: Aramco Seeks Diesel for Saudi Arabia in Rare Move. Aramco Trading is seeking an unusually large volume of diesel for prompt delivery to Saudi Arabia in a rare move for the country, which is usually an exporter of the fuel, according to traders who asked not to be identified. * Co. sought ~1.2m-4.6m barrels of 10ppm sulfur gasoil for delivery to Ras Tanura, Jizan, Jeddah and Duba via a tender * Delivery period from mid-March to mid-April." Is it a coincidence that Aramco just happened to seek an "unusually large volume of diesel" for immediate delivery? We just find it hard to believe that the SPA report didn't come out for a day later for a reason. Our Supplemental Documents package includes the SPA report and Bloomberg diesel order report."*

Yanbu is Aramco's strategic oil area on the Red Sea

An attack on Yanbu is a long range drone attack and it reminds that if the Houthis can reach Yanbu, they can reach any Saud Aramco oil facility. Yanbu is the major Saudi Arabia oil refinery, pipeline and oil export terminal on the Red Sea. Yanbu is probably the 2nd most important oil infrastructure area in Saudi Arabia following its Ras Tanura oil export terminal in the eastern province. The EIA notes the extensive Saudi oil infrastructure in Yanbu includes the SAMREF 400,000 b/d refinery, another Saudi Aramco 250,000 b/d refinery, Yanbu Aramco Sinopec Refining Company (YASREF) JV with Sinopec that is 400,000 b/d refinery (note YASREF was to be expanded in 2020 to 430,000 b/d capacity), and its also Saudi Aramco's main export terminal on the Red Sea at Yanbu that can handle 1.3 million b/d. Plus there is the major Petroline oil pipeline that move oil to the Yanbu export terminal with a capacity of 3 million b/d. And the parallel 290,000-bbl/d Abqaiq-Yanbu NGL pipeline

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Figure 22: Approx 1,400 km missile range

Source: Google Maps, SAF

Figure 23: Saudi Arabia major oil and natural gas infrastructure

Source: EIA

Oil – Houthis hit Aramco Jeddah fuel depot on the eve of 7th anniversary of the war

Aramco Jeddah fuel depot hit by missile

No sooner than the Saudi warning then the Houthis hit them again, this time at the Saudi Aramco fuel depots in Jeddah. The attack happened on the eve of the 7th anniversary of the start of the war. No surprise, there were many social media reports on the attack considering there are a lot of visitors to Jeddah right now with today's Saudi Arabia Grand Prix in Jeddah. Formula 1 confirmed the race was on for later today. The missiles hit fuel storage tanks. It's hard to know if more than the one direct hit tank are out of commission and for how long. Below is the Planet satellite picture post attack.

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Figure 24: Saudi Aramco North Jeddah Bulk Plant March 26, 2022

Source: Planet

Oil – Saudi's weekly long war vs the Houthis passes 7th yr anniversary on March 26

7 years since beginning of Saudi-Houthi war

It's been a bad week for Saudi Arabia being hit by Houthi drones/missiles. It makes sense that the Houthis would launch missiles on the 7th anniversary of Saudi Arabia launching the war against the Houthis. Saudi Arabia has never said (no wonder) how much it's war in Yemen has cost. And we suspect US government, major international banks and others haven't wanted to provide estimates to avoid being on the wrong side of the Saudis. The last time we recall seeing some sort of estimates, it was over $100 billion and that was two years ago. Yesterday, March 26, marked 7th anniversary of the start of the Saudi Arabia's war against the Houthis in a war that they went into expecting to be over in a matter of weeks, not years. Saudi Arabia's intervention in Yemen began on March 26, 2015, exactly seven years to Saturday. At 12 AM on Thursday March 26, 2015, King Salman ordered the beginning of a large scale military operation against the Houthis with several airstrikes targeting air bases and air defense infrastructure [LINK]. Saudi Arabia was the leader of the 10-country coalition behind the initial operations which included Morocco, Eqypt, Sudan, Jordan, Kuwait, Bahrain, Qatar, UAE, and Pakistan. Prior to the Saudi led large scale intervention, the internal conflict in Yemen between the Houthis and the Hadi government had pushed Hadi to the city of Aden. The Saudi's had warned against Houthi forces pushing towards Aden where Hadi had taken refuge, which was the ultimate reason for the initial military intervention.

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Figure 25: Saudi-Led Coalition

Source: Al Arabiya News

Oil – Will Biden's call for Putin regime change impact getting a JCPOA?

Biden's call for Putin regime change

Prior to Biden's speech yesterday, the US had been signaling no imminent JCPOA deal. And with Blinken meeting with Israel in the coming days, we thought there wouldn't be anything until after those discussions. And then throw on top of that Biden's speech. We, like many, were listening to Biden's Warsaw speech yesterday and were surprised by what comes out later was an off the cuff ending to his speech. The Washington Post and others reported that it wasn't in Biden's prepared speech to close by saying "*For God's sake, this man cannot remain in power*." This will have reverberations far beyond oil, but we tweeted [LINK] "*In case you weren't listening, #Biden's Warsaw speech "for God's sake, this man cannot remain in power" referring to #Putin. Surely this makes it unlikely/impossible for any areas of cooperation ie. will this keep #JCPOA in limbo? #OOTT*." We had to believe Biden's call for a Putin regime change puts Putin in a position of not wanting to do anything that Biden may want. The US position has been that Russia also wants to make sure Iran never gets nuclear weapons so they are aligned in that goal. A return to JCPOA was one of Biden's key priorities. We just have to believe there will be some impact.

Blinken cute wording tries to defuse Biden's call for regime change

We love political speak and how politicians try to use cute wording to say they didn't mean it. This morning, Reuters reported [LINK] "U*.S. has no strategy of regime change in Russia, Blinken says" ""As you know, and as you've heard us say repeatedly, we do not have a strategy of regime change in Russia or anywhere else, for that matter. In this case, as in any case, it's up to the people of the country in question. It's up to the Russian people," Blinken said."* So the US doesn't have a strategy of regime change, but that really isn't the same as a goal or policy for regime change.

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Oil – US special Iran envoy on JCPOA, "I can't be confident it's imminent"

Biden's call for Putin regime change

Earlier this morning, we had two tweets on US Special Envoy for Iran, Robert Malley, comments at the Doha Forum today. (i) Our key takeaway from listening to the clips is that it reminds Malley is the frontman. He was given marching orders that Biden and he has worked hard but he hasn't got Iran to his marching orders. So he got to where everyone thought he would get to – down to some specific items like IRGC terrorist designation. And now its time for the decisionmakers above him to decide on a deal or note. (ii) Our first tweet [LINK] was on the Bloomberg reporting of Malley's comments. "*"#JCPOA "i can't be confident it's imminent""it's one of the requests Iran has made we haven't decided to delist the IRGC""zero sense of now you really need to rush for a deal because of the need to get oil on the market" @USEnvoyIran thx @SimoneFoxman @V_Ratcliffe @RcShahla #OOTT."* (iii) Our second tweet [LINK] *"#JCPOA. good @BeckyCNN @USEnvoyIran clip. Is he the frontman or decisionmaker? He says no deal unless Iran gives in to his marching orders. But aren't we to the expected reality of reaching any deal, does #Biden decide if he will close any gap? #OOTT [LINK]"*. Part of his comments were "*All I've heard is here's the parameters under which a deal is acceptable, because they meet, they address US national security concerns. If not, there'll be no deal.*" Surely we aren't the only one who believes Malley isn't the decisionmaker. He was given parameters to hit by his bosses and they haven't been hit. Isn't this what was expected, that there would be a gap to close and it's up to Biden and Iran to decide if they want to close the gap? Our Supplemental Documents package includes the Bloomberg report and the transcript we made of Malley's comments at the Doha Forum.

Oil – BloombergNEF: Global oil inventories continue to show big deficit

BNEF's global oil inventories

For those with a Bloomberg terminal we recommend flipping thru BloombergNEF's "Oil Price Indicators" weekly that comes out on Mondays as it provides good charts depicting near-term global oil demand and supply indicators. It is important to highlight that this is the first time we have seen all oil indicators point to either neutral or negative. The key data this week is the outlook for global oil and products stocks which delivers a bullish outlook at the widening of the deficit relative to the 2017-2019 average. The deficit for crude and product narrowing from 120.5 mmb to 119.4 mmb compared to the 2017-2019 average. For the week ended Mar 15, land crude oil storage in tracked regions rose by 1.4% WoW to 522.8 mmb. The stockpile deficit against the 5 yr average (2015-2019) narrowed from 84.6 mmb to 83.1 mmb. Total crude inventories increased by 0.1% to 616.0 mmb, including global floating inventories. Product stocks were down 0.6% WoW with the stockpile deficit against the 3-year average widening from 68.8 mmb to 72.3 mmb. Gas oil and middle distillate stocks have narrowed against their three-year average deficit (2017-2019) of 42.5 mmb to 40.5 mmb. Jet fuel consumption by international departures decreased by 7,400 b/d WoW while consumption by domestic passenger departures declined by 43,600 b/d, putting an end to 5 weeks of gains. Global mobility indices were mixed over the week putting an end to four weeks of gains with significant declines in Asia. The high frequency oil and product stockpile deficit against the three-year seasonal average (2017-2019) suggests the stockpile deficit has widened to near the post pandemic record set three weeks ago. Below is a snapshot of aggregate global stockpiles. Our Supplemental Documents package includes excerpts from the Bloomberg report.

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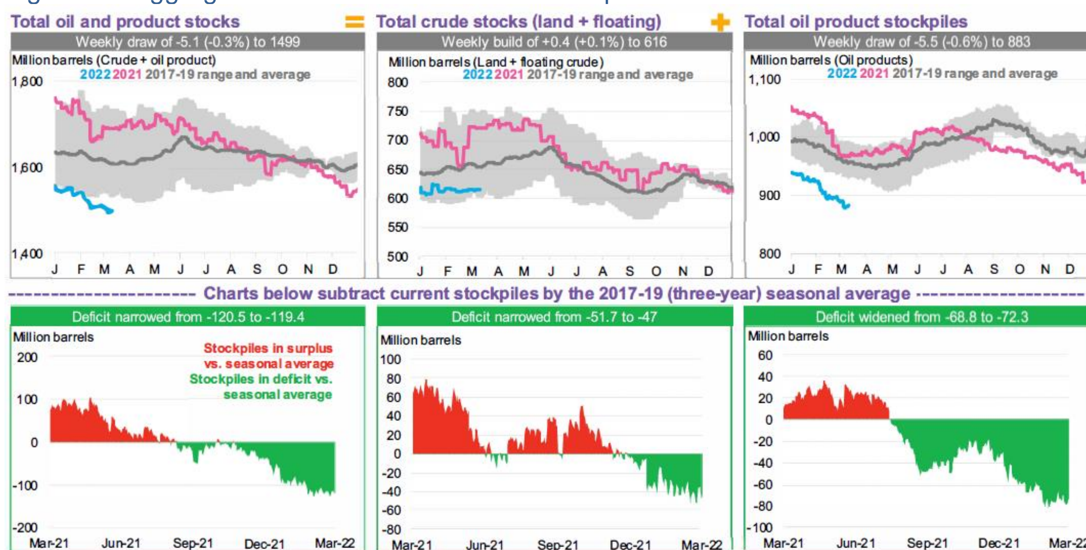
Figure 26: Aggregate Global Oil and Product Stockpiles



Source: Bloomberg

Vortexa crude oil floating storage

Oil – Vortexa crude oil floating storage 91.44 mmb as of March 25, -4.18 mmb WoW

We are referencing the Vortexa global crude oil floating storage data posted on the Bloomberg terminal as of 1pm MT yesterday. And we note that these estimates get revised over the course of the week. Note we do not check daily for the revisions, so our comments are compared to the March 25 and March 18 posted on Bloomberg on March 19 at 1pm MT. (i) As of 1pm MT, Bloomberg has posted Vortexa crude oil floating storage estimate as of March 25 was 91.44 mmb, which was -4.18 mmb WoW vs revised March 18 of 95.62 mmb. Note March 18 was revised +7.73 mmb from the Bloomberg estimate of 87.89 mmb posted as of 1pm on March 19. (ii) The general trend over the past few months is continuing with crude oil floating storage generally being in the 90 to 100 mmb range. (iii) Today's March 18 estimate of 95.62 mmb, which is +7.73 mmb from the Bloomberg estimate of 87.89 mmb posted as of 1pm on March 19. Today's March 11 estimate is 90.00 mmb, which is -2.54 mmb vs 92.54 mmb posted as of 1pm on March 19. (iv) March 25 estimate of 91.44 mmb is -1351.02 mmb vs June 26, 2020 peak of 224.46 mmb. (v) March 25 estimate of 91.44 mmb is +27.3 mmb vs pre-Covid March 20, 2020 of 64.14 mmb. Note we will have do a different comp next week as the floating storage really cranked up in 2020 covid right around now. Below are the last several weeks estimates made as of today at 1pm MT, March 19 at 1pm MT, and March12 at 13pm MT.

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Figure 27: Vortexa Floating Storage as of March 25 Posted on Bloomberg 1pm MT Sat

Source: Bloomberg, Vortexa

Figure 28: Vortexa Estimates Mar 26 1pm MT, Mar 19 1pm MT, and Mar 12 1pm MT

Est as of Mar 26, 1pm MT

FZWWFST VTXA Inde — 03/24/2020 - 03/25/2022

	Date	FZWWFST V... Mid Px
Fr	03/25/2022	91443
Fr	03/18/2022	95618
Fr	03/11/2022	89990
Fr	03/04/2022	96966
Fr	02/25/2022	93293
Fr	02/18/2022	85019
Fr	02/11/2022	97292
Fr	02/04/2022	98869
Fr	01/28/2022	94032
Fr	01/21/2022	98387
Fr	01/14/2022	84689

Est as of Mar 19, 1pm MT

FZWWFST VTXA Inde — 03/17/2020 - 03/18/2022

	Date	FZWWFST V... Mid Px
Fr	03/18/2022	87894
Fr	03/11/2022	92535
Fr	03/04/2022	98407
Fr	02/25/2022	94289
Fr	02/18/2022	84645
Fr	02/11/2022	98207
Fr	02/04/2022	101.946k
Fr	01/28/2022	95109
Fr	01/21/2022	101.164k
Fr	01/14/2022	86550
Fr	01/07/2022	92922

Est as of Mar 12, 1pm MT

FZWWFST VTXA Inde — 03/10/2020 - 03/11/2022

	Date	FZWWFST V... Mid Px
Fr	03/11/2022	79207
Fr	03/04/2022	96290
Fr	02/25/2022	96668
Fr	02/18/2022	88504
Fr	02/11/2022	104.323k
Fr	02/04/2022	105.319k
Fr	01/28/2022	96377
Fr	01/21/2022	98631
Fr	01/14/2022	83624
Fr	01/07/2022	92340
Fr	12/31/2021	93862

Source: Bloomberg, Vortexa

Oil – Bloomberg: Prior to China plane crash, global jet fuel demand was up

BNEF Aviation Indicators weekly

Note that the BloombergNEF's Monday release of "Aviation Indicators Weekly" was before the China Eastern Boeing 737-800 tragic plane crash, which, as noted in the following item, has led to a huge increase in China flight cancellations. Prior to the crash, we were a little surprised by the subtitle "*China downside Outweighs EU and U.S. Upside*" at least based on the data prior to the crash, which shows that the global picture for jet fuel demand was still positive – at least until then, the negative impact of China is not offsetting any global demand. But we will have to see about next week. Global passenger jet fuel demand decreased 1.1% WoW with Asia Pacific experiencing the largest growth reduction compared the rest of the world. Sanctions and flight bans continue to impact activity in Russia with flights out of Russia down 8.7% since last week. Prior to the crash, China has reduced their flights by 7.21% WoW, both international and domestic flights have noted cancellations this week. In Europe

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departures in Eurocontrol area increased by 2% this week led by increases in British Airway, KLM, Ryanair and Turkish Airlines. US passengers were up 6% WoW with passenger levels at 86% of 2019 levels. Based on the number of passenger flights scheduled, jet fuel demand over the next four weeks will average 5.01 million barrels per day - exceeding 5 million for the first time. Cancellations in for the week ended March 16 saw an average of 249,450 b/d of jet fuel demand removed over the same four weeks. Our Supplemental Documents package includes the BloombergnNEF report.

China flight cancellations up huge post China Eastern 737-800 plane crash

As noted, the BNEF Aviation Indicators Weekly report was prior to the China Eastern Boeing 737-800 tragic plane crash on Monday. On Tuesday, we tweeted [LINK] on how China flight cancellations went post the crash "*About 3/4 of China's 11,800 scheduled flights on Tues have been canceled, according to aviation data company VariFlight, but it remains unclear at this stage how long some services will be halted" report @elizabethlow @saketsundria #JetFuel #OOTT.*" Bloomberg reported "*The mass cancellation of flights in China following a plane crash is another challenge for jet fuel's haphazard demand recovery, which has been impacted by Covid-19 lockdowns and Russia's war in Ukraine. About three-quarters of China's 11,800 scheduled flights on Tuesday have been canceled, according to aviation data company VariFlight, but it remains unclear at this stage how long some services will be halted.*"

Oil – February truck tonnage flat MoM, up 2.4% YoY

Truck tonnage index +2.4% YoY in February

Demand for truck haulage continues to grow, but supply shortages are still an obstacle for the industry. Truck tonnage was flat during February for after five consecutive months of gains, but it is worth noting that the index fell by 4.6% from April to July so not quite back to the levels observed in 2020. The American Trucking Association released its seasonally adjusted Truck Tonnage Index for February on Tuesday [LINK]. February observed a 0% increase MoM from January, after increasing 0.4% last month. It was the first time since July without a MoM gain and Chief Economist Bob Costello noted, "*February was the first month that the index didn't increase since July, Despite a string of gains, the index is still off 1.8% from March 2020. The index is also off 4.2% from the all-time high in August 2019. Demand for trucking freight services remains strong, but for-hire contract carriers are capacity constrained due to the driver and equipment markets. The spot market has been surging as these carriers can't haul all of the freight they are asked to move.*" The index is up 2.4% YoY from February 2021, with a consecutive YoY gain. Trucking serves as a barometer of the U.S. economy, representing 72.5% of tonnage carried by all modes of domestic freight transportation, including manufactured and retail goods. Trucks hauled 11.84 billion tons of freight in 2019. Motor carriers collected $791.7 billion, or 80.4% of total revenue earned by all transport modes. Our Supplemental Documents package includes the ATA release.

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Figure 29: Truck Tonnage Index

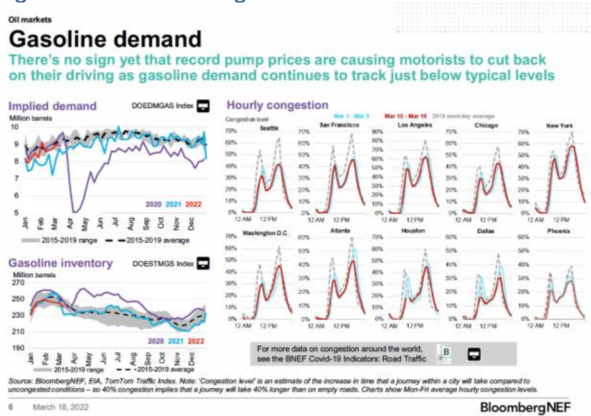
Source: ATA

Oil – BNEF, no sign record gasoline prices are cutting back on US driving

Most driving is needed

Everyone like to complain or at least comment on the high price of gasoline because everyone goes to the gas station, has to pump their own gas so sees the price per litre or gallon. But we keep reminding that, to the most part, driving gasoline consumption is mostly inelastic in the short term. Unless there is a forced restriction on driving, driving miles don't change much in the short term as most driving is needed as part of everyday living whether its commuting to work, running errands, taking kids to places, etc. It's also why governments are all scrambling to cut taxes on gasoline – they know people need their cars. The question mark is how high do gasoline prices have to go before there is a significant impact on personal consumption. All we know so far is that gasoline prices linked to $100+ oil isn't hammering driving. We were reminded this in BloombergNEF's US Oil Price Indicators Weekly report. BNEF included the below chart and said "*there's no sign yet that record pump prices are causing motorists to cut back on their driving as gasoline demand continues to track just below typical levels*". Our Supplemental Documents package includes excerpts from the BNEF US Oil Price Indicators.

Figure 30: BloombergNEF Gasoline Demand



Source: BloombergNEF

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Oil & Natural Gas – Liberals hard targets for oil & gas emissions reductions this week

Liberals oil and gas emissions targets by March 31

The wait will be over as the Liberals are planning to release their oil and gas emissions targets for the oil and gas sector this week. This timing was well known and announced in Dec that the Liberals would be releasing its hard targets for emissions reductions for the oil and gas sector by the end of March. These are to include the hard targets the Liberals are setting for emissions reductions for 2025. Don't forget the Liberals are now legally obligated to check on a year basis that they are on track to hit those hard targets. This is our big concern that the worst is still to come for the oil and gas sector. For some reason, this doesn't seem to be a big issue for most. But our view is unchanged. In our Dec 12, 2021 Energy Tidbits, we wrote "*The Liberals Friday afternoon Dec 3 press release didn't get any coverage so we didn't see it until we did our Sunday afternoon what did we miss search of websites. We take advantage of NFL football for a leisurely afternoon of searching news. And that is when we saw the Liberals Dec 3 release "Canada to launch consultations on new climate commitments this month, establish Emissions Reduction Plan by the end of March 2022". [LINK] (i) ERP is the 2030 Emissions Reduction Plan. Liberals confirmed it will be established by March 31, 2022. This is the plan will set the emissions reductions targets for the oil and gas sector including the 5 year targets for the pace and scale needed to keep the oil and gas sector on track to be net zero by 2030. They previously announced the first hard target is 2025 for how much emission reductions are needed to keep the oil and gas sector on track. This all links to the Canadian Net-Zero Emissions Accountability Act, which also included that there will be yearly checks to make sure they are on track for the 5-yr targets. This remains our big concern – reductions are needed right away. (ii) This progress tracking will be made even stricter. The release said "Canada's 2030 Emissions Reduction Plan is the first of many requirements under the Canadian Net-Zero Emissions Accountability Act. The Government of Canada is considering more formal, ongoing, and consistent engagement processes for the establishment of future emissions reduction targets, plans, and reports." (iii) Note the classic political speak saying something that sounds sincere that, in reality, means nothing. "The ERP will be informed by early consultations on these new commitments." They will be doing a lot of consultations. But all this means is that they will consult and "be informed". All it does is to tick the box that they consulted and didn't just drive thru what they wanted without consulting. (iv) Positive for CCS. They don't say it, but that is the likely interpretation that they need or CCS. The Liberals are talking about "net-zero emitting electricity" vs "non-emitting electricity". There was what looks like a different position in Trudeau's COP26 speech that we did not highlight but jumped out in the Friday release. On Friday, the Liberals said "At COP26 in Glasgow in November 2021, Prime Minister Trudeau announced on the world stage Canada's commitment to cap and cut emissions from the oil and gas sector and to achieve net-zero emitting electricity in Canada by 2035." This was shift from their June 11 policy statement [LINK] that said "Canada's electricity grid is over 80% emissions-free—one of the cleanest in the world—and is on track to meet its goal of having 90% non-emitting electricity generation by 2030." (v) This release came out on Friday so ahead of the Environment Minister Guilbeault meeting in Calgary with big oil and gas companies. If you haven't heard Guilbeault's interviews, it's worth doing so. He is very smooth at saying things that sound accommodative to industry but, if you listen closely, he does stick to his strong climate views. So if you look at the Friday release, we saw some of this smooth set up in the Friday release as we think this is one of the first Liberal releases (or maybe the first) that they acknowledged the oil sands efforts. The release said*

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"Many of Canada's oil and gas producers have made their own net-zero commitments. Canadian Natural Resources, Cenovus Energy, Imperial, MEG Energy, and Suncor Energy—collectively accounting for around 90 percent of Canada's oil sands production—have each committed to achieving net-zero emissions from their oil sands operations by 2050."

No hints from Environment Minister Guilbeault op-ed on Friday
Even if you aren't a Guilbeault fan, you have to give him credit for being pretty disciplined in his messaging, in particular not feeling the urge to give too many hints on what is to come. He has a major announcement this week on the hard emission targets for the oil and gas sector. Yet his big op-ed on Friday didn't really give any insight as to what is to come. Power to him. He restates items previously stated such as "*We will, for example, cap and lower pollution from our oil and gas sector, move to a net-zero electricity grid, switch to zero-emission vehicles, and retrofit our homes to make life more*". But he does reinforce one of our big concerns on this. There are hard targets coming to keep the oil and gas sector on track. And that this plan is reviewed every year. This is not like setting a 2030 or 2040 or 2050 target and not being held to any interim targets. This will be putting companies on the spot for what they do every year, where they are and what they will do to stay on track. And this will be for the oil and gas companies to get at now for immediate reductions by 2025 and there will be progress reports. The other issue this will require emissions tracking. Clearly a big growth area for oil and gas will be a lot of capital being allocated by companies and service providers on measuring emissions. Our Supplemental Documents package includes the Guilbeault op-ed. [LINK]

Oil & Natural Gas– reminder of Turkish Straits & Montreaux convention

Turkish Straits

We are a little surprised that we haven't seen more focus on the Turkish Straits given the escalation of Russia/Ukraine fighting and the videos of the Russian ships getting attacked this week. The Turkish Straits are important to oil and gas shipping with over 2.5 mmb/d but even moreso to other global trade including minerals and wheat. One item to remember is that the Turkish Straits are governed by the Montreaux Convention 1936, which gurarantees passage for all civilian ships in times of peace and gives Turkey the right to restrict passage during times of war. The EIA writes "*The Turkish Straits, which include the Bosporus and Dardanelles waterways, divide Asia from Europe. The Bosporus is a 17-mile waterway that connects the Black Sea with the Sea of Marmara, and the Dardanelles is a 40-mile waterway that links the Sea of Marmara with the Aegean and Mediterranean Seas. Both waterways are located in Turkey and supply Western and Southern Europe with oil from Russia and the Caspian Sea region. Only half a mile wide at the narrowest point, the Turkish Straits are among the world's most difficult waterways to navigate because of their sinuous geography. About 48,000 vessels transit the Turkish Straits each year, making this area one of the world's busiest maritime chokepoints. Commercial shipping has the right of free passage through the Turkish Straits in peacetime, although Turkey claims the right to impose regulations for safety and environmental purposes."*

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Figure 31: Turkish Straits

Source: EIA

Oil & Natural Gas – Updated EIA Australia country brief

EIA's country brief on Australia

We continue to recommend adding the EIA's country analysis briefs to reference libraries as good quick references, in this case its new EIA country executive summary [LINK] on Australia. Australia is a large producer of both coal and LNG and exports the majority of its energy production. In 2020, Australia was the world's largest coal exporter based on energy content and the second-largest exporter based on weight, behind Indonesia. It was also the largest exporter of LNG in the world that year. In 2020, fossil fuels accounted for approximately 90% of Australia's total energy consumption; petroleum accounted for an estimated 33%, coal accounted for 30%, and natural gas accounted for 26%. The shares for petroleum and coal both decreased in 2020, accounting for the 2% drop in fossil fuel's overall share of energy consumption from 2019. Australia has proved oil reserves of 2.4 bnb at the end of 2021 mainly located on the Western states of Australia, Victoria, and the Northern Territory. Exploration for further undiscovered conventional reserves remains in its infancy and is unable to use in the assessment of production potential. Petroleum and other liquids produced was approx. 461,000 b/d in 2021 which was 26% crude, 46% condensate, and 24% natural gas liquids. New projects that came online in the Northern Carnarvon basin were partially responsible for the increased production of crude oil and condensate. Australia's petroleum production is expected to remain flat in the coming years as no new projects are slated to come online until 2025. In 2020 Australia became a net exporter of crude oil for the first time since 1991, with exports mainly going to the Asia Pacific region for a total of 252,000 b/d. Australia had two refineries as of August 2021, with a total refining capacity of 229,000 b/d, operated by the Vitol Group and Ampol Ltd; 5 refineries have close in Australia since 2013. In 2020 Australia passed Qatar as the largest LNG exporter at 3.7 tcf, with exports headed almost exclusively to Asia. At the beginning of 2021 Australia had 15 LNG facilities with a total capacity of 4.4 tcf/yr; there are plans to add 6.6 bcf/d of additional capacity, though prospective projects are facing challenges as Australia's natural gas production has declined. Australia has over 24,233 miles (39,000 kilometers) of natural

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gas transmission pipelines. The Northeast Gas Interconnector started operation in 2019. The 622 km onshore pipeline is a joint venture of China's State Grid Corporation and Singapore Power, operated by Jemena. Our Supplemental Documents package includes the EIA brief.

Neste's large SAF deal

Energy Transition – One of largest ever SAF deals = jet fuel for 3 UK-NYC flights

It was hard not to be attracted to the Neste & DHL Express Monday press release "*Neste and DHL Express announce one of the largest ever sustainable aviation fuel deals*" [LINK]. There is an advantage with SAF as a drop-in fuel, Neste wrote "*Neste MY Sustainable Aviation Fuel is an available solution today. As a drop-in fuel it can be used with existing aircraft engines and airport fuel infrastructure, requiring no extra investment to them*". Neste wrote "*In the next five years, Neste will supply DHL with approximately 320,000 tons (400 million liters) of Neste MY Sustainable Aviation FuelTM. The agreement is Neste's largest for Sustainable Aviation Fuel (SAF) to date and one of the largest SAF agreements in the aviation industry."* The challenge of SAF having a long way to go to make dent was clear if this is one of the largest ever SAF deals. We tweeted [LINK] ""*one of the largest ever sustainable aviation fuel deals" is only 1,400 b/d. reinforces challenge for hard to decarbonize #JetFuel. It's not just nowhere near cost competitive, @PPouyanne warned there isn't capacity for any big volume of #Biofuels. [LINK] #OOTT"* So its 1,400 b/d. But we also wanted to put that into context of how many airflights 1,400 barrels of SAF would power. We tweeted [LINK] "1*,400 b/d is approx enough sustainable aviation fuel for three 1-way flights from London to NYC every day. #JetFuel will be hard to decarbonize is an understatement. #OOTT*". Our Supplemental Documents package inclues the Neste release.

TotalEnergies reminds of the land competition/shortage for food vs SAF

We have noted in prior Energy Tidbits the well understood challenge for SAF is that it is hugely expensive relative to regular jet fuel. But the other part that doesn't seem to be understood is that there isn't the available land. Here is what we put in our Oct 3, 2021 Energy Tidbits. "*We believe one of the many overlooked assumptions on the energy transition is that no one seems to be worried that the competition for land for food production will impact feedstock for biofuels. This was another of the direct insights from the Q&A portion of the TotalEnergies investor day was on the big challenge for biofuels like sustainable aviation fuel (SAF) – there is limited amount of land for growth in biofuels. After seeing the JetBlue release, we tweeted [LINK] "#SAF (Sustainable Aviation Fuel, not our SAF Group) news from @JetBlue. Yes, SAF reduces aviation emissions, but note @PPouyanne warning on 1st Generation #Biofuels supply "which is quite limited, in fact on the planet". #EnergyTransition will take longer than expected #OOTT." Mgmt was asked "And I was wondering, how confident you feel that the raw material will be there to fuel such a substantial growth there without really competing on the other side with the role of nature-based solutions and also without the key role of agriculture to supply food for a growing global population." CEO Pouyanne gave a long answer, which included "So in my view, there will be, of course I would say the biofuels are immediately available. So we can begin to make, for example, sustainable aviation fuels with biofuels. I have a first generation or even what I call some wasted animal fats or used cook oil, but there will be a limit to that. Obviously in this type of feedstock, which is quite limited, in fact, on the planet. So and I agree with you that the competition with agriculture and -- will be also limited to the first generation biofuels." Separately, they referred to*

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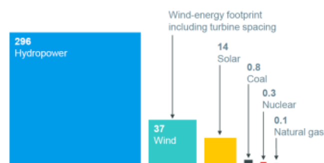
their below chart on one of the challenges for solar and wind is that they need a huge amount of land to produce the same energy as other sources. Our Supplemental Documents package includes the full longer answer."

Figure 32: Land use of relative energy sources

The footprint is also to be considered

Land use required to power a 100W flat TV screen by energy type
(m^2)



Acceptability issues of solar & wind due to their impact on territories and landscape must be overcome

10 | September 2021 – Energy Landscape

Source: van Zalk, John, Behrens, Paul, 2018, The Spatial Extent of Renewable and Non-Renewable Power Generation

Source: TotalEnergies

Energy Transition – Long term SAF demand could lead to supply constraints

Long term SAF supply issues

The TotalEnergies reality check on the ultimate supply of sustainable aviation fuel (SAF) was reinformed on Tuesday with the Platts report [LINK] that supply limitations may potentially constrain growth to 2050 as many countries fall short of their blending targets. This is a good quick read on the limitations of supply. Platts notes that SAF demand by 2050 could climb to 5.8% of global jet fuel demand, with country-level demands concentrated in Europe and the US. Majority of the countries that have already proposed or have adopted blending targets for SAF are EU member states, which will be expected to comply with the EU's yet-to-be-finalized "Fit for 55" package that proposes a 2% SAF blending mandate by 2025, which goes up to 5% by 2030, and 63% by 2050. If all countries were to meet their blending targets, it would imply a 1.14 mmboe/d across all types of SAF fuels. The aviation industry has been deemed a "hard-to-decarbonize" sector and is expected to continue to grow by 2.6% annually, returning to pre-covid levels by 2027. The report noted *"With current delivered SAF supply volumes estimated at just over 200 million gallons, achieving a minimum 17.5 billion delivered volumes by 2050 would require an astonishing 17.3% growth. Given the potential for more countries to announce targets or for blending to occur even in countries without targets in place, this growth requirement could actually be conservative."* S&P is tracking approx. 120 production facilities that are currently operating or in the planning stage; these aggregates amount to a capacity of around 11.5 bn gallons, but in reality, the majority of these facilities will look to maximize the production of renewable diesel rather than SAF. This in addition to the availability of various biomass-based feedstocks is expected to constrain supply growth over time. Below is a chart depicting SAF commercial off take supply commitments. Our Supplemental Documents package includes the S&P article.

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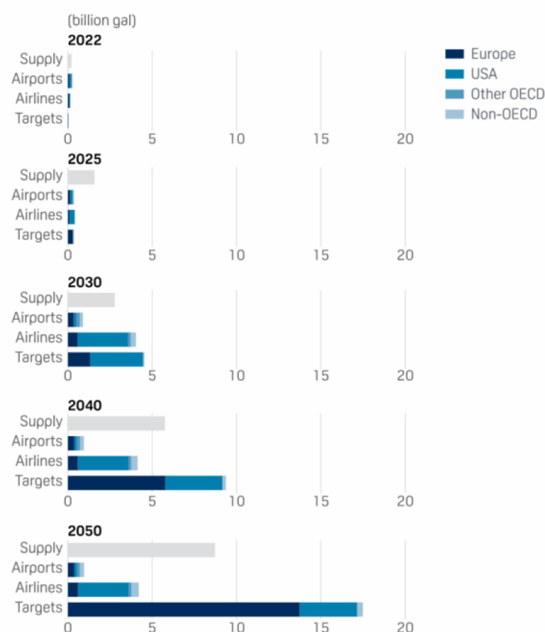
Figure 33: SAF Supply Capacity vs Commercial Offtake Commitments



Source: S&P Platts

Energy Transition – Australia has strong positions & growth in most critical minerals

Australia's critical minerals potential

We continue to be surprised that we don't see, even after Russia/Ukraine, a bigger panic on the supply risk for critical minerals for the 2020s and 2030s. This is not a new issue with Russia. Our concern is that governments and others make these hugely ambitious forecasts for clean energy but don't really seem to focus on the critical metals needed for most of the key items in these clean energy forecasts. This should be top of mind as the governments move to squeeze Russia supply of metals, minerals, oil and gas out of western markets. This week, Australia posted a timely report "2022 Critical Minerals Strategy". The report is basically a sales report on Australia on how they are already a big global critical minerals player and they have huge potential for growth in pretty well all the major critical minerals. Australia goes thru the major minerals and its potential therein. Our Supplemental Documents includes excerpts from the report. [LINK]

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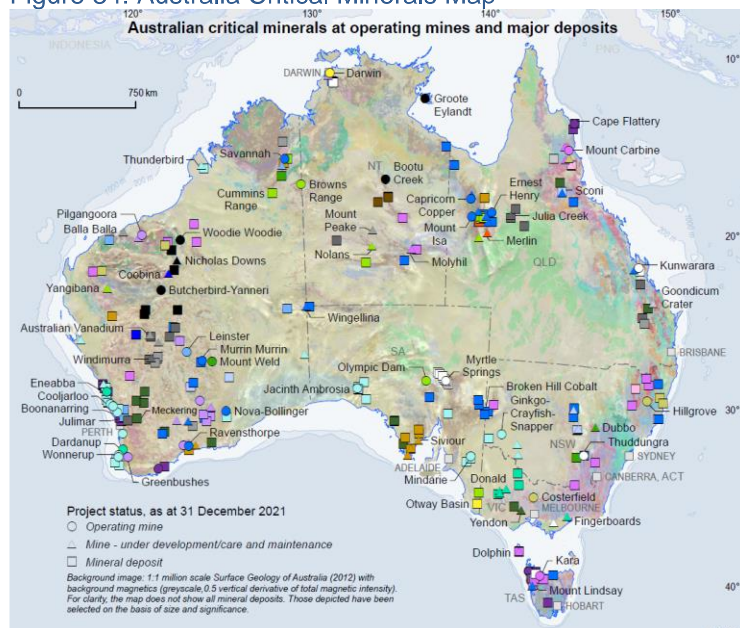
Figure 34: Australia Critical Minerals Map



Source: Australia

Russia's resource impact is also on nickel, palladium and platinum

Russia's impact is big in critical minerals like nickel, palladium and platinum. Last week's (March 20, 2022) Energy Tidbits wrote "*on Friday, we tweeted [LINK] on an excellent Bloomberg recap of Russia's commodity impact on the world. The report included 20 charts that show Russia's importance on oil, petroleum products, diesel, natural gas, LNG, thermal coal, wheat, sunflower oil, fertilizer, nickel, aluminum, palladium, platinum and steel. It is an excellent recap to add to reference libraries. Our Energy Tidbits focus on oil and natural gas, so we thought we would attach the Russia fertilizer charts to our tweet instead of oil and gas. Bloomberg notes that Russia's fertilizer exports account for almost 1/5 of total world fertilizer exports in 2021. Bloomberg said that "Producers such as CF Industries Holdings Inc. in the U.S., Canada's Nutrien Ltd. and Norway's Yara International ASA could benefit if they fill a gap in Russian supply. With spring arriving, the upcoming U.S. corn planting season will give the first real glimpse at how high fertilizer prices will play out for farmers". The problem with that is we just saw (see our March 13, 2022 Energy Tidbits) is that Yara just cut its 2022 fertilizer production due to high natural gas prices. Our Supplemental Documents package includes the Bloomberg report.*

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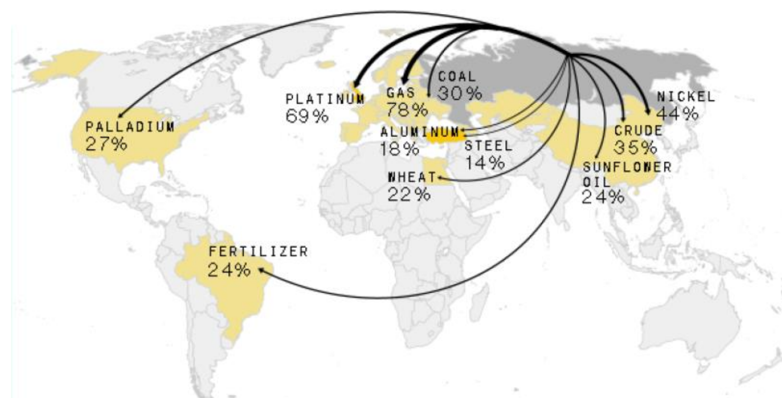
Figure 35: The primary market for Russia commodity exports



Source: Bloomberg

In May 2021, IEA warned critical minerals risk for energy transition

Here is what we wrote in our May 9, 2021 Energy Tidbits. *We have been warning that the big IEA theme will be that the world is behind in where it needs to be to meet its Net Zero and Energy Transition aspirations. This is not a new IEA theme, rather they have been hammering this home for a year. Its one of the reasons why we continue to say the Energy Transition is happening, it will just take longer, be a bumpy road and cost more than the aspirations. On Wednesday, the IEA released a major report "The Role of Critical World Energy Outlook Special Report Minerals in Clean Energy Transitions" [LINK] that reinforced these concerns. The IEA release starts off "Supplies of critical minerals essential for key clean energy technologies like electric vehicles and wind turbines need to pick up sharply over the coming decades to meet the world's climate goals, creating potential energy security hazards that governments must act now to address, according to a new report by the International Energy Agency." The messaging isn't in any doubt here and why we tweeted [LINK] "Path to #EnergyTransition is clear, but demise of #Oil #NatGas won't be as quick as aspirations. Another @fbirol warning not on track to meet #NetZero aspirations. this time critical minerals raising risk of delayed or more expensive #EnergyTransition. Great report @IEA . #OOTT". This is a good report to read and for reference libraries. There are a huge amount of good insights and perspective report. One perspective example is that coal revenues will still be almost double energy transition minerals revenues in 2030. Its not just a potential shortage of critical minerals, it's the concentration of minerals sources that will cause increased security risks ie. China in the below chart. Its why the IEA recommendations include "as well as voluntary strategic stockpiles in some instances". Our Supplemental Documents package includes excerpts from the IEA Executive Summary from the report.*

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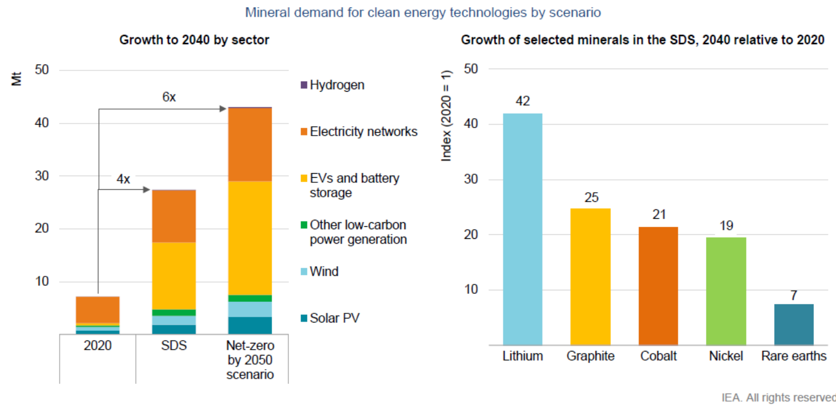
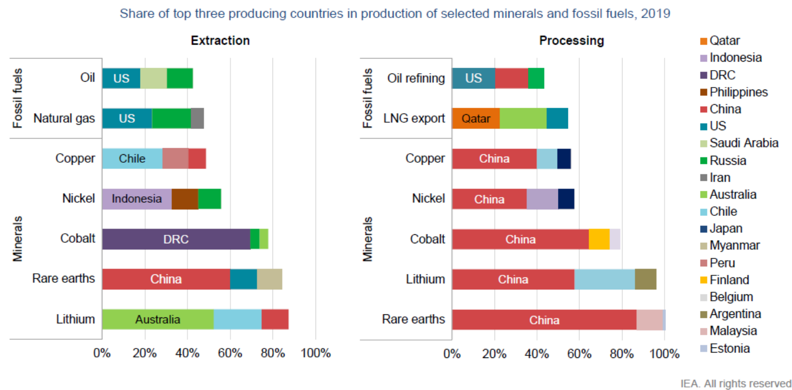
Figure 36: Critical Minerals demand



Source: IEA

Figure 37: Extraction and Processing of Fossil Fuels and Critical Minerals



Source: IEA

Energy Transition – ING, need oil/gas flowing to keep energy security & affordability

ING won't finance new oil and gas fields

This week, we saw another big investor note that they need to keep oil and gas flowing if they want to have a chance at having energy security and affordability. They just don't want anything to do with making sure there is enough oil and gas supply. It looks like the new European oil and gas investing direction for big investors is they don't want to have anything to do with drilling for oil and gas, but they are happy to money in for energy infrastructure to receive oil and gas. They know that they have to invest in oil and gas infrastructure to receive oil and gas, but want to wash their hands of finding and producing the oil and gas. On Monday, ING announced "*ING steps up renewable energy efforts and restricts financing of new oil & gas fields*" [LINK]. ING wrote "*Today we go a step further and announce that we aim to grow new financing of renewable energy by 50% by year-end 2025 and will no longer*

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provide dedicated finance to new oil & gas fields." But they also say "*The restriction announced today refers to dedicated upstream finance (lending or capital markets) for oil & gas fields approved for development after 31 December 2021. At the same time, we will continue to provide financing to clients active in keeping oil and gas flowing, in line with efforts to keep energy secure and affordable during the low-carbon transition*". (i) We tweeted [LINK] *"Translating ING's new financing approach. We don't want Europeans mad at us for supporting dirty drilling. But want to make sure EU can take more #Oil #NatGas #LNG so Europeans see we are doing all we can to "keep energy secure & affordable during the low-carbon transition" #OOTT.*" ING says they won't finance any new oil and gas fields, but provide financing to keep oil and gas flowing. (ii) ING admits they need to keep oil and gas flowing to keep energy security and affordability. ING said "*The restriction announced today refers to dedicated upstream finance (lending or capital markets) for oil & gas fields approved for development after 31 December 2021. At the same time, we will continue to provide financing to clients active in keeping oil and gas flowing, in line with efforts to keep energy secure and affordable during the low-carbon transition*." This is kind of the box the developed countries have put themselves in because the overestimated their ability to meet the aspiration of the energy transition. So they set policy that takes capital away from E&P. and now realize they need oil and gas for longer. So have to say they will support any items to keep oil and gas flowing to have secure and affordable energy. (iii) ING also said "*The best way to reduce dependency on fossil fuels is to make sure there are enough affordable green alternatives available".* We suspect he either didn't live thru the Arab Oil Embargo 1973-74 or just forgot that the best way to reduce dependency on fossil fuels is to reduce demand. And when there is a shortage, people learn how to do with less. Our Supplemental Documents package includes the ING release.

Energy Transition – City of Chicago won't invest in E&P part of oil and gas sector

Chicago won't invest in E&P

On Thursday, we tweeted [LINK] *"#Chicago joins the movement of we don't want anything to tie us to capital to #Oil #NatGas #Coal producers, but we won't/can't say we don't want/need supply thereof because we need to have secure and affordable energy. #OOTT*". The City of Chicago joins the list of investors that are specific and say they will not invest in any E&P companies, but do not extend that group to midstream, pipeline or power generation related to oil and gas. They want to be able to say they kept their hands clean and clear of E&P but also realize they need natural gas to survive. Imagine Chicago without enough natural gas in the winter? Our tweet included excerpts of the Chicago rule, which said "*The written investment policy shall include a list of the top companies that are coal, oil, and gas reserve owners, ranked by the potential carbon emissions embedded in their reserves, which shall be updated by the Treasurer, at least annually. The Treasurer shall annually report to the Committee on Finance any changes, or whether there have been no changes, to the list. The Treasurer shall not invest any City funds in securities or other obligations of the companies on the list and shall divest from all securities or other obligations of the companies on the list, as soon as practicable or in accordance with the written investment policy."*

Capital Markets – Canada's first $5 bn green bond issue excl nuclear, natural gas

Canada issues first green bond

Another good indicator for the Liberals view on nuclear and natural gas comes from the Wednesday announcement [LINK] that Canada has successfully issued its inaugural 7.5-yr green bond to fulfill the governments commitment to issue the $5 bn bond within the fiscal year. The Green bonds are intended to support Canada's green transition by offering

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investment opportunities in both climate and environmental measures, while also fostering the development of Canada's sustainable finance market. The framework, announced Mar 3 [LINK], is expected to mobilize private sector investment that will play a crucial role in reducing emissions to the 2030 target, and net zero by 2050 including thru expanded clean transportation, and an increase in Canada's renewable energy production. The Liberals view on nuclear and natural gas comes while looking at the green bond framework [LINK] as to what is an eligible green expenditure or a specifically excluded expenditure/area. Eligible green expenditures include clean transportation, home energy efficiency grants and renewable energy programs. The summary of industries that are excluded are transportation, exploration and production of fossil fuels, nuclear energy, arms manufacturing, gambling and alcohol/tobacco products. Liberals said their categories are consistent with the world, but, as previously noted, Europe made nuclear and some natural gas eligible in their taxonomy of eligible green expenditures. The government release states *"The Government of Canada recognizes that no credible plan to achieve significant emissions reductions by 2030, and net zero emissions by 2050, can ignore the emissions-reduction and innovative potential of heavy industry, including the Canadian energy sector, nor the intersection between ambitious decarbonization and ensuring a just transition and economic opportunity for communities and individuals across Canada. The Government of Canada remains committed to supporting decarbonization, nature conservation and environmental quality in all sectors and Canadian regions."*

Capital Markets – Biden to open the flood gates with his 1st version of wealth tax

Biden to introduce a wealth tax?

It looks like Biden is opening the flood gates in North America for a wealth tax of some form. And it's hard not see this on the agenda for consideration at the state level and also in Canada. And don't forget what tends to happen is that this new revenue stream will creep higher and inevitably be expanded to include more "eligible" households Plus it doesn't mean the structure will inevitably be modified. Yesterday, the Washington Post reported [LINK] "*President Biden to unveil new minimum tax on billionaires in budget" and "The "Billionaire Minimum Income Tax" plan under President Biden would establish a 20 percent minimum tax rate on all American households worth more than $100 million, the document says. The majority of new revenue raised by the tax would come from billionaires."* No question Biden is trying to satisfy the left side of his party with a wealth tax, but we suspect that he will inevitably have to give in on making it a tougher wealth tax. Our Supplemental Documents package includes the Washington Post report.

Unintended consequences will be a lot of quickie divorces

Upon seeing the Washington Post report, we tweeted [LINK] "*Unintended consequence - pickup in quickie "divorces" if it gets them separately <$100mm wealth mark. ie. household $150mm with $15mm income would save $3mm/yr. That would cover a lot of flying private & much more. Great scoop @JStein_WaPo".* As reported, this tax will be applied to households with over $100 mm wealth. We fully expected quickie uncontested divorces to make get the household wealth down below $100 mm. In fact, in light of the wealth tax chatter last fall, we expect many wealthy households have ready to be filed divorces that will happen in the coming days/weeks. The simple example we used was a household with $150 mm wealth and $15 mm income, they would save $3 mm per year by divorcing. That's more than enough to pay for all their private flying every year and more.

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Capital Markets – USDA consumer price index for food +7.9% YoY

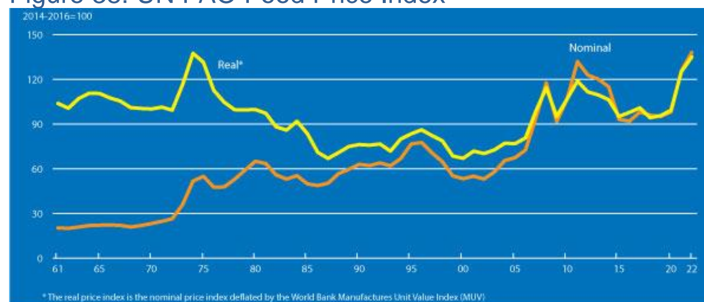
USDA consumer price index for food

Whenever we see the US government food price data, we still keep asking our friends who live in the US if they believe their food bills are only up, in this case 7.9% YoY. The common response was laughter and that they believe their grocery bills are up at least 15 to 20% YoY. We like to keep asking to get real people feedback if they are feeling this low a price escalation. We doubt anyone believes their grocery bills are only up 7.9% YoY. The USDA released its monthly food price index data for Feb on Friday [LINK], and we wanted to hear their reaction to the USDA numbers. The USDA posted its consumer price index for food data for Feb, which is +1.0% MoM and +7.9% YoY; while this is an increase MoM, it still seems low given the rapidly increasing grocery bills being reported. This is for the overall food price index, which weights various changes like beef/veal +16.2% YoY, pork +14.0%, eggs +11.4% with changes like fresh vegetables +7.6% YoY, dairy products +5.2% YoY and cereals & bakery products +7.8% YoY. We also just don't see how the USDA won't be low in their 2022 forecast which predicts price escalation between 4.5-5.5% throughout the year.

Recall UN FAO Food Price Index for Feb was +20.7% YoY

Our Mar 13, 2022 Energy Tidbits highlighted the Mar 10 release of the UN FAO Food Price Index [LINK] titled "*The FAO Food Price Index rises to a new all-time high in February.*" Note this is on a real price basis. The FFPI averaged 140.7 points for Feb 2022, which was +3.9% MoM and +20.7% YoY. All food categories registered monthly increases. The Cereal Price Index was +3.0% MoM and +14.8% YoY and Dairy Price Index that was +6.4% MoM and +24.8% YoY The Vegetable oil Index was up 8.5% MoM marking an all time high. Below is the all time FFPI graph.

Figure 38: UN FAO Food Price Index



Source: UN

Capital Markets – IFIC: Mutual funds and ETF assets +0.1% in February

Mutual Fund & ETF assets increase MoM

On Wednesday, the IFIC (Investment Funds Institute of Canada) reported [LINK] mutual funds and ETF sales for February. IFIC does not provide any commentary on the numbers but there should be no surprise that the assets are down. Energy stocks had another good month in February, but broad markets were down in February ie. Nasdaq -3.3%. So market price decreases accounted for majority of the overall decrease in net assets as Russia invaded Ukraine. For February, the IFIC reported "*Mutual fund assets totalled $1.997 trillion at the end of February 2022. Assets decreased by $24.6 billion or 1.2% compared to January 2022. Mutual funds recorded net sales of $9.9 billion in February 2022. ETF assets totalled*

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$317.1 billion at the end of February 2022. Assets increased by $0.2 billion or 0.1% compared to January 2022. ETFs recorded net sales of $4.0 billion in February 2022." Our Supplemental Documents package includes the IFIC release.

Demographics – China's low marriage rate means lower birth rates ahead

Good reminder to get quality sleep

For years, we have been highlighting that China's population is now turning to an aging population. And to top it off, it looks like low birth rates will be a theme in 2022 and 2023. The leading indicator is the Chinese marriage rates as most births happen in married couples. And the number of Chinese couples getting married fell sharply in 2021 which experts believe will likely lead to a decline in China's birthrate. The Global times reported on Sunday [LINK] that a total of 7.63 million couples registered to get married across the nation in 2021, a record low for the past 36 years since 1986 when the Ministry of Civil Affairs started to release such statistics. Since most children in China are born out of marriage, the decline will inevitably result in a decline in the birthrate. According to expert He Yafu, the marriage rate has been declining for the last 8 years due to a declining number of young people, more men than women of marriageable age and the decision to put off marriage until they are older. Another factor playing into the lower marriage rate is the rising economic and educational development of women which lead to a willingness of marriage being lower than that of their male counterparts. The divorce rate ion 2021 also dropped which is a temporary effect of caused by the new cooling-off period stipulated by the newly enacted civil code last year. A total of 2.14 million couples registered their divorce across the nation in 2021, only accounting for 57.3 percent of the total number of 3.73 million couples in 2020. Due to the low birthrate and the insufficient childbirth encouragement policies in China, China is expected to experience negative population growth in 2022. Our Supplemental Documents package includes the Global Times article.

Demographics – Good reminders about need to get good sleeps

Good reminder to get quality sleep

World Sleep Day was on March 18 which was created and hosted by the World Sleep Society [LINK] and serves as an important reminder as to the importance of healthy sleep in your daily routine. They posted some good reminders about sleep The three elements of a quality sleep are: sufficient duration, seamless without fragmentation and deep enough to be restorative. We were interested by the Facts about Regular Sleep and Health section which noted "*Irregular sleepers have delayed sleep timing and more daytime sleep… Reduced sleep duration has been shown to cause impairments in working memory, executive function, processing speed, and cognitive throughput."* The impact of the Covid-19 Pandemic has highlighted many issues in the quality of sleep in which people are getting with 35% indicating they do not get enough sleep citing a significant impact to their physical and mental health. In reference to sleep disorders, those who experience insomnia represent 30-45% of the adult population. This lack of quality of sleep leaves individuals more vulnerable to accidents with insomniacs seven time more likely to be involved in an accident-causing death or serious injury than good sleepers.

Demographics – Texas, Florida & Arizona counties show biggest population growth

Population growth by US county

On Thursday, the US Census Bureau released "*Over Two-Thirds of the Nation's Counties Had Natural Decrease in 2021*". [LINK] It notes all the population changes in every US county. This is a numbers report and the only commentary outside of strict number changes was "*In many cases, there was a shift from larger, more populous counties to medium and*

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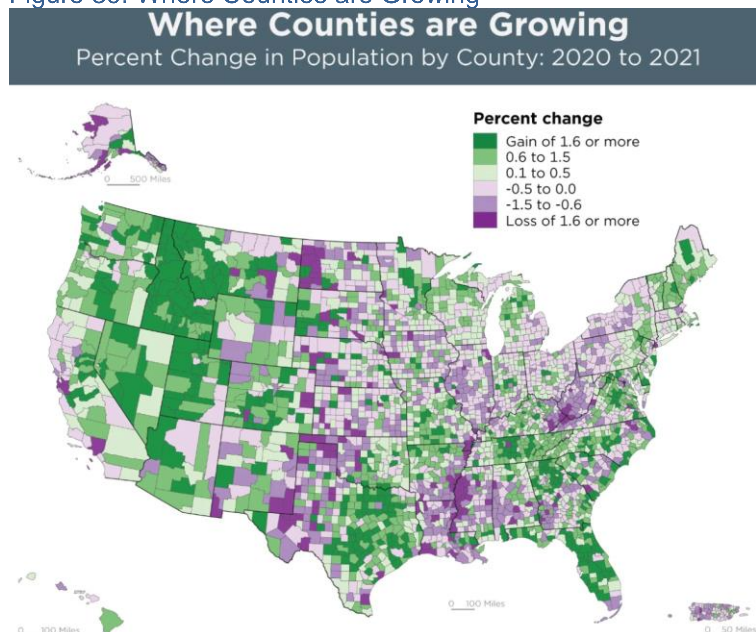
smaller ones." A few other items that jumped out. (i) An aging population. They say 73% of the US's 3,143 counties had "natural decrease" in population in 2021 ie. where more people died than were born. (ii) They don't give reasons, but we have been highlighting the population shift from higher tax regions like California and New York to low or no state income tax regions like Texas, Florida and Arizona. The numbers support these trends. For example, 8 of the top 10 counties with the largest net population gains in 2021 were in Texas (5), Florida (2) and Arizona (1). And 8 of the top 10 counties with the largest net population losses in 2021 were in California (4) and New York (4).

Figure 39: Where Counties are Growing



Source: US Census Bureau

Demographics – Visual Capitalist's map of World Happiness Report 2022

World Happiness Report 2022

As usual, the better messaging value from a good graphic was clear this week especially when graphic experts create the graphic. This was evident when we saw the Visual Capitalist graphic on the 10th anniversary report of the World Happiness Report 2022. [LINK] Last week's (March 20, 2022) Energy Tidbits highlighted the report and our disappointment to see how Canadians in these results led to a huge drop in Canada's ranking of the world's happiest places to live and our lowest ranking ever. We dropped to #15. We created a little table of the top and bottom of the rankings. But this week, Visual Capitalist [LINK] did their thing and created the below map.

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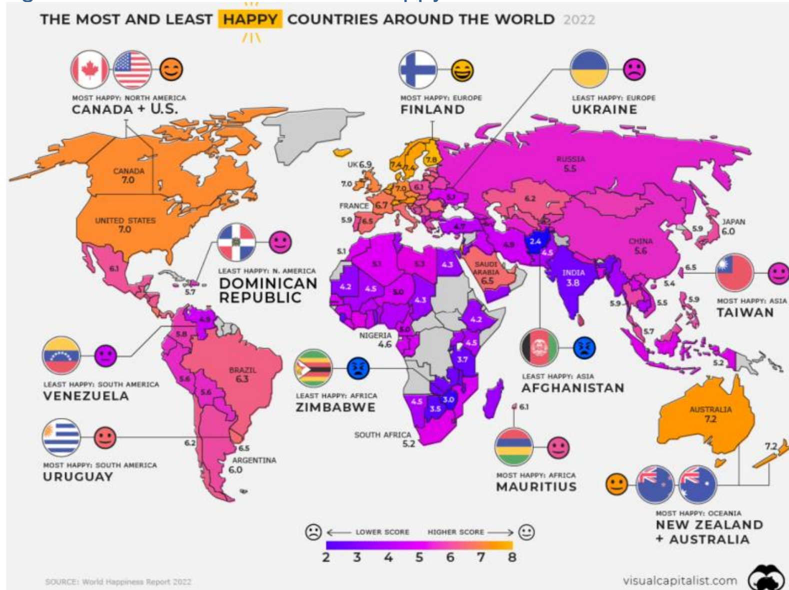
Figure 40: The Most and Least Happy Countries Around the World



Source: Visual Capitalist

Twitter – Look for our first comments on energy items on Twitter every day

@Energy_Tidbits on Twitter

For new followers to our Twitter, we are trying to tweet on breaking news or early views on energy items, most of which are followed up in detail in the Energy Tidbits memo or in separate blogs. Our Twitter handle is @Energy_Tidbits and can be followed at [LINK]. We wanted to use Energy Tidbits in our name since I have been writing Energy Tidbits memos for over 20 consecutive years. Please take a look thru our tweets and you can see we aren't just retweeting other tweets. Rather we are trying to use Twitter for early views on energy items. Our Supplemental Documents package includes our tweets this week.

LinkedIn – Look for quick energy items from me on LinkedIn

Look for energy items on LinkedIn

I can also be reached on Linkedin and plan to use it as another forum to pass on energy items in addition to our weekly Energy Tidbits memo and our blogs that are posted on the SAF Energy website [LINK].

Misc Facts and Figures.

During our weekly review of items for Energy Tidbits, we come across a number of miscellaneous facts and figures that are more general in nature and often comment on sports.

Two Canadians in the hunt on PGA and LPGA closing day

Have to give a shout out to our Canadian golf pros in the hunt today. Corey Connors is in the semi-finals vs Kevin Kisner in the PGA World Golf Championships-Dell Technologies Match Play. He tees off 7:20am MT, which is just after our 7am MT news cut off, The winner will face the other semi-final winner in the Dustin

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Johnson/Scottie Scheffler match. Maude-Aimee Leblanc is tied for 3rd at the LPGA JTBC Classic. She is at -10 so four shots off the leader Nanna Koerstz Madsen who is along at -14. We will be cheering big time for her as she goes for her first win.

Canadian Forces Snowbirds

One of the items we missed last July was that July 11, 2021 was the Golden (50th) anniversary of the first airshow for the Canadian Forces Snowbirds on July 11, 1971 at their home base of CFP Moose Jaw, Saskatchewan. [LINK] The Snowbirds were the preceded by Siskins, RCN Grey Ghosts, RCAF Golden Hawks, and Canadian Armed Forces Golden Centennaires. We hadn't realized that we knew Peter Zebedee, who moved this week from LNG Canada to Suncor, was the son of Doug Zebedee. This is why we thought of the Snowbirds as, after the Snowbirds, we got a chance to meet Doug as he ended up flying with Air Canada and privately based out of Calgary.

Figure 41: Original Canadian Forces Snowbirds 1971

The original Snowbird pilots, from left: Capt Fred McCague, Lt Chester Glendenning, Capt Laurie Illingworth, Lt George Hawey, Capt Mike Marynowski, Capt Lloyd Waterer, Capt Tom Gernack, Capt Bob Sharpe, and Lt Doug Zebedee. In the cockpit: Capt Gord Wallis and Maj Glen Younghusband. DND Photo

Source: Canadian Government

Reminder of Exxon Valdez tanker oil spill 33 years ago

While watching one of the BBC Earth shows this week (yes, it's nerdy but good background noise while working after markets), there was a mention that there were still some oil spill pockets from the Exxon Valdez tanker spill. We haven't noted that spill for a couple of years, and this week happened to be the 33rd anniversary of when the Exxon Valdez tanker ran aground in Prince William Sound, Alaska on March 24, 1989. The Valdez spilled 11 million gallons of oil. NOAA wrote [LINK] "*The ecologically sensitive location, season of the year, and large scale of this spill resulted in one of the largest environmental disasters in U.S. history. Exxon settled in 1991 with funds disbursed in three discrete parts: criminal plea agreement ($25 million), criminal restitution ($100 million), and civil settlement ($900 million).*" The

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Exxon Valdez also changed the standard for oil tankers. It led to the Oil Pollution Act of 1990, which specified the phasing out of single-hull tankers in US waters, requiring all new tankers and tank barges to be built with double-hulls.

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