SAF GROUP

Energy Tidbits

Feb 20, 2022

Produced by: Dan Tsubouchi

Good Time For JCPOA Deal This Week With Biden's State of the Union on March 1

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. Does anyone believe Biden wants to say no JCPOA deal in his State of the Union on March 1? (Click Here)

2. It continues to be a winter of very high wind power generation in Europe. (Click Here)

3. Trans Mountain expansion costs are +70% to $21.4b, and delayed 1 yr to late 2023 (Click Here)

4. Escalation in protests up to a violent attack on a Coastal GasLink site (Click Here)

5. Moving into the seasonal period ahead of asphalt/paving season when WCS-WTI differentials tend to narrow (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].

Dan Tsubouchi
Principal, Chief Market Strategist
dtsubouchi@safgroup.ca

Ryan Dunfield
Principal, CEO
rdunfield@safgroup.ca

Aaron Bunting
Principal, COO, CFO
abunting@safgroup.ca

Ryan Haughn
Principal, Energy
rhaughn@safgroup.ca

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Natural Gas – Natural gas draw of 190 bcf, storage now -404 bcf YoY deficit

YoY storage at -404 bcf YoY deficit

Gas draws have increased as the colder weather has settled in across the US. The EIA reported a 190 bcf draw (vs 194 bcf draw expectations) for the Feb 11 week, which was above the 5-yr average draw of 111 bcf, and below last year's draw of 237 bcf. Storage is 1.911 tcf as of Feb 11, decreasing the YoY deficit to -404 bcf, from 444 bcf last week and storage is 211 bcf below the 5-year average vs 215 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 (02/11/21)		5-year average (2017-21)	
Region	02/11/22	02/04/22	net change	implied flow	Bcf	% change	Bcf	% change
East	435	485	-50	-50	491	-11.4	471	-7.6
Midwest	496	552	-56	-56	600	-17.3	565	-12.2
Mountain	114	121	-7	-7	139	-18.0	124	-8.1
Pacific	177	181	-4	-4	246	-28.0	202	-12.4
South Central	689	763	-74	-74	839	-17.9	800	-13.9
Salt	173	207	-34	-34	237	-27.0	249	-30.5
Nonsalt	516	556	-40	-40	602	-14.3	551	-6.4
Total	**1,911**	**2,101**	**-190**	**-190**	**2,315**	**-17.5**	**2,162**	**-11.6**

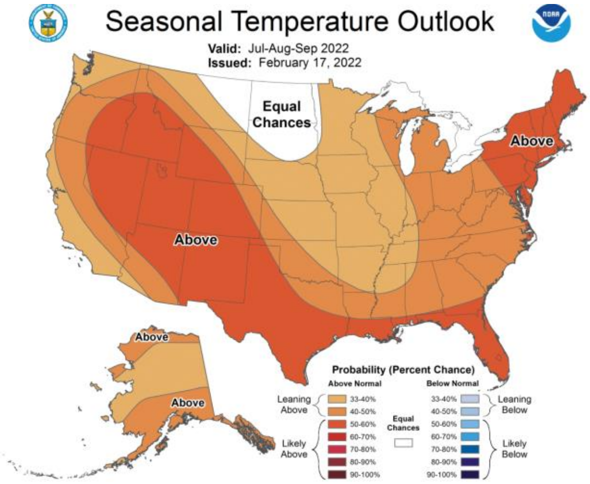
Source: EIA

Natural Gas – NOAA's early look to summer is for hot weather

NOAA forecasts hot summer

NOAA's Thursday monthly update to its seasonal temperature forecasts [LINK] also includes a look ahead to the summer. It is still early but the outlook for the summer is still looks very hot with the JAS forecasted temperatures expected to be well above average temperatures; this is supportive of natural gas prices as Americans look to stay cool in the summer heat. Below are the temperature probability maps for and for JAS.

Figure 2: NOAA JAS Temperature Probability Forecast



Source: NOAA

Natural Gas – EIA, US shale/tight natural gas shows increase J/F/M

Shale/tight gas continue to increase

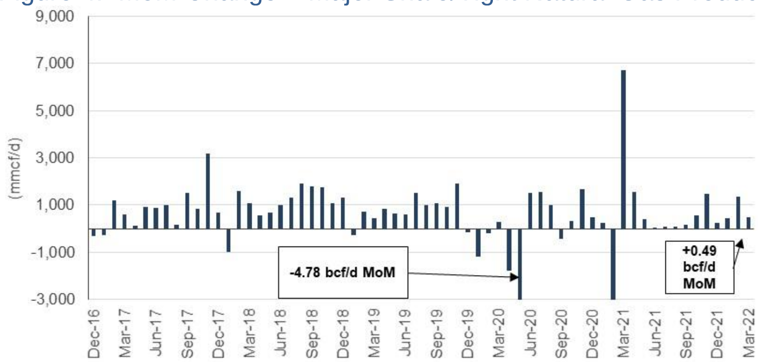
No one should be surprised to see the shale/tight plays are increasing production levels. On Monday, the EIA issued its Drilling Productivity Report February 2021 [LINK], which is the EIA's forecast for oil and natural gas production from the major shale/tight oil and gas basins for the current month (in this case Feb) and the next month (in this case Mar). (i) The key takeaway remains that US shale gas continues to increase off the bottom in May. The EIA forecasts Mar at 91.686 bcf/d which is +0.499 bcf/d MoM (would have been +1.471 bcf/d MoM if not for the +972 bcf/d revision to February) and up +4.802 bcf/d from the Nov/19 peak of 86.884 bcf/d. (ii) This month, all basins increased except for Anadarko (-0.005 bcf/d MoM). Bakken and Eagle Niobrara showed increases, but Bakken and Niobrara were basically flat MoM. The largest increases came from Haynesville (+0.174 bcf/d MoM) and Permian (+0.124 bcf/d MoM). (iv) All basins are now up YoY, with the most notable YoY increases being Haynesville +1.901 bcf/d YoY and Permian +2.896 bcf/d YoY. Total US shale/tight natural gas production is +7.022 bcf/d YoY for Mar. (v) Remember US shale/tight gas is ~90% of total US natural gas production. So whatever the trends are for shale/tight gas are the trends for US natural gas in total. Below is our running table showing the EIA DPR data for the shale/tight gas plays, and the MoM changes in major shale/tight natural gas production. Our Supplemental Documents package includes the EIA DPR.

Figure 3: MoM Change – Major Shale/Tight Natural Gas Production

												2022				
mmcf/d	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Mar YoY	Mar less Feb
Anadarko	5,257	6,163	6,082	5,992	5,919	6,129	6,192	6,139	6,107	6,203	6,321	6,278	6,341	6,336	173	-5
Appalachia	34,894	34,823	34,685	34,619	34,586	34,364	34,366	34,783	34,838	35,601	34,825	34,988	35,716	35,830	1,007	114
Bakken	2,747	2,916	2,851	2,787	2,732	2,798	3,005	3,003	3,004	3,012	3,071	3,150	3,137	3,147	231	10
Eagle Ford	5,036	5,723	5,660	5,610	5,589	5,842	5,971	5,990	5,994	5,950	6,012	6,118	6,176	6,254	531	78
Haynesville	11,302	12,564	12,699	12,826	12,942	13,337	13,413	13,415	13,514	13,778	13,874	14,019	14,291	14,465	1,901	174
Niobrara	5,104	5,014	4,967	4,922	4,882	4,960	5,032	5,090	5,183	5,308	5,329	5,339	5,293	5,297	283	4
Permian	14,164	17,461	17,499	17,543	17,602	18,030	17,947	18,700	19,027	19,298	19,573	19,936	20,233	20,357	2,896	124
Total	78,503	84,664	84,444	84,300	84,252	85,460	85,926	87,120	87,667	89,150	89,005	89,828	91,187	91,686	7,022	499

Source: EIA, SAF

Figure 4: MoM Change – Major Shale/Tight Natural Gas Production



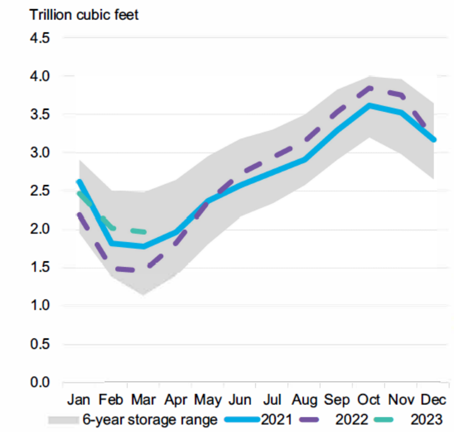
Source: EIA, SAF

Natural Gas – BloombergNEF forecasts higher YoY gas storage for winter 22/23

BNEF US gas monthly

BloombergNEF released their "US Gas Monthly Report" which is a good report to flip through for a look at US natural gas. BNEF tightened their view of end of winter 2021/2022 storage in expectation of strong heating demand and production freeze offs. Industrial gas demand for Jan came in at 27.7 bcf/d, +4.1 bcf/d higher than the 5-year avg of 23.6 bcf.d. Residential and commercial consumption in Jan was 1.0 bcf/d higher than the Dec report and BNEF increased its Feb forecasted consumption by 0.4 bcf/d, tightening the winter year end stocks. As a result. winter 2021-22 is forecasted to bring 93HDD below normal levels assuming the 10 year normal weather holds for the remainder of the season. Winter 2021-22: forecasts 1,464 bcf end-of-winter inventory view is 314 bcf lower than last month's forecast. The difference is driven by a recovery in rescom and industrial demand. However, the updated look at US gas storage is negative as BNEF forecasts winter 2022-23 to have storage beginning at 3,843 bcf (up 22 bcf from last month's forecast and up 229 bcf YoY) due to increased lower 48 production and higher gas prices. The other negative is BNEF forecasts end of winter 2022-23 gas storage at 1,971 bcf which is 286 bcf above last months report and +506 bcf YoY. Our Supplemental Documents package includes excerpts from the BloombergNEF report.

Figure 5: Natural gas inventory forecast 2021-23



Source: BloombergNEF

Natural Gas – EQT reminds Granholm $30 natural gas in New England are self inflicted

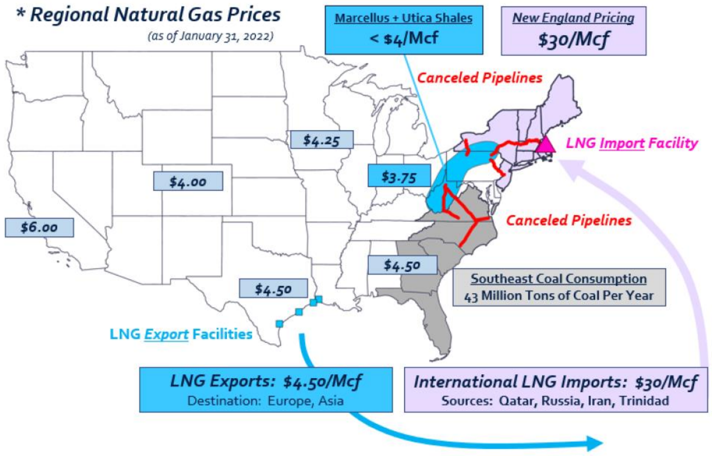
EQT letter to Granholm

The EQT CEO letter to Secretary Granholm is a good read. CEO Rice wrote Granholm in response to the US Senators urging her to limit US LNG exports and examine their impact on domestic energy prices. He reminds Granholm of the obvious – the success in stopping natural gas pipelines in New England means imported LNG instead of Appalachia natural gas. We tweeted [LINK] "*unfortunately, a great reminder the $30 #NatGas price in New England is self inflicted. Hopefully @SecGranholm takes the 10 minutes to read the @Shalennial letter even if just to understand the situation as it will come up next winter unless its a warm winter. #OOTT.*" He writes "*New England's "Canceling" of Natural Gas Infrastructure is the Cause of Recent Price Inflation. It is difficult to look past the fact that seven of the ten signatories to the February 2nd Letter hail from New England, as well as the timing of their letter. The weekend before the February 2nd Letter, natural gas pricing in New England reached levels that were among the highest in the world, approaching $30/mcf. At the same time, prices in Pennsylvania (and most of the United States) were around $5/mcf, below the 20-year average.*" And "*The problem is very straight forward: the pipelines heading to New England are full, and as a result, we cannot physically flow that gas needed to meet growing demand without more infrastructure. That's it.2 And the way to solve this problem is* *equally straight forward: allow the completion of pipeline projects such as those in the table noted above, many of which are substantially complete, and let us provide the natural gas … while also reducing New England's emissions. The True Impact of the Infrastructure "Cancelation" Movement. What we are seeing play out in New England is the result of a symbolic attempt to address climate change by canceling pipelines, thereby isolating itself from domestic supply. I say "symbolic" for a few reasons. At the time, it was argued that the natural gas that the pipelines would deliver was not necessary, and that lower emissions alternatives were all that was needed. In reality, though, since canceling the first natural gas pipeline that would have accessed New England, the consumption of natural gas by the region has increased, not decreased. The consequence has been that New England has had to look to foreign natural gas to meet its energy needs. New England is the only region remaining in the United States that is importing LNG from foreign sources. Rather than relying on natural gas sourced from Appalachia with some of the lowest methane emissions and smallest carbon footprints on the planet, New England instead has to source foreign supply shipped from over 2,000 milesaway. Not only has the cancelation movement resulted in New England's natural gas being the least responsibly-sourced with the highest emissions in the United States, it has also caused the region to be subject to international LNG pricing. This is the reason New Englanders are paying five times more for natural gas than their neighbors."* Below is Rice's recap of regional natural gas prices as of Jan 31, 2022. Our Supplemental Documents package includes EQT CEO letter.

Jones Act waivers would help lower New England natural gas prices

We agree with EQT that the lowest price natural gas supply for New England would be Appalachia natural gas if the US and states didn't hold up or cancel natural gas pipelines. But there is one other way that Biden could make a big dent in the price of natural gas in New England = Jones Act so any LNG tankers can move US LNG into New England. Many forget that the Jones Act covers all tankers including oil, petroleum products and LNG. This is not a new view. Rather, on Nov 9, 2021, we tweeted [LINK] "*if @POTUS @SecGranholm want to help on winter #NatGas home heating costs, how about waiving #JonesAct so NE US aren't forced to import #LNG at high spot LNG prices & can try for US LNG from Gulf Coast. @BrynneKKelly recaps NE US LNG imports at [LINK] #OOTT."* In our Nov 14, 2021 Energy Tidbits, we wrote "*US NE still imports LNG, Jones Act prevents US Gulf Coast LNG. One other reminder is that the US still imports LNG in the winter into the NE US. The EIA STEO forecasts US LNG "gross" exports to increase from 6.53 bcf/d in 2020 to 9.81 bcf/d in 2021 and then to 11.49 bcf/d in 2022. US LNG imports are modest forecast at 0.10 bcf/d in 2021 and 0.23 bcf/d in 2022. These LNG imports are into the NE US during winter for unpredictable weather related demand. And unfortunately, these LNG imports are likely at spot LNG prices and not at HH prices. The question is why does the US import LNG? its because of the Jones Act. On Tuesday, we tweeted [LINK] "if @POTUS @SecGranholm want to help on winter #NatGas home heating costs, how about waiving #JonesAct so NE US aren't forced to import #LNG at high spot LNG prices & can try for US LNG from Gulf Coast. @BrynneKKelly recaps NE US LNG imports at [LINK] #OOTT". The Jones Act means that only US owned, flagged and crewed LNG tankers can deliver US LNG from the Gulf Coast to the NE US. And the few such LNG tankers are really just small volume LNG refuelling* *tankers. As a result, Cheniere cannot ship its LNG to the NE, rather has to send to Asia*

Figure 5: Regional Natural Gas Prices as of January 31, 2022



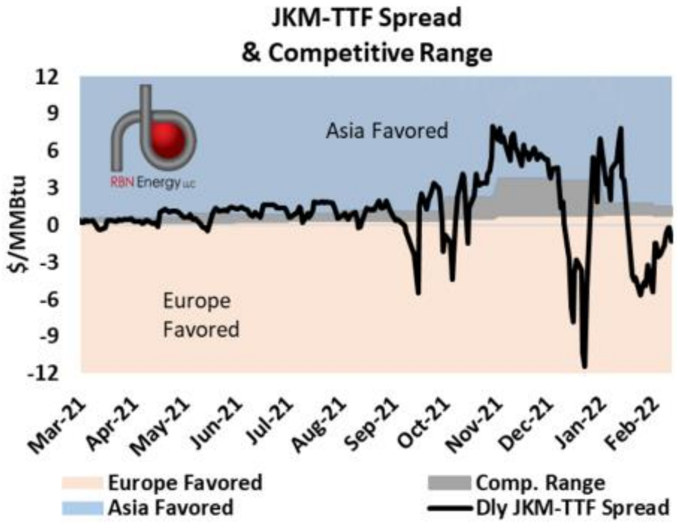
Source: EQT

Natural Gas – RBN blog: how prices steer US LNG to different destinations

RBN blog on US LNG cargoes

RBN posted a good blog on Tuesday titled *"Upside Down - How Global Prices Steer U.S. LNG To Different Destinations"* [LINK] which gives a good overview of the current LNG market. The blog is a good explanation of relative Asian vs Europe natural gas prices and how US LNG cargos move relative to the price differential. The tight market has led to producers looking to capitalize on higher prices by increasing LNG cargoes as well as spurred demand for new long-term sales and purchase agreements (SPAs), particularly in Asia, creating momentum for a potential new wave of LNG development. US LNG production is at an all time high. The crazy spike LNG prices in early Dec are gone, but LNG prices remain elevated compared to previous years. One of the most important characteristics of U.S. LNG is its destination flexibility. Contracts and government regulations allow offtakers to market to any country not under U.S. sanctions and a diverse group of offtakers hold long-term contracts for U.S. LNG. Utilities hold just under 40% of U.S. long-term offtake agreements, split evenly between Europe and Asia. Destination flexibility is impacted by price in which offtakers adjust their cargo purchases, as was observed during the LNG crash associated with the pandemic. There is also a lot of wiggle room in the market. If the price spread between Europe and Asia gets wide enough, even utilities have been known to resell and reroute cargoes. Shipping is an important factor in price spreads as the proximity to the US Gulf Coast impacts the additional fees associated with transport to the destination. While end users don't instantly respond to changes in the price spread, and decisions about lifting cargoes can be made months in advance, looking at the price spread over time in the context of shipping differentials is highly predictive of where US exports land. When the JKM was higher over the summer, US cargoes favoured Asian offtakers as the higher transport costs were offset by a higher price spread. This fall we watched the TTF soar and in some instances, surpass the JKM and the US cargoes began ramping up to Europe throughout the fall. With the TTF now trading well above the JKM since mid January, US cargoes are overwhelmingly headed to Europe with demand expected to remain high due to the record low levels of gas stockpiles in Europe. Below is an RBN graphic depicting the price spread in a shipping differential context. Our Supplemental Documents package include the RBN blog.

Figure 7: JKM-TTF Price Spread



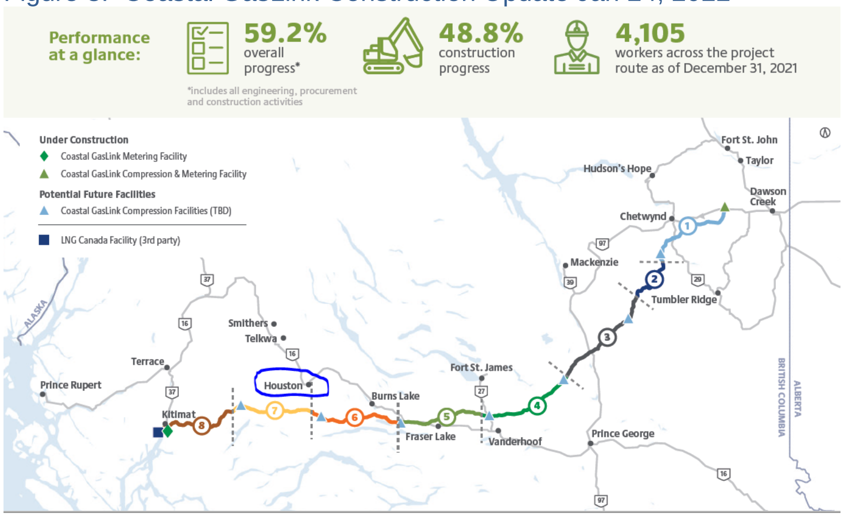
Source: RBN

Natural Gas – Anti Coastal GasLink pipeline protests turn violent

Violent attack on Coastal GasLink site

There was a big change in peaceful protests in Canada escalating into violence but it wasn't the truckers protests in Ottawa or at the Ambassador Bridge that led to the Liberals involving the Emergencies Act. Rather it was anti-Coastal GasLink side attack on a BC worksite for the natural gas pipeline. (i) We worry that it only just escalates from here unless there is some sort of resolve that causes the protestors to stop a further escalation. Not only did they attack the worksite and workers, they attacked the police. And without a stopping of an escalation, this could turn out to be an inflection point that leads to delays in Coastal GasLink and potentially LNG Canada Phase 1. (ii) On Thursday, Coastal GasLink reported [LINK] "*During the early morning hours of Feb. 17, 2022, approximately 20 masked and violent attackers wearing camouflage surrounded and attacked Coastal GasLink workers in a highly planned and dangerous unprovoked assault. It happened near the Morice River drill pad site off the Marten Forest Service Road — the location of a former blockade and opposition camp last year that lasted 59 days. This coordinated and criminal attack from multiple directions threatened the lives of several workers. In one of the most concerning acts, an attempt was made to set a vehicle on fire while workers were inside. The attackers also wielded axes, swinging them at vehicles and through a truck's window. Flare guns were also fired at workers. Workers fled the site for their own safety and remain shaken by this violent incident. Fortunately, there were no physical injuries to Coastal GasLink workers. The attackers used grinders to cut locks on a permitted gate to the active construction site and continued to vandalize and attack heavy equipment and construction trailers on-site, causing millions of dollars in damage to Coastal GasLink contractor equipment and property. Equipment* *hydraulic and fuel lines were also cut, causing dangerous leaks. Damage and environmental impacts are still being assessed."* (iii) For some reason, the report got very little attention. Perhaps people thought Coastal GasLink was exaggerating or maybe they didn't see the RCMP report. We were surprised to see the RCMP said they were also attacked as they went to investigate. On Friday, we tweeted [LINK] "*No longer peaceful protest, anti @CoastalGasLink escalated to violent attacks & significant damage, And #RCMP says "several people threw smoke bombs and fire lit sticks at the police, injuring one office". #OOTT #NatGas #LNGCanada".* The RCMP also wrote "*Houston RCMP is presently investigating an incident where individuals allegedly engaged in a violent confrontation with employees of Coastal GasLink, and with attending police officers along the Morice River Forest Service Road near Houston, BC."* And "*This is a very troubling escalation in violent criminal activity that could have resulted in serious injury or death. This was a calculated and organized violent attack that left its victims shaken and a multimillion dollar path of destruction, says Chief Superintendent Warren Brown, North District Commander."* Below is the Coastal GasLink construction update map as of Jan 24. We circled Houston. Our Supplemental Documents package includes the Coastal GasLink and RCMP [LINK] releases.

Figure 8: Coastal GasLink Construction Update Jan 24, 2022



Source: Coastal GasLink

Natural Gas – Qatargas says Trains 6 & 7 is planned maintenance but not how long

Qatargas planned maintenance

On Friday, Qatargas announced [LINK] "*Qatargas denies reports of unplanned maintenance on LNG trains. Recent media reports speculating that Qatargas may be experiencing unplanned shutdowns of two LNG trains are not true. Qatargas operates a rolling program of planned maintenance at its facilities. These shutdowns are coordinated with all parts of our operations, shipping and customers as part of our annual planning exercises. This includes our customers around the world."* We wish Qatargas had taken the opportunity to say how long Trains 6 and 7 would be down for their planned maintenance. On Wednesday, we tweeted [LINK] "*Worth watching to see how long these big #Qatargas #LNG trains 6 & 7 are offline. And if planned or unplanned maintenance. Each train has capacity of 1.0 bcf/d. Good thing thru most of winter and its been warm in most key regions. Thx @SStapczynski*

@Kayrros #NatGas #OOTT." Separately, ConocoPhillips said on its Q4 call that Train 6 maintenance was maintenance that had originally been scheduled for Q4. We still wish Qatargas said how long for the shutdowns as these are each large 1.0 bcf/d LNG trains.

Natural Gas – Eni doesn't deliver more LNG cargos to Pakistan, will pay penalty

LNG force majeures for spot price wins

It looks like Pakistan still 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 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. (i) Our Dec 26, 2022 Energy Tidbits noted that week's The News (Karachi) report that Singapore based LNG trading company, GUNVOR indicated to Pakistan "*that it will not be able to deliver its term LNG cargo which is due on January 10, 2022 by claiming the force majeure".* This is the 2nd GUNVOR LNG cargo and ENI also did one LNG cargo. The News reported a senior official Energy Ministry official "*said that technically it will be a second default by GUNVOR in a row in the current winter season 2021-22, as it earlier defaulted from the provision of the term cargo on November 19-20, 2021. The Italian company ENI also defaulted on November 26-27, 2021 from the delivery of its term cargo. ENI had earlier backed out of its term LNG cargo in August, 2021. "And this is how both the LNG trading companies have defaulted twice."* (iii) Eni is now up to 4 LNG cargoes that it has paid a penalty so it could sell the contracted cargo on the spot market. On Thursday, The News (Karachi) [LINK] "*No let-up in gas crisis: LNG firms renege on commitment to provide cargoes" "The ongoing gas crisis is unlikely to subside when the mercury rises as LNG trading companies, Italy-based ENI and Singapore-based GUNVOR, have cancelled their term LNG cargoes, which were scheduled to be delivered in the first and second week of March 2022 respectively. "This will be the fourth time when ENI will back out of delivering the term LNG cargo. However, GUNVOR will default for the second time as it earlier defaulted in November 2021. Both the LNG trading companies have emerged as habitual defaulters, which is simply unacceptable," a senior official at the Ministry of Energy told The News. He said that both the LNG trading companies are involved in selling term cargoes of Pakistan in the spot market for monetary gains by repeatedly selling wherein LNG prices hover at $25-27 per MMBTU. "We will never allow them to make profit out of our term cargoes and to this effect a legal battle against both the two companies will start soon."* Our Supplementals Documents package includes The News Feb 17 report.

Natural Gas – India's ONGC still hopeful Total Mozambique LNG restarts in 2022

ONGC on Total's Mozambique LNG

India's Oil & Natural Gas Corp (ONGC) held its Q3/2022 call on Monday. ONGC is a partner in TotalEnergies Mozambique LNG project. It looks like ONGC didn't see TotalEnergies CEO Pouyanne comments last week on the even later expected timing to lift force majeure or just wants to put our a more optimistic view. . In the Q&A, mgmt was asked what is happening in Mozambique and if there were any update or any progress in resolution of the political problems there?. Mgmt gave a long answer but one that looks like they didn't get the memo on Pouyanne's comments. Rather they are still hopeful for the project to resume in 2022. Mgmt replied "*Therefore, summing up all this, till the time that Mozambique kicks in, which would be '25-'26, the gas production will lag and our projections continue to be for the next two years around this 12.5 MMTOE that I'm projecting presently before it picks up further with Mozambique. Now, coming to your second specific question on Mozambique situation.*

Mozambique, as you know, went into force majeure in April 2021 with the consortium deciding under the basic (inaudible) to declare a force majeure and later as far as exploration contracts to declare it in May. Since then there has been a lot of progress as part of the security situation in the Cabo Delgado province is concerned because of which with the deployment of the Southern African forces and also that of the Rwandan forces, the situation has improved dramatically. The operator, which is total [ph] is calibrating the situation closely. However, the consortium is very clear that still, there is a sustainable solution to the security situation, we cannot start operations. In other words, we cannot start operations again just to stop it again. Therefore we are hopeful that going forward in 2022, we would be in a position to resume those operations. However, Mozambique force majeure yet has been declared by the operator publicly also will impact the production at least by a year -- at least one year."

TotalEnergies CEO maybe Mozambique LNG work restart in H2/23

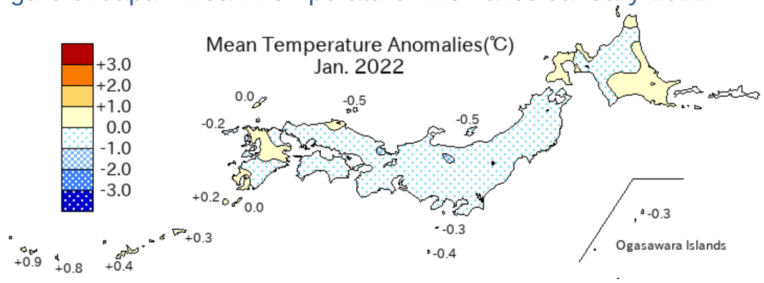
Last week's (Feb 13, 2022) Energy Tidbits memo highlighted the comments from TotalEnergies CEO Pouyanne that were much more negative than expected on when there might be a lifting of force majeure and construction restart of their Mozambique LNG Phase 1. Last week, we wrote "*Wow! There was a big positive for LNG prices in the 2020s on Thursday, when TotalEnergies CEP Pouyanne threw cold water on the potential for a lifting of the Mozambique LNG force majeure in 2022. He was clear that maybe it will take a year to lift the force majeure. And then he added in something that most have overlooked – it will take six months after TotalEnergies makes the restart decision to actually get construction underway. We listened to the Q4 call on Thursday and, as soon as we could make a transcript from our iphone recording, we tweeted [LINK] "1/2. #LNGSupplyGap getting bigger. Expect longer time to restart @TotalEnergies #Mozambique. In Q&A, @PPouyanne "But my view is that the conditions under which we could restart the project might be fulfilled, maybe it will take a year. I don't know. We'll see" #LNG #NatGas #OOTT." And [LINK] "2/2. @PPouyanne "We know that when we say yes we can come back, it will take six months really to start up again". Hope was 2022 restart for 1st #LNG in 2026. Backs up ~5 bcf/d of #MozambiqueLNG. see SAF 04/28/21 blog. Need brownfield FIDs ie. #LNGCanada Phase 2. #NatGas #OOTT". There was much more to Pouyanne's direct comments but there is only so much we can put in a tweet. One other example was "We will not build a plant in a country where we will be surrounded by soldiers." Pouyanne was clear, the restart of work on Mozambique LNG is likely not happening until at least H2/2023. Our Supplemental Documents package includes the transcript we created of Pouyanne's comments."*

Natural Gas – Temperatures cooled through January in Japan

Jan was cooler in Japan

We have been noting the turn to cold weather throughout Japan in which draws to LNG inventories ramped up throughout the month. Thursday, the Japan Meteorological Agency posted its recap of January weather [LINK] and their mean temperature anomalies map (below) shows it was below average temperatures month thru most of Japan. Their recap also noted how it got colder throughout the first half of January, "*Monthly mean temperature was below normal in eastern Japan due to cold air inflow till mid January. On the other hand, it was above normal in Okinawa/Amami due to warm air inflow in later January."*

Figure 9: Japan Mean Temperature Anomalies January 2021



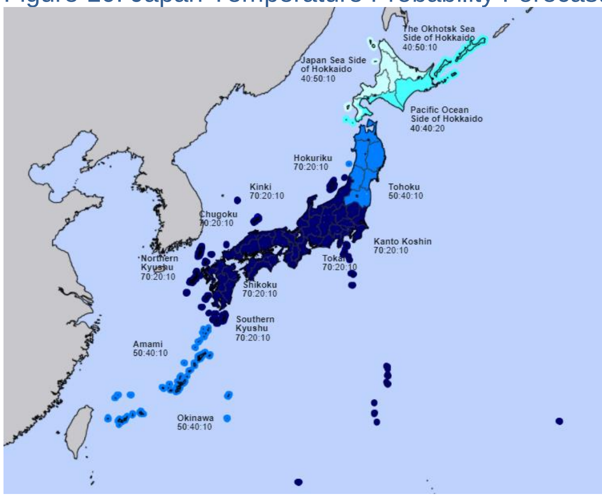
Source: Japan Meteorological Agency

Natural Gas – Japan expects continued cold end to February before a warm March

Japan forecasted cold end to February

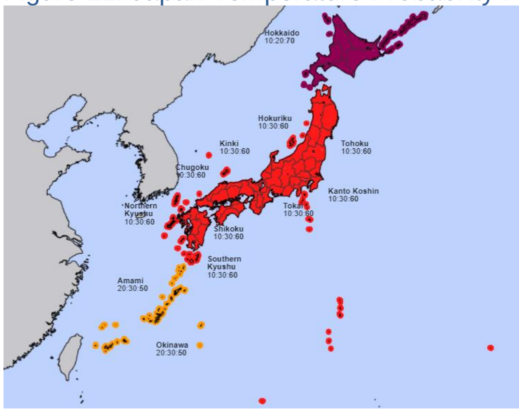
Japan has observed a cold start to the year with both January and February average temperatures well below average. The Japan Meteorological Agency posts its weekly temperature probability forecast for the next 4 weeks on Thursday mornings. [LINK]. JMA forecasts that Japan will experience well below normal temperatures for the remainder of Feb before returning to above average temperatures at the beginning of March. The northern regions of Japan are expected to have closer to normal temperatures while the southern regions are expected to be well below average temperatures. Below is the JMA forecast for the next two week of the forecast period (Feb 19 – Feb 25 and Feb 26 – Mar 4), which expects below normal temperatures for the next two weeks before returning to warmer temperatures.

Figure 10: Japan Temperature Probability Forecast Feb 19 – Feb 25



Source: Japan Meteorological Agency

Figure 11: Japan Temperature Probability Forecast Feb 25 – Mar 4



Source: Japan Meteorological Agency

Natural Gas – Japan LNG Imports in Jan -15.8% YoY to 10.51 bcf/d

Japan Jan LNG imports -15.8% YoY

On Thursday, Japan's Ministry of Finance posted its import data for Jan [LINK]. As we highlighted last month, Japan kept its LNG storage volumes at very high levels going into the winter, which, given the warm start to winter temperatures, gave them the flexibility to redirect cargos in Dec at a time of very high LNG prices. As noted above, Japan went from a warm Dec to a colder than normal Jan. But given high LNG prices, it continued to minimize LNG imports in Jan. The MOF reported Japan's Jan LNG imports were 10.51 bcf/d, down 15.8% YoY and down 3.5% MoM. Japan's Jan LNG imports were the lowest Jan in a decade. The high LNG prices also showed up as Japan favored other cheaper fuel alternatives in Jan with a note that Japan is price sensitive as evidenced by thermal coal imports -1.3% YoY, Oil +4.7% YoY and Petroleum Products +13.0% YoY. Below is our table that tracks Japan LNG import data.

Figure 12: Japan Monthly LNG Imports

bcf/d	2015	2016	2017	2018	2019	2020	2021	21/20	2022	22/21
Jan	13.06	11.22	12.85	12.79	11.69	11.63	12.48	7.3%	10.51	-15.8%
Feb	13.26	12.30	13.36	14.23	12.61	10.99	13.84	25.9%		
Mar	12.60	12.62	12.61	12.28	11.30	11.16	11.04	-1.1%		
Apr	10.56	10.21	10.52	8.97	9.00	8.31	7.96	-4.3%		
May	8.91	8.55	9.66	9.92	8.62	7.09	7.67	8.1%		
June	10.61	10.02	9.90	8.88	8.32	8.42	9.13	8.5%		
July	10.77	10.19	10.19	10.55	10.56	9.35	9.58	2.5%		
Aug	10.93	11.96	11.24	11.73	9.45	9.04	9.75	7.8%		
Sept	11.06	10.67	9.31	10.04	10.30	10.41	8.66	-16.8%		
Oct	9.38	9.73	9.50	10.12	9.75	9.20	7.17	-22.1%		
Nov	10.71	12.07	10.26	10.15	10.03	9.63	9.38	-2.6%		
Dec	12.51	11.69	12.31	11.23	10.54	11.96	10.89	-8.9%		

Source: Japan Ministry of Finance

Natural Gas – Japan LNG inventories up 9% to refill depleted storage

Japan LNG stocks back to normal

There was a bit of s surprise increase in Japan's LNG stocks given the cold weather and Japan's LNG users bidding for more cargos. Every week, Bloomberg's Stephen Stapczynski & Shoko Oda tweet on the Japan's METI weekly LNG stockpiles. On Tuesday, they tweeted [LINK] "*Japan's LNG inventories rise for the first time in nearly two months; LNG supplies held by regional utilities rose to 1.82 million tons, up about 9% from the previous week*

Japan's utilities are snatching up spot cargoes to refill storage drained by frigid winter weather." Below is their graph.

Figure 13: Japan's LNG Inventories Held by Utilities

Source: Bloomberg, METI

Natural Gas – Sounds like Beijing Gas rumored 10 yr LNG supply is with Shell

Beijing to buy 10 yr LNG supply

We continue to believe the best indicator for tight LNG markets thru the 2020s is that Asian buyers abruptly changed last summer to lock in long term LNG supply and that push continues in 2022. (i) It is still not finalized, but it looks like the rumored Beijing Gas locking up long term LNG supply is progressing but not yet concluded and, significantly, the rumors are that Shell is the LNG supplier. On Thursday, Reuters reported [LINK] "*China's Beijing Gas Group aims to conclude a 10-year liquefied natural gas (LNG) supply and purchase deal with Shell (SHEL.L) in the second quarter, a source with direct knowledge of the talks told Reuters*." And "*Negotiations began in January, with Beijing Gas seeking 1.5 million tonnes a year of the super-chilled fuel, starting in 2023, in what will be the first long-term LNG contract for the state-owned piped gas distributor. Shell became the first of three suppliers Beijing Gas short-listed around the end of last year, followed by Qatar Petroleum and China's CNOOC, the source said. "A deal is expected in the second quarter at the latest," said the source, who asked not to be named because the discussions are not public. Pricing of the gas will be indexed to the Brent crude benchmark and likely to be lower than the 12% of Brent rumoured to be under consideration, the source added. Shell declined to comment and Beijing Gas said it could not comment immediately."* (ii) Our Jan 16, 2022 Energy Tidbits wrote on Bloomberg's Jan 10/11 reports of the rumored deal. Bloomberg then wrote "*Beijing Gas signed an LNG deal with a portfolio supplier to purchase 1.5m tons/year for 2023-2032 delivery to China, according to traders with knowledge of the matter."* This is equal to 0.2 bcf/d. And "*On Wednesday, China's Beijing Gas Group Co. recently signed a deal to buy LNG from a portfolio player at about 12.7% to 12.9% of the price of Brent crude. By comparison, Qatar was signing supply agreements to customers in Asia's largest economy in the low-10% range early last year."* At Brent $80, this would be a price of ~$10.25, vs ~$8.15. (iii) Note the Reuters report said the slope would likely be lower than the 12% of Brent rumored. Our Supplemental Documents package includes the Reuters report.

Explaining "slope" in LNG contracts

Our Sept 27, 2020 Energy Tidbits item noted above reference the slope of 10.19. Look at the slope very simply as a % of a reference oil price. Take whatever the reference price is and divide by the slope. The original Qatar and most other long term LNG supply deal were done at a slope of 16.7, or 1/6 the price of oil. Basically the energy equivalent of oil and natural gas. In our March 28, 2021 Energy Tidbits, we noted Qatar negotiated a lower slope with Sinopec, which was reported at 10.19. The Bloomberg reported Beijing Gas deal was at 12.7% to 12.9%, which, at Brent $80 is ~$10.25, compared to a 10.19 slope of $8.15.

Asian LNG buyers abruptly changed and moved to lock in long term supply
We have been highlighting that the best validation for a LNG supply gap in the 2020s is that Asian LNG buyers have 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 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."* Below is our graphic noting recent Asian long-term LNG supply contracts. Our Supplemental Documents package includes our July 14 blog.

Our Jan 30, 2022 updated list of new LNG buyer long term contracts
We have now seen 19 deals since July 1, 2021 where Asian LNG buyers locked up long term LNG supply past 2030. Below is the updated table of Asian LNG buyer new long term supply deals since the end of June. This table was first posted in our July 14 blog. We have changed our table to also include long term LNG supply deals to Europe since June 30. Previously, these European LNG deals were notes to the table.

Figure 14: Long Term LNG Supply Deals since July 1, 2021

Long-Term LNG Buyer Deals Since July 1, 2021							
Date	Buyer	Seller	Country	Volume	Duration	Start	End
			Buyer / Seller	(bcf/d)	Years		
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
Total Asian LNG Buyers New Long Term Contracts Since Jul/21				**3.55**			
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	0.16	11.0	2021	2032
Total Non-Asian LNG Buyers New Long Term Contracts Since Jul/21				**0.42**			
Total New Long Term LNG Contracts since Jul/21				**3.97**			
*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							

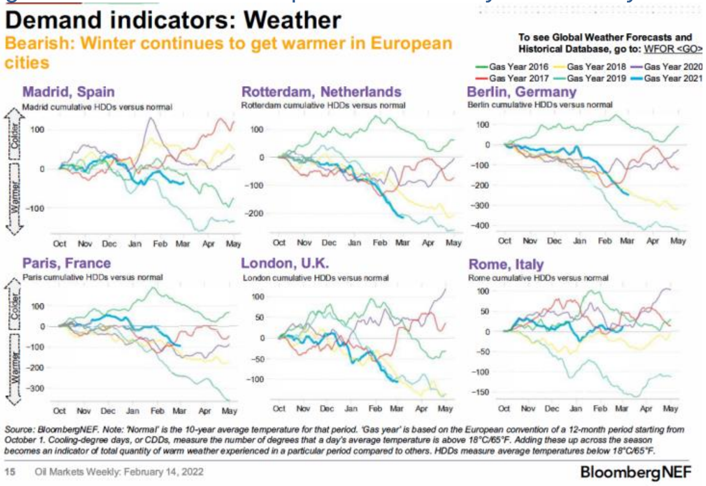
Source: Bloomberg.

Natural Gas – Warm temperatures forecast for Europe in Feb/March

Warm temps continue for Europe

Last week's (Feb 13, 2022) Energy Tidbits highlighted the Copernicus [LINK] recap of global January temperatures and how it was big relief for Europe natural gas storage that it was warmer than normal in key parts of Asia and also in Europe. It helped relieve the Europe natural gas storage situation, along with increasing LNG cargos to Europe. The good news for Europe is that it looks like warmer than normal temperatures will continue over the next month. On Monday, we tweeted [LINK] "*Looking better for Europe to skate thru winter without burning all #NatGas storage. High level of #LNG imports continuing & most importantly, looks like the warmer than normal temps should continue thru Feb. Note Europe temp charts courtesly of @BloombergNEF @WayneTanMing #OOTT.*" Our tweet included the below BloombergNEF near term temperature forecasts Feb/March for key European cities. The forecasts were included in the weekly BNEF Oil Price Indicators and highlighted for their demand impact on oil, but the concept applies even moreso for natural gas.

Figure 15: Surface air temperature anomaly for January 2022



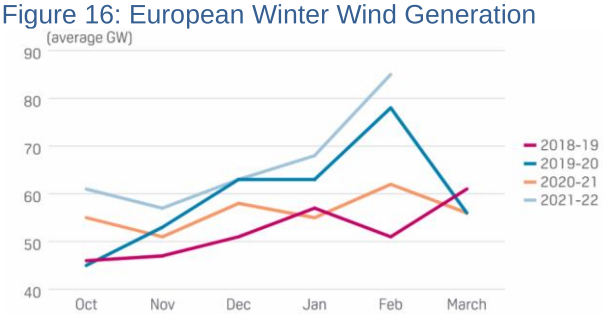
Source: BloombergNEF

Natural Gas – EU gas storage also saved by very high wind power all winter

Very strong Europe wind power

In addition to the warm Europe winter, the other saving grace for Europe not burning through all their natural gas has been very strong wind power generation. On Friday, we tweeted [LINK] "*EU had a big break this winter as everything lined up to not run out of #NatGas. It was warmer than normal, high EU prices attracted US #LNG cargos and best @Wind generation all winter vs recent years. Great graph from @AFrankeEUenergy. #OOTT.*" Europe wind power generation has been at the highest levels in the last few years in every month. So it has been consistently high all winter. This has had a direct impact on demand for natural gas for power generation. In addition, European wind power generation was close to all-time records on Feb. 16, averaging 115.6 GW with an hourly peak of 127.4 GW, S&P Platts reported on Thursday [LINK] that near record winds in Europe generated a total of 2.775 TWh over the 24-hour period covered 28.6% of power demand compared to a record 28.9% on March 11, 2021. Wind turbines across Europe have already generated 33.2 TWh, averaging around 86 GW and putting February on course for a record month and exceed February 2020 levels. Below is a chart depicting European wind generation in the past 4 years. Our Supplemental Documents package includes the S&P article.

Figure 16: European Winter Wind Generation



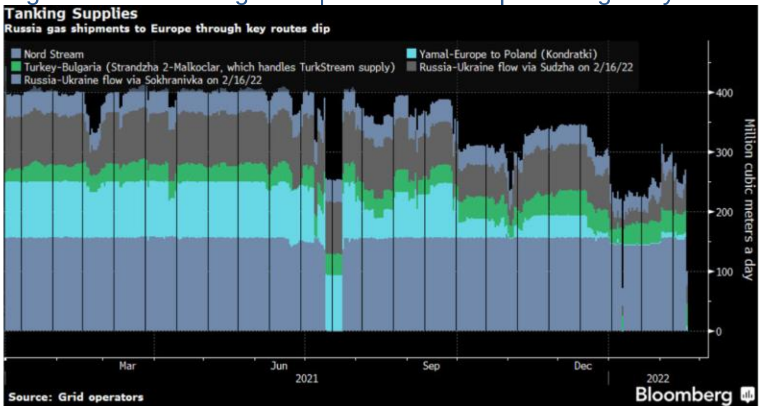
Source: S&P Platts

Natural Gas –Russia pipeline natural gas to Europe down ~5 bcf/d YoY

Russia pipeline to EU down ~5 bcf/d YoY

We can't stress enough how lucky Europe has been to have warm temps and very high wind power generations this winter. No question, it has saved Europe from running out of natural gas and having outages. If they didn't have the huge weather break, Russia's squeeze play on natural gas on Europe would have brought Europe to its knees. On Thursday, we tweeted [LINK] "*Here is the data to support the Russian #NatGas squeeze play on Europe. Would have worked big time if it hadn't been a warm winter. Thx @WillHares.*" Bloomberg's Will Hares tweeted the below graph that shows the huge drop in Russian natural gas pipeline deliveries to Europe YoY. Hares tweeted [LINK] "*here is our data on Russian piped supply to Europe - flows are down nearly 40% from normal levels last year. Mostly from Yamal (Poland) and Sokhranivka (Ukraine) pipelines* | *#oott #ongt*". This is a huge drop in Russian pipeline natural gas of ~5 bcf/d less natural gas supply.

Figure 17: Russian gas shipments to Europe through key routes dip



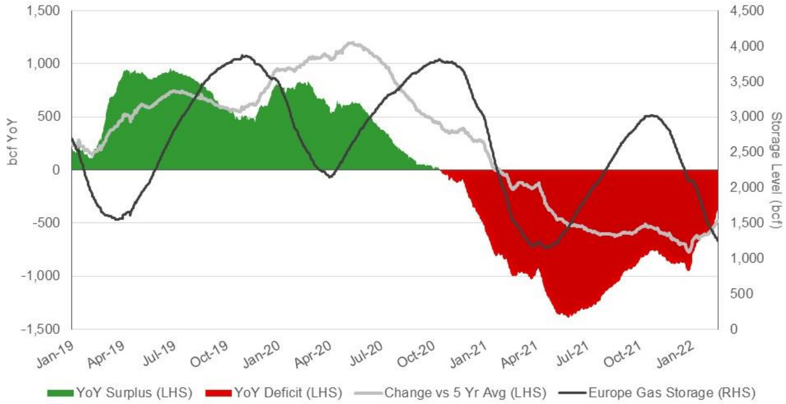
Source: Bloomberg

Natural Gas – Europe storage only 32.01% full vs last year of 40.44%

Europe storage down to 32.01% full

Europe has been lucky that it hasn't been cold because the combination of a warm DJF, the massive increase in US LNG to Europe, and high wind generation this winter is having an impact on Europe gas storage. The YoY Europe storage gap has narrowed this week since the start of the winter natural gas season. Europe gas storage started down 18.52% YoY and is now down 8.43 % as Europe has been experiencing warmer than normal temperatures recently. Draws to European gas storage units continued this week. It was a smaller draw due to the warmer weather. 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 Feb 16 is still only at 32.01%, which is -8.98% less than last year levels of 40.44% and are -12.40% below the 5-year average of 44.41%. The set up for winter natural gas prices continues to support strong winter natural gas prices. Below is our graph of Europe Gas Storage Level.

Figure 18: Europe Gas Storage Level



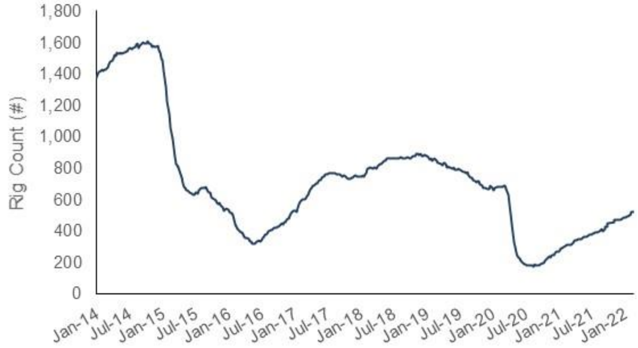
Source: Bloomberg

Oil – US oil rigs +4 WoW at 520 oil rigs at Feb 18

US oil rigs +4 WoW

Baker Hughes released its weekly North American drilling activity data on Friday. We expected another increase as the favourable ~$90/bbl WTI incentivizing greater production and pent-up demand that was held up with freezing conditions in Texas that delayed rig moves. The cold weather and snows in past weeks had affected drilling, particularly in the Permian and Bakken basins, but now that the inclement weather has mostly subsided, drilling has increased to prepare for summer demand. 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 up +4 WoW at 520 oil rigs. Oil rigs are +348 off the bottom of 172 in Aug14/2020 week. There were big basin changes this week; Permian was up +5 at 306 rigs this week while Bakken was flat at 33 rigs after increasing for consecutive weeks; Eagle Ford decreased -2 rigs to 45 after a sizeable increase in rig count last week.. US oil rigs hit their 2020 peak at 683 on March 13 and have since fallen by 163 to 520 oil rigs (-16%). US Gas rigs were +6 WoW reflecting the heightened $4 HH. Below is our graph of US oil rigs since January 1, 2014.

Figure 19: Baker Hughes Total US Oil Rigs



Source: Baker Hughes

Oil – US frac spreads +8 to 283 for week ended Feb 18

Frac spreads +8 to 283

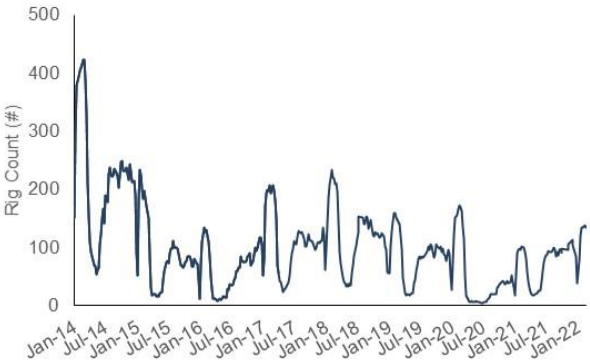
Mark Rossano (C6 Capital Holdings) held his weekly US frac spread recap for week ended Feb 18 on the Primary Vision network. YouTube video is at [LINK]. For the week ended Feb 18,, US frac spreads at the high point in the week were +8 to 283. He noted that now back over 150 spreads in the Permian. Also had some one-off increases in the smaller basins in addition to increases in the Permian. Rossano warned that, even though spreads are up, there are some limiting factors such as shortages of proppant and sand, and that some have said that this is limiting the number of stages they can frac ie. some maybe 10 or less when they would do double that. Also that this means that some of the frac spreads will be on location longer than normal so limit efficiency. Rossano continues to warn on labor as an issue. He also noted that frac spreads are being outpaced by rig increases.. And that the rate of change in DUCs is changing, starting to flat line and not keep declining. Bakken and Eagle Ford will have to pick up drilling to replenish DUCs. The three areas that are doing the best for DUCs replenishment are Permian, Haynesville and Anadarko. As a result, by the time get to Q3 and have 315 to 325 spreads running, there should be more than enough DUCs to support activity. And he still expects year end US oil production at 12.2 to 12.3 mmb/d.

Oil – Total Cdn rigs +1 to 220 total rigs, +47 rigs YoY

Cdn rigs +1 WoW

Total Cdn rigs were up +1 this week to 220 total rigs. Cdn oil rigs were -2 at 135 rigs. Cdn gas rigs were up +3 at 85 gas rigs; we expect the large post Christmas ramp up has come to an end and we have reached peak winter drilling levels and expect Cdn rigs to start to decrease with the approaching end to winter drilling. Total rigs are now +206 since the June 26, 2020 all-time low. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 100 and Cdn gas rigs were 72 for a total Cdn rigs of 172, meaning total Cdn rigs are +48 YoY and total rigs are +8 vs 2019.

Figure 20: 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

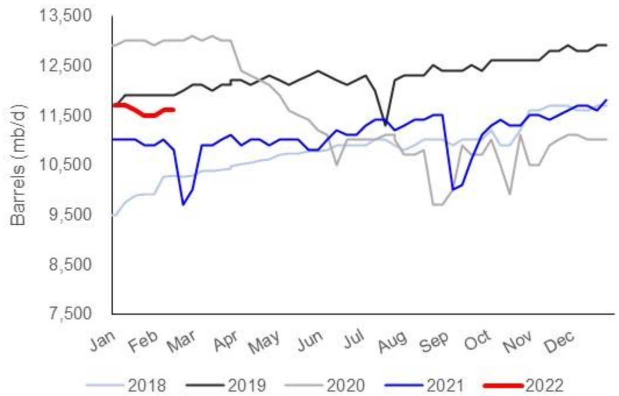
In the absence of any inclement weather, US production has remained flat in line with the expectation for the quarter. Weekly production in the US was flat this week at 11.6 mmb/d for the week ended Feb 11. Lower 48 production drove total production and was flat from last weeks level at 11.1 this week; US oil production is up YoY at +0.800 mmb/d and is still down significantly at -1.5 mmb/d since the 2020 peak of 13.1 mmb/d on March 13. The slight increase is mainly attributed to the cold weather subsiding in Texas allowing for increased production. Absent further weather impacts, we would expect US oil production to remain relatively flat if not inch up a little higher in Q1/22.

Figure 21: EIA's Estimated Weekly US Oil Production

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-Month	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						

Source: EIA

Figure 22: US Weekly Oil Production



Source: EIA, SAF

Oil – North Dakota December oil production down MoM with

North Dakota oil production had a slight decrease in December mainly driven by the cold weather the Bakken experienced over the month and producers keeping production flat. On Monday afternoon, the North Dakota Industrial Commission posted its Director's Cut, which includes December oil and natural gas production data [LINK]. The headline on the Dec numbers was that North Dakota Dec oil production was 1.159 mmb/d, which was down 1.83% MoM from Nov 2021 production of 1.158 mmb/d. YoY production decreased -4.5% from December 2020 production of 1.191 mmb/d. January saw cold weather in the Bakken and we may see further decline of production as frac crews are limited by the elements. The NDIC reports that well completions were up significantly in December to 81, up from 60 in Nov and 41 in Oct. In theory, more wells completed should mean higher oil production. Our Supplemental Documents package includes excerpts from the Director's Cut.

North Dakota oil production down MoM

Figure 23: North Dakota Oil Production By Month

(b/d)	2016	2017	2018	2019	2020	2020/2019	2021	2021/2020
Jan	1,122,462	981,380	1,179,564	1,403,808	1,430,511	1.9%	1,147,377	-19.8%
Feb	1,119,092	1,034,248	1,175,316	1,335,591	1,451,681	8.7%	1,083,554	-25.4%
Mar	1,111,421	1,025,690	1,162,134	1,391,760	1,430,107	2.8%	1,108,906	-22.5%
Apr	1,041,981	1,050,476	1,225,391	1,392,485	1,221,019	-12.3%	1,123,166	-8.0%
May	1,047,003	1,040,995	1,246,355	1,394,648	859,362	-38.4%	1,128,042	31.3%
June	1,027,131	1,032,873	1,227,320	1,425,230	893,591	-37.3%	1,133,498	26.8%
July	1,029,734	1,048,099	1,269,290	1,445,934	1,042,081	-27.9%	1,076,594	3.3%
Aug	982,011	1,089,318	1,292,505	1,480,475	1,165,371	-21.3%	1,107,359	-5.0%
Sept	971,760	1,107,345	1,359,282	1,443,980	1,223,107	-15.3%	1,114,020	-8.9%
Oct	1,043,693	1,183,810	1,392,369	1,517,936	1,231,048	-18.9%	1,111,910	-9.7%
Nov	1,034,484	1,194,920	1,375,803	1,519,037	1,227,138	-19.2%	1,158,622	-5.6%
Dec	942,322	1,182,836	1,402,741	1,476,777	1,191,429	-19.3%	1,137,466	-4.5%

Source NDIC, NDPA

NDIC sees Dec production down vs EIA shows up

There were conflicting reports coming out of the Bakken as the EIA Drilling Productivity Report data (noted later in the memo) shows Bakken oil production up MoM in December whereas the NDIC estimates a 2% MoM decline in production. We would expect North Dakota to have the better data. The DPR had actuals for Dec at 1.146 mmb/d, up from 1.137 mmb/d in Nov; while the NDIC reported Dec at 1.137 mmb/d, down from 1.158 mmb/d after a revision to the Nov levels. It is important to note that there is a two-month lag from when the NDIC reports its data. Both agencies have noted the steady return of production after the steep decline associated with the pandemic. The EIA DPR has continued to forecast production increases through March 2022 at 1.198 mmb/d.

North Dakota gas-oil ratio increases as Bakken matures

One of the long-term trends that we have been highlighting for all of the US tight/shale oil plays that produce associated natural gas and NGLs is that, over time, the percentage of natural gas increases in the production. This is the case for all the oil plays with associated natural gas, not just the Bakken. We see this clearly in North Dakota where the gas-oil ratio continues to increase. The gas-oil ratio in December was 2.54, vs December 2020 of 2.42, December 2019 of 2.07, December 2018 of 1.89, and December 2017 of 1.76. Below is our running graph of North Dakota gas-oil ratio updated for the new NDIC December production data.

Figure 24: North Dakota Gas-Oil Ratio

Source: NDIC, NDPA

Oil – North Dakota crude by rail down MoM to 178,961 b/d in December

North Dakota CBR down in December

The average crude by rail exports from the Bakken were down significantly in December, likely reflecting some impact of the November storms in Washington that led to some temporary refinery runs impact. There is normally >100,000 b/d of Bakken crude by rail to the US West Coast including Washington state refineries. The North Dakota Pipeline Authority also posted its monthly update "*December 2021 Production & Transportation*" [LINK]. Please note that we always go to the backup excel sheets from the North Dakota Pipeline Authority for more detailed numbers of crude by rail out of North Dakota. The NDPA Monthly Update (graph below) report only provides rounded numbers, and these rounded numbers are not accurate enough to match the graphs. In the backup excel, the NDPA estimates crude by rail in December was a low of 163,961 b/d and a high of 193,961 b/d for an average of ~178,961 b/d. This is down from November low of 176,995 b/d to high of 206,995 b/d for an average of ~197,955 b/d. Note that November's numbers were revised up 1,296 b/d. Below is a chart from the NDPA monthly update showing the crude by rail volumes since 2013. Our Supplemental Documents package includes excerpts from the NDPA monthly update.

Figure 25: Estimated North Dakota Rail Export Volumes

Source: North Dakota Pipeline Authority

Oil – North Dakota expects Bakken is no longer a growth oil play

Bakken not expected to grow

It looks like North Dakota is realizing what many investors believe – the Bakken is moving from a growth play to no real growth even under very high oil prices. On Tuesday, we tweeted [LINK] "*Time to change #Bakken #Oil production from growth to "pretty much flat production) even under $90/$100 oil. Producers telling #NorthDakota Bakken is a "mature play" but with surplus free cash flow for investors, #Permian, etc. Great report @mondaknewsbug #OOTT."* We always look to the local North Dakota oil media for extra insights from the monthly North Dakota Director of Mineral Resources Lynn Helms press conference on the monthly North Dakota production data. And that was certainly the case with the Williston Herald reporting this week that led to the tweet. (i) Helms had clear comments following his meetings with many Bakken producers that he doesn't expect to see growth in the Bakken, rather that the expectation for Bakken oil outlook is "*pretty much flat production"*. The Williston Herald wrote "*"The Bakken has been rebranded, whether we wanted it to be or not, as mature," Helms said. "And so you know, we all face that day when our friends and our significant other calls us mature. And for some of us that's a good thing, and in other ways not a good thing." Helms spent last week in Houston talking to 10 or so of the Bakken's top 25 operators in Houston about the Bakken and their upcoming plans."Helms said he was also told that the Bakken has become a "real cash cow" and that it still has very good economics. "Those are positives," Helms said. "But they're not reinvesting all of that revenue back in as Capex*." "*That means flat production is the likely reality for the Bakken for the foreseeable future, Helms said*". "*Again, that's a reflection of a mature basin and with, you know, slow growth, if at all, pretty much flat production." "That's going to be true, Helms added, regardless of $90 or even $100 oil."* (ii) Helms did note Bakken natural gas production should continue to grow. This is consistent with theme we have been highlighting for years that gas/oil ratios continue to grow as well mature. The Williston Herald wrote "*Gas, however, is a likely exception Helms added. "Everyone does agree that gas production can grow, even with flat oil production," Helms said. "Gas production is going to continue to grow. They're all seeing it in their gas-oil ratios and in their test wells."* (iii) Rig additions will be less due to a labor shortage. The Williston Herald wrote ""*It's just that hard to get workers," Helms said. "And so the expectation has changed from adding, you know, maybe a dozen rigs over the next year to hoping to add seven*." Our Supplemental Documents package includes the full Willison Herald report. [LINK]

Oil – EIA DPR forecasts US shale/tight up again, Permian to stay above 5 mmb/d

US shale/tight oil production

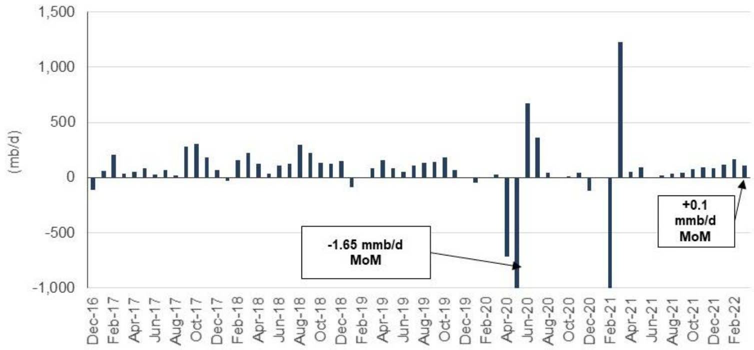
The EIA issued its Drilling Productivity Report Feb 2022 on Monday [LINK], which is the EIA's forecast for oil and natural gas production from the major shale/tight oil and gas basins for the current month (in this case Feb) and the next month (in this case Mar). (i) The headline from the report is that the Permian continues to set new all time high oil production and is forecast to exceed 5 mmb/d in Mar. (ii) The takeaway is that US shale/tight oil started to return to growth in July and that steady modest growth is expected to continue thru Mar. This is expected with the increase rig count, frac spread count and significantly higher than budgeted oil and gas cash flows. (iii) The EIA forecasts March at 8.707 mmb/d which is +0.109 mmb/d MoM (would have been +167,000 b/d MoM if not for revisions to February) and down 0.451 mmb/d from the Nov/19 peak of 9.158 mmb/d. (iv) This month, all basins are basically flat except for the Permian and Eagle Ford, which saw an increase of +71,000 b/d and 24,000 respectively. YoY most basins have turned to surplus, except Appalachia, but the Permian has ramped up significantly since last year, +0.734 mmb/d YoY. Total US shale/tight oil production is now +0.956 mmb/d YoY. (v) Even before the massive capex cuts and shut-ins, the oil shale/tight production had built a narrative for 2020 that US oil production had peaked in Nov/19 at 9.158 mmb/d, expected to plateau H1/20 and then starting to decline later in 2020. (vi) Note that shale/tight oil is approx. ~70% of total US production, so whatever the trends are for shale/tight oil are the trends for US oil in total. Below is our table of running DPR estimates of shale/tight oil production and our graph of MoM changes in major shale/tight oil production. Our Supplemental Documents package includes the EIA DPR.

Figure 26: MoM Change – Major Shale/Tight Oil Production

											2022				
Thousand b/d	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Mar YoY	Mar less Feb
Anadarko	309	386	373	361	353	354	370	369	363	366	378	389	393	399	13	6
Appalachia	123	126	126	127	128	131	129	125	118	122	120	115	113	114	-12	1
Bakken	1,106	1,129	1,118	1,108	1,102	1,116	1,139	1,139	1,131	1,137	1,146	1,184	1,192	1,198	69	6
Eagle Ford	882	1,062	1,045	1,032	1,027	1,043	1,054	1,053	1,076	1,078	1,090	1,104	1,122	1,146	84	24
Haynesville	28	33	33	32	32	34	34	34	34	34	33	33	33	33	0	0
Niobrara	556	544	534	524	516	540	555	576	594	608	615	615	611	612	68	1
Permian	3,546	4,471	4,510	4,555	4,607	4,647	4,756	4,773	4,826	4,886	4,960	4,996	5,134	5,205	734	71
Total	6,549	7,751	7,739	7,738	7,765	7,865	8,037	8,069	8,142	8,231	8,342	8,436	8,598	8,707	956	109

Source: EIA Drilling Productivity Report

Figure 27: MoM Change – Major Shale/Tight Oil Production



Source: EIA Drilling Productivity Report

Oil – EIA DUC's worked down by 191 in January

DUCs continue to work down

The big risk to how much US oil production can grow in 2022 is the need to increase rig counts to replenish the inventory of Drilled UnCompleted wells. The biggest problem in the past with the EIA's Drilling Productivity Report [LINK] estimate of Drilled UnCompleted wells was that the data had been constantly revised and sometimes significantly. However, the DUC estimates provide a clear picture of the trend since Aug 2020, which is that DUCs continue to be worked down. It's why there is the need for drilling rigs to pick up to replenish the DUC inventory if the US to have strong oil growth in 2022. (ii) Drilled Uncompleted Wells are down another 191 MoM in January, meaning a total 4,408 DUCs were worked down since the Jun/20 peak of 8,874. The largest work downs are coming from the Permian (-1,633 YoY) and Eagle Ford (-495 YoY). With DUCs being worked down so significantly we will need to see rig counts go up to replenish DUCs in the near future. (iii) Bakken DUCs. As per the NDPA presentation on April 22, 2021, they estimate there are only 395 economic DUCs at April 30. This is 268 DUCs or ~40% lower than the EIA estimate of 663 as of April.

Bakken DUCs were worked down 294 since then and in 2021 DUCs have dropped ~23 per month. This means that at this rate, the Bakken has ~14 months of economic DUC inventory. Below is our running table of the EIA Drilling Productivity Report DUCs.

Figure 28: EIA - Estimated Drilled UnCompleted Wells

			2021												2022	
Drilled UnCompleted	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Jan YoY
Anadarko	965	952	932	921	901	880	863	856	838	824	812	799	787	773	761	-171
Appalachia	645	641	623	616	603	590	598	595	590	588	557	537	513	565	542	-81
Bakken	786	760	731	710	688	663	656	619	590	566	541	516	485	464	437	-294
Eagle Ford	1,220	1,181	1,152	1,135	1,102	1,071	1012	954	912	869	833	796	760	685	657	-495
Haynesville	374	380	375	389	387	385	392	399	402	406	396	392	386	372	369	-6
Niobrara	663	621	575	530	489	448	402	373	380	379	375	372	362	354	345	-230
Permian	3,227	3,116	2,988	2,955	2,852	2,731	2598	2,419	2,249	1,994	1,812	1,669	1,537	1,444	1,355	-1,633
Total	7,880	7,651	7,376	7,256	7,022	6,768	6,521	6,215	5,961	5,626	5,326	5,081	4,830	4,657	4,466	-2,910

Source: EIA, SAF

Oil – Trans Mountain receives detailed route approval

Final route approved for Trans Mountain

Trans Mountain expansion project has finally received detailed route approval for its planned route with construction approved on all land. Trans Mountain issued a press release on Wednesday [LINK] announcing that the detailed route for the project has been approved. The CER issued the final order approving the 1,147 km route last year in which Trans Mountain was required to submit a plan, profile and book of reference (PPBoR). The PPBoR shows the proposed detailed right-of-way, as well as the landowners and occupants for more than 2,500 tracts of land required for the project. These tracts are grouped on nearly 400 PPBoR sheets, which all required CER approval. Detailed hearings were held by the CER to determine if there were any valid objections to the proposed route after extensive consultation with indigenous communities, governments and landowners. The final approval by the CER will clear the path forward with all tracts of land on the proposed route giving approval for the project. Our Supplemental Documents package includes the Trans Mountain release.

Oil – Trans Mountain expansion costs +70% to $21.4b, and delayed 1 yr to late 2023

Big TMX cost revision and a year late

Our Feb 6, 2022 Energy Tidbits noted the Feb 3 Bloomberg report [LINK] that the Trans Mountain Pipeline Expansion project is expected to run over budget by at least ~$4b and cost over $17b, and would likely be a year late with a revised startup in 2023. On Friday, we tweeted [LINK] "*#TransMountain revises #TMX expansion to now cost $21.4b (was $12.6) and start up pushed back a year into late 2023. Good early catch @ChrisVarcoe. #Oil #OOTT.*" Trans Mountain had just posted [LINK] "*Trans Mountain Corporation Updates Expansion Project Cost and Schedule*" that had two key updates. (i) 70% higher cost. "*Trans Mountain has completed a full review of its Project schedule and cost estimates. With all work fronts now active, mechanical completion of the Project is anticipated to occur in the third quarter of 2023. The total Project cost has increased from $12.6 to $21.4 billion.*" (ii) One year delay in startup. Prior planned start up was by year-end 2022, but Trans Mountain wrote "*Schedule pressures total approximately $2.6 billion of the increase and include permitting processes required for the several thousand permits that are required for the Project, and significant construction challenges in both marine and difficult terrain which have extended the schedule into late 2023*." Our Supplemental Documents package includes the Trans Mountain update.

Liberals say no more public funding for TMX

After the Trans Mountain release, the Liberals released a statement from Deputy Prime Minister Freeland on TMX [LINK]. She was clear in her statement "*TMC today announced their increased cost estimates, and the extended completion date for the Trans Mountain Expansion Project to the third quarter of 2023. Reasons cited include the pandemic, the BC floods, and significant but necessary changes to deal with the terrain and to protect the environment. However, I want to assure Canadians that there will be no additional public money invested in TMC. TMC will secure necessary funding to complete the project through third-party financing, either in the public debt markets or with financial institutions. Both BMO Capital Markets and TD Securities have been engaged by the government to provide advice on financial aspects of the project. Their analyses confirm that public financing for the project is a feasible option that can be implemented swiftly. They have also confirmed that the project remains commercially viable."* Our Supplemental Documents package includes the Freeland statement.

Oil – Michigan evaluating what operating Line 5 means for climate change

Michigan latest review of Line 5

We expect many will be surprised to see the Michigan Public Service Commission could still throw a wrinkle in Enbridge Line 5. They aren't evaluating the tunnel impact. Rather they are reportedly evaluating what Enbridge's continued operations of Line 5 means to climate change. This was explained in a good Michigan Radio report yesterday [LINK] "*Line 5's impact on climate change being reviewed as part of tunnel decision".* They wrote "*The Michigan Public Service Commission is best known as the government body that decides whether gas and electric utilities can raise their rates. But, the commission has other duties. Right now, it's looking at whether Enbridge Energy's plans to move a segment of its Line 5 oil and liquid natural gasses pipeline into a tunnel is safe. In an unusual move, the commission is also reviewing what keeping Line 5 operating means for climate change."* And "*Typically, the Public Service Commission would look at the impacts of moving the line. Will construction bother the neighbors? Will it impact fishing or interfere with Native American tribal rights? Will it damage the environment? Evaluating the impact on climate change if Line 5 continues to operate is new."* This will be increasingly in the news as Friday was the deadline for any initial briefs. No surprise, we started to see reports on these briefs. For example, on Friday, Earth Justice reported [LINK] "*Today a coalition of Indigenous Tribes, public safety experts, and environmental groups brought together all the pieces of their powerful case before the Michigan Public Service Commission (MPSC) to deny a permit for the Enbridge Line 5 Tunnel Project. In their initial briefs submitted to the Commission, the groups underscored the serious risks the pipeline tunnel in the Straits of Mackinac would pose to Tribal treaty rights, public safety, and efforts to combat the climate crisis.*" Earth Justice also wrote "*For the first time in Michigan history, the potential climate impacts of proposed fossil fuel infrastructure are being considered under the Michigan Environmental Protection Act (MEPA) during a separate but simultaneous permit hearing. That hearing is also before the Michigan Public Service Commission. "This decision to allow consideration of potential climate impacts sets precedent that climate change is within the scope of MEPA," said ELPC senior attorney Margrethe Kearney. "This means, moving forward, MEPA can be a much more powerful tool in preventing investments in fossil fuels that create a worst-case climate scenario."* Our Supplemental Documents package includes the Michigan Radio and Earth Justice reports.

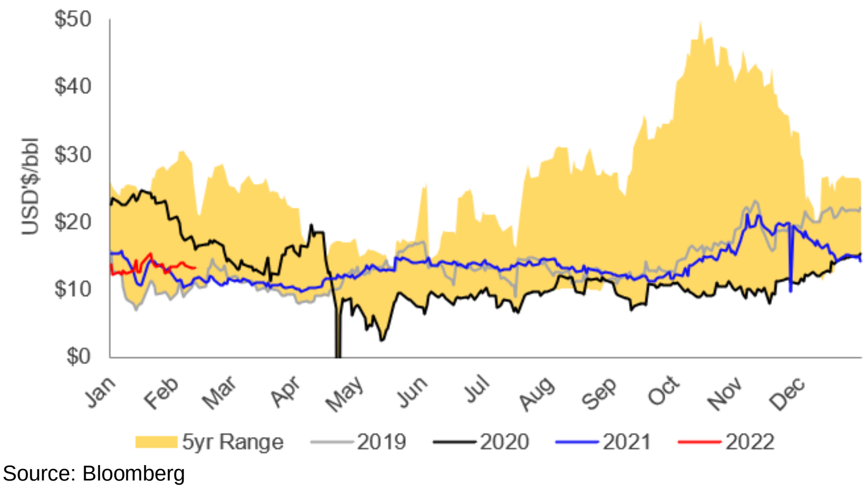
Line 5 should get more Whitmer chatter with <9 mths until election
If there isn't success in the conciliation process, we should expect an actual strike because the Liberals haven't previously stepped in to enact back to work legislation to stop a rail strike. Our Dec 1, 2019 Energy Tidbits highlighted the end of the 8-day CN Rail strike. At that time we wrote "*Oil – CN Rail strike ended on Day 8, but says "weeks, not days" to recover. As expected the CN Rail strike ended with a negotiated deal and not back to work legislation>,*

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

WCS-WTI differentials normally narrow in the spring

It's been a good month for WCS (Western Canadian Select) heavy oil prices hitting over $80 on Feb 11, and this week closing at US $77.36. Last week's (Feb 13, 2022) Energy Tidbits noted one of the key support factors for the strong WCS prices was low western Canadian inventories. On Feb 8, we tweeted [LINK] "*Crude #Oil stockpiles in West Can down >14 mmb since early Nov, to <25 mmb at end Jan, according to Wood Mackenzie data. At ~36% of storage capacity, lowest utilization observed by Wood Mackenzie during this time of year. Thx @roberttuttle & @WoodMackenzie Dylan White. #OOTT.*" 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 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 29: WCS-WTI Differential



Source: Bloomberg

Expected to be a huge paving year in the US with infrastructure spending
Earlier this morning, we tweeted [LINK] "*Big increase in asphalt/paving should be positive to Cdn heavy oil. WCS-WTI diffs normally narrow as refiners move to maximize asphalt production ahead of paving season. note the normal seasonal*

narrowing below. Thx @katekelly #OOTT." Yesterday, the New York Times posted its story "*One of the Infrastructure Plan's Biggest Winners Is the Pavement You Drive On A range of special interests lobbied for infrastructure dollars. The asphalt industry may have been the most successful."*[LINK]. The NYT wrote "*The strategy appears to have paid off. Within the $1 trillion of spending authorized by the infrastructure legislation that President Biden signed in November, the asphalt industry may ultimately receive the biggest share. And while roads were always likely to be a key focus of the legislation, the lobbying effort provided the industry a chance to promote what it cast as its environmental consciousness, making funding it more palatable to lawmakers who were concerned about road building fueling climate change. An outsize portion of the pavement spending under the infrastructure plan is expected to go to asphalt. An outsize portion of the pavement spending under the infrastructure plan is expected to go to asphalt. The infrastructure package allocates at least $350 billion over five years to highways and bridges, according to the Eno Center for Transportation, a nonprofit transportation think tank in Washington, compared with about $91 billion for mass transit. An additional $19 billion to the Transportation Department to fund major projects, like underwater vehicular tunnels or bridge replacements, could augment the pavement spending."*

Oil – Teamsters voting ends Feb 21 for strike among CP rail locomotive engineers, etc

Teamsters strike vote at CP

A potential CP rail strike will be in the news tomorrow as voting encs for the the potential strike by locomotive engineers, conductors, trainpersons and yardpersons. Last week's (Feb 13, 2022) Energy Tidbits noted the Feb 10 Teamsters Canada Rail Conference announcement [LINK] of the strike vote "*among its more than 3,000 Locomotive Engineers, Conductors, Trainpersons and Yardpersons. The strike vote results will be tabulated in late February*." Teamsters posted its notice [LINK] that notes strike voting ends tomorrow. The notice also said "*On February 8, 9, 10 the Union was scheduled to meet with CP Rail in the presence of Federal Mediation and Conciliation Services (FMCS) in Calgary. Unfortunately, the parties met for a total of 30 minutes over the course of the 3 days. We are now scheduled to meet starting March 11, 2022 again in the presence of FMCS in Calgary. Members should be starting to receive their ballot in the mail as they were sent out via Canada Post on February 01, 2022. We urge all to cast their vote in an act of solidarity in the interest of protecting your working conditions, benefits and wages. It is extremely important to send the Company a clear message that the Membership supports the TCRC Bargaining Committee and the proposals that have been put forward on behalf of the Membership."* Our Supplemental Documents package includes the Teamsters notice.

Liberals haven't stepped in before with back to work legislation

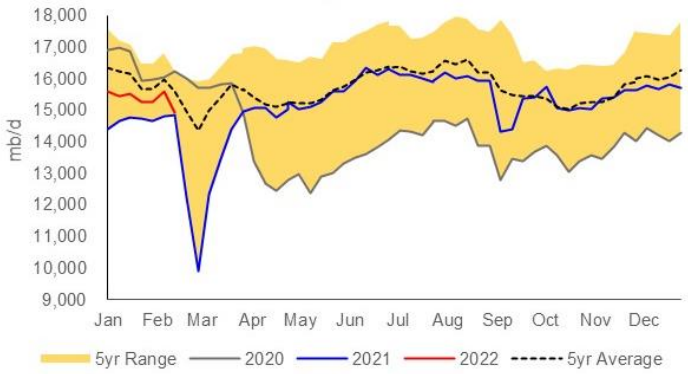
If there isn't success in the conciliation process, we should expect an actual strike because the Liberals haven't previously stepped in to enact back to work legislation to stop a rail strike. Our Dec 1, 2019 Energy Tidbits highlighted the end of the 8-day CN Rail strike. At that time we wrote "*Oil – CN Rail strike ended on Day 8, but says "weeks, not days" to recover***.** *As expected the CN Rail strike ended with a negotiated deal and not back to work legislation. It was well reported that the Liberals were doing all they could to avoid, what we called the nuclear option of recalling parliament to pass back to work legislation as the first bill of the new Liberal minority government. Especially a bill that would be supported by Conservatives but opposed* *by the NDP, who they will be needed support to stay in govt. The strike ended up lasting 8 days, so longer than the prior 7 day strike. National Post [LINK] reported on comments from CN Executive Vice President of Corporate Services Sean Finn writing "We're looking at weeks to recover fully," Sean Finn, CN's executive vice-president of corporate services, said in an interview Thursday. "This is a complex network — 21,000 miles of track that at any given time 100,000 rail cars are operating on" and "During the strike, CN operated its network at about 10 per cent capacity. It will take between one and four weeks to clear the backlog depending on how far a customer is from an operating yard and how frequently they typically receive service, Finn said."*

Oil – Refinery inputs -0.675 mmb/d WoW at 14.902 mmb/d

Refinery inputs down WoW

The EIA crude oil input to refinery data is for the week ended Feb 11. There was a significant decline in crude inputs to refineries as the turnaround season appears to be underway in the US, leading to decreasing crude oil inputs at refineries, up -0.675 mmb/d this week to 14.902 mmb/d and are +0.083 mmb/d YoY. The normal ramp up is to still produce winter fuels before refineries go into the turnaround in Q1 to switch to more summer fuels. Refinery utilization was down at 85.3%, which is still +2.2% YoY though is still below 5-year average utilization levels. Total products supplied (i.e., demand) increased WoW, up 0.86 mmb/d to 22.741 mmb/d. Motor gasoline was down -0.556 mmb/d at 8.571 mmb/d from 9.126 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 increased to 8.607 mmb/d, up from last year.

Figure 30: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA

Oil – US "net" oil imports up +0.230 mmb/d WoW at 3.519 mmb/d

US "net" oil up WoW

US "NET" imports were up +0.230 mmb/d to 3.519 mmb/d for the Feb 11 week. US imports were down -0.599 mmb/d to 5.790 mmb/d. US exports were down -0.829 mmb/d to 2.271 mmb/d. The WoW increase in US oil imports was driven by US's Top 10 imports by country were down -0.860 mmb/d from Top 10. Some items to note on the by country data. (i) Canada was down this week by -0.289 mmb/d to 3.342 mmb/d, which is now ~0.1 mmb/d above the average levels in Jan/Feb of 2020. (ii) Saudi Arabia was down 133,000 b/d to 0.250 mmb/d this week. (iii) Colombia was down -0.024 mmb/d to 0.234 mmb/d. (iv)

Ecuador was down -0.003 mmb/d at 0.098 mmb/d. (v) Iraq was down -1,000 b/d to 225,000 b/d. (v) Venezuela remained at 0 due to US sanctions. (vi) Mexico was down by 448,000 b/d to 0.510 mmb/d.

Figure 31: US Weekly Preliminary Oil Imports by Major Countries

(thousand b/d)	Dec 3/21	Dec 10/21	Dec 17/21	Dec 24/21	Dec 31/21	Jan 7/22	Jan 14/22	Jan 21/22	Jan 28/22	Feb 4/22	Feb 11/22	WoW
Canada	3,869	3,879	3,147	4,032	3,803	3,340	3,556	3,752	3,953	3,631	3,342	-289
Saudi Arabia	393	463	384	609	418	294	381	596	613	383	250	-133
Venezuela	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	625	569	503	648	226	584	902	321	383	958	510	-448
Colombia	71	232	146	184	64	241	193	143	286	258	234	-24
Iraq	248	29	359	268	226	317	434	133	412	226	225	-1
Ecuador	0	265	195	308	95	58	0	0	236	101	98	-3
Nigeria	175	217	128	58	53	0	0	43	9	144	182	38
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	5,381	5,654	4,862	6,107	4,885	4,834	5,466	4,988	5,892	5,701	4,841	-860
Others	1,118	817	1,332	652	779	1,235	1,279	1,248	1,193	688	949	261
Total US	6,499	6,471	6,194	6,759	5,664	6,069	6,745	6,236	7,085	6,389	5,790	-599

Source: EIA, SAF

Oil – JCPOA, deal or no deal this week ahead of Biden’s March 1 state of the union

JCPOA coming down to crunch time

We continue to see the parties indicating its down to the wire for a JCPOA deal or no deal. Rightly or wrongly, its ultimate about politics and we continue to believe that the politics point to a JCPOA deal by Feb 27 or 28. (i) On Thursday, we tweeted the political reminder [LINK] “*over/under for #JCPOA sign off by Feb 28. #Biden State of the Union is Tues March 1. Hard to believe he wants #SOTU to include couldn't get a deal done with Iran. #OOTT.”* Biden’s State of the Union is Tues March 1 and we believe one of his themes will be the US and the world is safer. Safer from Covid, but also safer from preventing Iran for having a nuclear weapon. (ii) On Friday afternoon, White House press secretary Psaki was asked on JCPOA and said “*Well, let me say, first, on the talks in Vienna, they are -- continue to be in the eighth round. It's a long round, I guess we could say. We feel substantial progress has been made in the last week and is continuing to be made, but nothing is agreed to until everything is agreed. If Iran shows seriousness, we can and should reach an understanding on mutual return to full implementation of the JCPOA within days. Anything much beyond that would put the possibility of return to the deal at grave risk.”* (iii) Israel seems to be accepting the deal is happening this week. Post Israel defense minister Gantz with VP Harris, his comments reflected this reality and turned to monitoring and enforcement. Gantz said “*A nuclear deal, if signed with Iran, does not mark the end of the road. Action must be taken to ensure that Iran does not continue to enrich in additional facilities, and oversight must be increased*.” This morning, Israel PM Bennett’s comments to his cabinet were reported saying a JCPOA agreement could be very soon and that the anticipated deal is weaker than the original JCPOA.

On Feb 1, Biden gave his clearest indicator he was prepared to give a little

We think that Biden has clearly signaled he was prepared to make changes. Our Feb 6, 2022 Energy Tidbits memo was titled “*Biden’s Team Messages Prepared to Give on “Details” to Get JCPOA Done*”. At that time, we wrote “*No question it was a week of indicators pointing to a JCPOA deal coming very soon. On Tuesday morning, we tweeted [LINK] “Sounds like #Biden prepared to make last minute concessions to get #JCPOA. "We are prepared to go back into the deal. It doesn’t mean that every detail of the negotiation has been resolved from our side, but we are* *prepared to make those tough choices" US State Dept. #OOTT." Yesterday, we retweeted [LINK] the Tuesday tweet with the message "#JCPOA. #Biden had this briefing on Tues for a reason - he is prepared to give on something to get JCPOA done. Reality is that any give will be messaged as a "detail". #OOTT ." There was a US State Department background briefing on Monday afternoon (not Tues as in my tweet) on JCPOA and it seemed like there must be a reason. Last week's (Jan 30, 2022) Energy Tidbits noted the US official comment that they were "in the ballpark" for a JCPOA deal. At the Monday briefing, the Stated Dept official was specifically asked about the "in the ballpark" comment. The official didn't shoot down or confirm the question of the other US official saying they were in the ballpark for a deal. Rather he talked about making progress but still more work to be done. But then we saw what looked to be the one big opening given by the US as to why there will be a deal. At the start, he stuck to the line that its really up to Iran and that the US will remove sanctions that are inconsistent with the JCPOA. But then there is this exchange that he admits they will have to make some concessions but these are just details. The US State Dept transcript [LINK] has the official saying "Again, your question is kind of a different way to ask the prior question about what we think, where we are in the negotiations, which I don't want to – I'm not going to address outside of the negotiating room. I'd say the decisions that need to be made by the U.S. in order to come back to the deal have been made. We are prepared to go back into the deal. It doesn't mean that every detail of the negotiation has been resolved from our side, but we are prepared to make those tough choices."*

Russia/China also signaled then a reason to think a JCPOA deal was soon

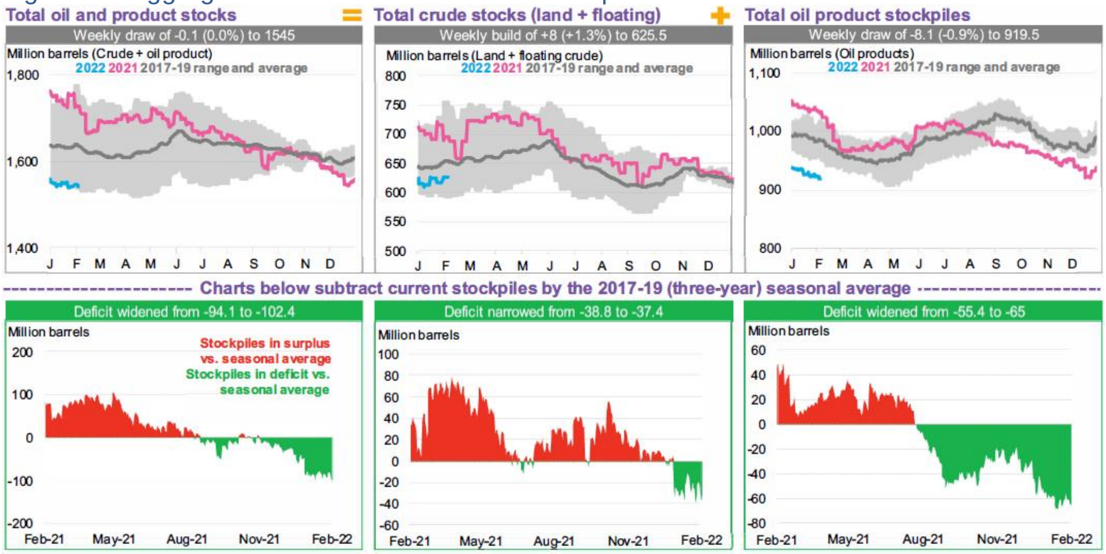
Here is what we wrote in our Feb 6, 2022 Energy Tidbits. "*We think there is another reason to think that a JCPOA deal may be soon after reading the 9-pg single spaced "Joint Statement of the Russian Federation and the People's Republic of China on the International Relations Entering a New Era and the Global Sustainable Development." [LINK] This lengthy joint statement covers almost everything you could think of where they agree or support the other. The headlines are on the shots taken at the US. and there are a lot of them. Russia and China made a point of taking shots at the US directly and indirectly. We always look for what seems off or what isn't in a statement. This is a 9-pg single spaced statement that has one of its key focuses to dump on the US. But, the interesting part of this 9-pg statement was what Russia and China did not dump on the US. There was one thing not in this and that was any specific mention of Iran or JCPOA. We read it twice and did a word search and could not see any reference. The question is why not in such a lengthy joint statement. We would have thought that, with all the slamming of the US in this joint statement, they would have included JCPOA. Russia has been critical of the US in pulling out of the JCPOA. Our assumption is that the logical reason is that there is a deal soon The closest reference was "The sides note that the denunciation by the United States of a number of important international arms control agreements has an extremely negative impact on international and regional security and stability".*

Oil – Bloomberg: global oil & products stocks deficit widened from 94.1 to 102.4 mmb

Bloomberg's Oil Price Indicators

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. 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 widened from 94.1-to-102.4-million-barrel deficit is compared to the 2017-2019 average. For the week ended Feb 4, land crude oil storage in tracked regions rose by 0.01 mmb WoW to 516.5 mmb. The stockpile deficit against the 5 yr average (2015-2019) widened from 66.3 mmb to 70.2 mmb. Total crude inventories increased by 1.3% to 625.5 mmb, including global floating inventories. Product stocks were down 0.9% WoW with the stockpile deficit against the 3-year average widening from 55.4 mmb to 65.0 mmb. Gas oil and middle distillate stocks have widened against their three-year average deficit (2017-2019) of 42.7 mmb to 44.3 mmb. Jet fuel consumption by international departures rose by 34,000 b/d WoW while consumption by domestic passenger departures rose by 19,400 b/d. Global mobility indices rose over the for the third consecutive week. 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 two weeks ago. Below is a snapshot of aggregate global stockpiles. Our Supplemental Documents package includes excerpts from the Bloomberg report.

Figure 32: Aggregate Global Oil and Product Stockpiles



Source: Bloomberg

Oil – Vortexa est 87.36 mmb at Feb 18, down 18.15 mmb WoW

Vortexa floating storage

Note that we are referencing the Vortexa global crude oil floating storage data posted on the Bloomberg terminal as of 3pm MT yesterday and 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 Feb 11 estimates posted on Feb 12 at noon MT. (i) Vortexa crude oil floating storage estimated as of Feb 18 was 87.36 mm, down 18.15 mmb WoW from 105.51 mmb as of Feb 11. Note Feb 11 was revised +4.00 mmb from the Bloomberg posted estimate as of noon MT on Feb 12 of 101.51 mmb. (ii) Unfortunately, the Vortexa estimates get revised regularly so we can't yet take too much of the large WoW decline. Floating storage has been generally stuck around the 100 mmb range for the past few months. We still think the floating storage is solid given the continuing increase to oil production (albeit less than the OPEC+ 400,000 b/d monthly increase), normal seasonal softness and still some Covid restrictions. (iii) As a reminder, Vortexa estimates get revised over the weekend, next week and even weeks later. Yesterday's Feb 11 estimate is 105.51 mmb vs 101.51 mmb as of Feb 12 at noon MT. Today's Feb 4 estimate is 108.86 mmb, almost unchanged vs 109.15 mmb as of Feb 12 at noon MT. (iv) Feb 18 estimate of 87.36 mmb is down 136.93 mmb vs June 26, 2020 peak of 224.29 mmb. (v) Feb 18 estimate of 87.36 mmb is +33.25 mmb vs pre-Covid Feb 17, 2020 of 54.11 mmb. Below is the Bloomberg posted Vortexa crude oil floating storage data for the past two years as was posted yesterday at 3pm MT.

Figure 33: Vortexa Floating Storage Feb 18 Posted on Bloomberg 3pm MT Sat

Source: Bloomberg, Vortexa

Figure 34: Vortexa Estimates Feb 19 3pm MT, Feb 12 Noon MT, and Feb 7 5am MT

Feb 19, 3pm MT estimate

FZWWFST VTXA Inde 02/17/2020 - 02/18/2022

Date	FZWWFST V... Mid Px
Fr 02/18/2022	87358
Fr 02/11/2022	105.508k
Fr 02/04/2022	108.86k
Fr 01/28/2022	100.734k
Fr 01/21/2022	103.197k
Fr 01/14/2022	88542
Fr 01/07/2022	97261
Fr 12/31/2021	100.096k
Fr 12/24/2021	101.285k
Fr 12/17/2021	99643
Fr 12/10/2021	94172

Feb 12 Noon MT estimate

FZWWFST VTXA Inde 02/10/2020 - 02/11/2022

Date	FZWWFST V... Mid Px
Fr 02/11/2022	101.514k
Fr 02/04/2022	109.153k
Fr 01/28/2022	101.597k
Fr 01/21/2022	103.983k
Fr 01/14/2022	90920
Fr 01/07/2022	99166
Fr 12/31/2021	100.133k
Fr 12/24/2021	102.646k
Fr 12/17/2021	100.084k
Fr 12/10/2021	95330
Fr 12/03/2021	93699

Feb 7. 5am MT Estimate

FZWWFST VTXA Inde 02/03/2020 - 02/04/2022

Date	FZWWFST VT... Mid Px
Fr 02/04/2022	108.29k
Fr 01/28/2022	100.389k
Fr 01/21/2022	102.233k
Fr 01/14/2022	90348
Fr 01/07/2022	98349
Fr 12/31/2021	99732
Fr 12/24/2021	102.167k
Fr 12/17/2021	99777
Fr 12/10/2021	95780
Fr 12/03/2021	92225
Fr 11/26/2021	100.026k

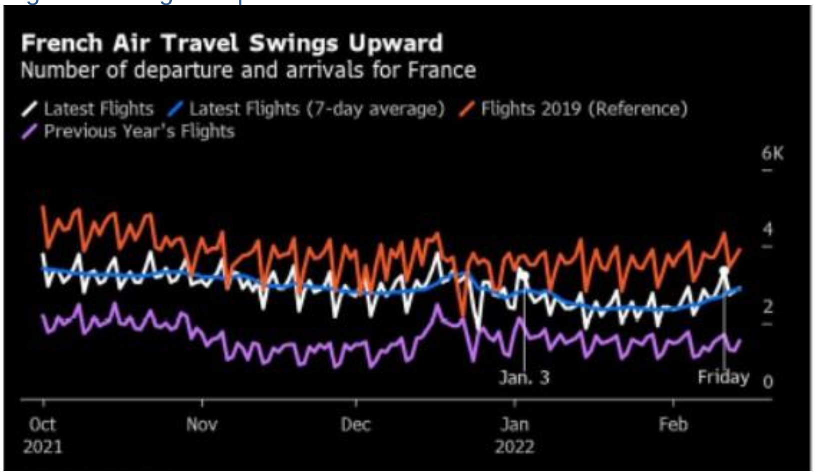
Source: Bloomberg, Vortexa

Oil – Bloomberg Oil Demand Monitor, Air Travel continues recovery

Bloomberg's Oil Demand Monitor

We recommend reading the weekly Bloomberg terminal Oil Demand Monitor for a good recap of key oil demand indicators around the world. Air traffic and passenger levels continued its recovery in Europe, Asia and the US over the past week, though jet fuel demand remains low due to lingering Covid-19 restrictions. The phase out of restrictions appears to be underway and air travel looks poised to increase once again. Total arrivals and departures in France surpassed 3,000 on Feb 11 for the first time since Jan 3; overall, air traffic in Europe was at 19,000 flights on Feb 14, down 30% from the same period in 2019 which is an improvement of +3% WoW. Both US and Chinese air passenger volumes continue to recover from the steep decline in January though China remains mostly closed to international travel. Global seat capacity rose in 16 out of 17 tracked regions on Feb 14 with a notable jump in northeast Asia; capacity is 52% higher from a year ago, still down 24% from 2019. India's Jet fuel demand in January was -41% YoY, prior to the impact from the pandemic. Jan withdrawals from Spain's Exolum pipeline – a proxy for demand – was down 12% from Jan 2019. Congestion levels increased in Paris on Feb 14, 4% above the equivalent week in 2019 while London dropped to 44% below the equivalent 2019 level though is believed to be attributed the English School's holiday break. Toll road volumes were down from 2019 across France, Italy, Spain and Brazil while Chile and Mexico were both up 12% from 2019 levels. Refinery utilization in US refineries was t 88.2% as of Feb 4, down 2.5% from 2019. US East refineries remain above pre pandemic levels, +11% from the equivalent period in 2019. Our Supplemental Documents package includes the oil demand monitor.

Figure 35: Flight Departures and Arrivals in France



Source: Bloomberg

Oil – Positive US oil demand indicators

US oil demand indicators

Bloomberg released their "US Oil Indicators" weekly report on Thursday and it provides a positive outlook for oil demand through 2022. The cold spell across the US Gulf Coast in early Feb that knocked out 1.2 mmb.d of combined production capacity appears to have subsided with total US production back at 11.6 mmb/d. The resulting outages were likely a driver of the surprise 1.1mmb/d build in inventories as reported by the EIA for the week ended Feb 11. The build creates a blurred picture of all inventories as the gains in GoM stocks were dampened by continued Cushing draws, which are at record low levels. US total rig counts increased by 22 for the week ended Feb 11, which was the largest weekly increase since Feb 2018. Gasoline demands four week moving average rose for a consecutive week as drivers return to the road after reducing activities over winter. US airport activity continued to recover closer to pre-pandemic levels with the TSA traveller throughput reached 83% of 2019 levels for the week ended Feb 11, up from 72% in Jan. Overall market indicators show mobility data continuing to steadily improve, though Tom Tom congestion data suggests the first weekly decline of 2022. US jobless claims fell for the third consecutive week to 238,000 in the first week of February. Our Supplemental Documents package includes the BloombergNEF report.

Oil – Bloomberg: Jet fuel demand up in China, Europe and the US

BNEF Aviation Indicators weekly

Bloomberg released their "Aviation Indicators Weekly" on Monday and it provides a good overview of jet fuel demand indicators. The key data in this week's reports is that the US, China and Europe all show signs of increased jet fuel demand in the near term. While Global passenger demand declined by 0.5% WoW, mainly led by Asia pacific, there were still YoY increases in all markets. Europe has begun relaxing restrictions across the UK, Greece, and Portugal and travel has become much easier, with the warm weather approaching we expect the demand for air travel will increase promptly. Departures in the Eurocontrol area have increased 8% WoW and are now at 70% of the 2019 levels; US passengers increased by 13% WoW to average 1.6 million passengers per day. Global jet fuel demand grew by 0.5% WoW. While there was a decline in jet fuel demand in Asia Pacific, mainly attributed to the Lunar holiday, China cut fewer flights than any other week in 2022, a positive sign for jet fuel demand moving forward. The passenger flight schedule for the next 12 weeks ahead is 0.7% lower WoW, which is the lowest level of cuts in several months. 600 flight per day have been cancelled on average in the coming 12 weeks, half the registered level in recent weeks. Our Supplemental Documents package includes the Bloomberg report.

Oil & Natural Gas – sector/play/market insights from Q4 calls

Sector insights from Q4 calls

This is our favorite time each time of each quarter as it is quarterly reporting and this is when we get the best insights into a range of oil and gas themes/trends, sectors and plays. As a reminder, our Energy Tidbits memo does not get into the quarterly results, forecasts, or valuation. Rather the purpose of highlighting a company is to note themes/trends and plays that will help shape a reader's investment thesis to the energy sector. In the conference calls, we also tend to find the best insights from the Q&A portion as opposed to the prepared remarks. Plus, we tend to get the best E&P sector insights from services, pipelines, refineries, and utilities

Eni – "structurally undersupplied" oil and natural gas markets

Eni held its Q4 call on Friday. We reviewed the Q4 call transcript, but found the best perspective on CEO Claudio Descalzi's outlook for oil and natural gas didn't come from mgmt's prepared remarks or the Q&A. Rather, they came from the FT's reporting on Descalzi's comments made outside of the investor Q4 call. The Q4 call did not include these outlook comments. Note that Descalzi says "*at least"* in referring to how long oil and natural gas markets will be undersupplied. We tweeted [LINK] *"#Eni CEO expects "oil market to remain "structurally undersupplied" for at* *least another 2 years, and the gas market for the next 4 to 5 years". why didn't he give this outlook in Q4 call? Thx to @thomas_m_wilson for this insight. #OOTT #NatGas."* The FT report [LINK] was titled "*Eni chief predicts gas market will remain tight for at least four years"* and "*Natural gas markets will remain tight for at least the next four years, Eni's chief executive has said, as the Italian energy major reported its highest annual profits since 2012 thanks to soaring prices. European gas prices are at record levels and oil at a seven-year high as supply has struggled to keep pace with resurgent demand.Eni boss Claudio Descalzi said the imbalance predated the pandemic and was a result of falling investment in oil and gas production since 2015. "I don't think the situation can change drastically because most of the major companies are engaged in the transformation, in climate change action," he said. As a result, he expected the oil market to remain "structurally undersupplied" for at least another two years, and the gas market for the next four to five years, until a planned major expansion of liquefied natural gas production in Qatar is completed around 2026."* Our Supplemental Documents package includes the FT report.

Patterson-UTI – Customers will pay more for eco friendly operations

Last Thursday, Patterson-UTI held its Q4 call. There was a good reminder that costs are going higher for oil and gas companies as they try to have a better ESG footprint. (i) Mgmt said "*We continue to see strong demand from customers, who are willing to pay a higher day rate for environmentally friendly sustainability solutions that help to reduce fuel costs and emissions, and we plan to continue investing in our fleet during 2022 to increase our sustainability solutions. For instance, we ended 2021 with six Ecocell units deployed and driven by strong customer demand, we plan to continue adding Ecocell units in our fleet throughout 2022."* In their 2020 sustainability report, Patterson-UTI described EcoCell as "*Our contract drilling business is expanding the use of lithium battery technology in our rig fleet through our proprietary EcoCell™ technology. EcoCell™ is an energy management system for drilling rigs that uses lithium batteries to store and dispense energy for use in drilling operations. This system stores energy in lithium batteries at times when demand from operations is lower than the rig's generator capacity and provides supplemental power back to the rig when demand exceeds the rig's generator capacity."* (ii) Will cost more if oil and gas companies want electric frac spreads. Patterson-UTI basically said they don't do it because they can't get a return ie. they would have to charge big dollars. In the Q&A, mgmt was asked what would you do if a customer wants Patterson-UTI to evaluate an electric frac solution. Mgmt replied "*I'm not interested in electric solution. I just don't think it. Yeah, You want me to -- everybody says electric it's natural gas, let's just call it, what it. And you've got to have a natural gas source, you've got to have some time of you determine generator or reset engine producing electricity to get VFT house, you got to have of cables, you got to have wiring. It's not something that I want to do and trust me, we know how to do it. We have an Electrical Engineering division, we own thousands of electric motors in our rig business with be VFD [ph] controls, so we're very familiar, but I just. -- I don't see the return on electric."*

Weatherford – Labor/supply chain issues from 2021 will be ongoing in 2022

Weatherford had its Q4 call on Thursday and gave a clear warning on inflationary costs are ongoing in 2022. In their prepared remarks, mgmt said "*We faced significant challenges including inflationary pressure, supply chain bottlenecks, and ongoing disruptions caused by the pandemic.*" In the Q&A, mgmt gave a more detailed answer. Mgmt replied "*Sure. Hey looks, so I'll start with supply chain. I think those issues truly are global, it's not restricted to the US alone. The logistics challenges on a little bit different just given in the US, the our transportation infrastructure that we've got and a lot of the trucking capabilities across, but look, we are seeing very significant shortages and your constraints around shipping lanes and freight charges and stuff like that. So overall, getting raw materials do factories especially where you've got electronics components and we do a lot of our high-tech applications etc., That is a challenge for us today on a global basis. From a labor labor side of it, I look at us a little bit different. I would say, the US has a much more fluid labor market than the rest of the world generalizing to a very large extent. We've also got different dynamics in terms of the unionization piece, etc., So, would say the labor side is a tad, but more challenging in the US and a little bit more stable in the rest of the world, but you've got inflation aspects that are very different again by country.*"

Energy Transition – BlackRock focuses on net zero but that includes oil and gas

BlackRock's net zero investing

There was a lot of headlines this week on BlackRock's reported Jan 3 memo to Texas financial institutions on its position to support fossil fuel companies including Texas fossil fuels companies. This should not have surprised anyone has BlackRock has done a major shift in their fossil fuels investing. This isn't an abrupt shift. (i) Rather it started on June 2, 2021 with CEO Larry Fink's comments at a US sellside conference. In our June 6, 2021 Energy Tidbits, we wrote that he concluded his address "*The last thing I just want to say and to link in ESG&E with the question on inflation, let's be clear. If we rush this and if our solution is entirely just to get a green world, we're going to have much higher inflation, because we do not have the technology to do all this yet to have it equivalent to the cheapness of hydrocarbons. And so that's going to be a big policy issue going forward too. Are we going to be willing to accept more inflation if the inflation is to accelerate our green footprint? And that's going to be a big policy question".* That was the first clear sign of a change and we noted other comments in our 2022 Energy Tidbits. But this change in fossil fuels has been clearly laid out in 2022. (ii) Our Jan 23, 2022 Energy Tidbits memo was titled *"BLK CEO Need to Rapidly Admit We Will Not Survive With the Society We are Accustomed Without Hydrocarbons Right now*". It featured CEO Fink's letter to CEOs on BlackRock's view of capital allocation. (iii) Last week's (Feb 13, 2022) Energy Tidbits memo was titled "*BlackRock's New "How to Invest in the Net Zero Transition" is Positive for Oil and Natural Gas Stocks*" and featured BlackRocks letter to clients on how to invest in the Net Zero Transition. The bottom line is that BlackRock made a big change to its investing in oil and gas and it is a positive to oil and gas stocks. Our Supplemental Documents package includes BlackRock's how to invest in the net zero transition [LINK] , the Fink letter to CEOs and the transcript from Fink's Jan 18 CNBC interview.

Fits our 2022 Prediction #1, leaders admit energy transition isn't working

The BlackRock and others changed views on oil and gas stocks fits to what we believe is the #1 change in energy views in 2022. In our Dec 12, 2021 Energy

Tidbits, we noted what we called our 2022 Prediction #1. At that time we wrote "*Its December and so analysts will soon be coming out with 2022 predictions, so we thought we would beat them with one of our main 2022 predictions. On Thursday, we tweeted [LINK] "Time for #2022Predictions. My #1 is more #EnergyTransition #NetZero leaders come out of closet, have a #MacronMoment ie. have "transition" not self inflicted shortage so 2021 energy crisis isn't every year. A return to #EnergySecurity = #Oil #NatGas #LNG strong thru 2030. #OOTT." This should not surprise readers as we have been noting the start of energy transition leaders starting to admit, in a politician's manner, that the energy transition isn't working as per aspirations and energy costs will be a lot higher than aspired. We have said for years that the energy transition will happen, but it will take longer, be bumpy road and cost more than the aspirations. Last week's (Dec 5, 2021) Energy Tidbits wrote on the ADNOC CEO speech There was much more in the speech, which is why we tweeted [LINK] "If more leaders have a "Macron Moment" in 2022, maybe COP28 UAE in 2023 can be catalyst for getting down to work on practical, commercial, sustainable energy solutions: pro climate/pro growth? See SAF Group transcript of @SultanAhmedalj8 #ADIPEC keynote. #EnergyTransition #OOTT." We do wonder if we will see more world leaders accept that the energy transition isn't working according to their aspirations and that there is an increasing risk of a decade of energy crisis like seen in Europe in H2/21 unless the world puts in an achievable energy transition plan." We think COP26 will turn out to be turning point, but a turning point to force energy transition leaders into changing their plan. It why we think we will more of the energy transition leaders come out of the closet and admit this in 2022. But what got us to tweet this week was after seeing Saudi Aramco CEO Nasser speech at the WPC in Houston. Nasser said "There is one more thing that can no longer remain unsaid. A majority of key stakeholders agree with these realities as much as they believe in addressing climate change. We know this, because they say so in private. They should say it publicly too. I understand their dilemma. Publicly admitting that oil and gas will play an essential and significant role, during the transition and beyond, will be hard for some." So our #1 2022 Prediction is that we will see leaders come out of the close and admit, in a politician's way, that the energy transition plan needs to be changed. The key result will be that fossil fuels are needed for way longer and the outlook for oil, natural gas and LNG will be stronger thru 2030 and beyond.*

Energy Transition – Japan's ammonia push for energy to cost twice as much as LNG

Japan's ammonia push

Our view is unchanged for the past couple years – the energy transition is happening, but it will take longer, cost more and be a bumpy road. Energy is just going to cost more, it's a question of how much more. We were reminded of this as Japan is getting serious on using ammonia, but it will also cost more. On Friday, Bloomberg reported "*Japan's top power producer will start one of the largest global auctions to buy ammonia, as it bets on the clean-burning fuel to curb emissions and hit its green goals. Jera Co. aims to sign a long-term contract to purchase the ammonia starting from 2027, which the utility will use to replace some of the coal at one of its power plants".* We should be clear that this is basically nothing in terms of Japan's total energy consumption, but it is a sign Japan is starting to get serious to start to use ammonia. Later on Friday, Bloomberg's Stephen Stapczynski tweeted [LINK] "*The clean ammonia that Jera plans to procure will cost two-times more than LNG. Not* *a cheap investment*". We then tweeted [LINK] "*Buckle up. We've only just begun trend of higher energy costs under #EnergyTransition. makes sense its 2x LNG cost, RFP is for green or blue #Hydrogen so instead of existing #NatGas/#LNG supply chain, use #NatGas with #CCS under a to be created #BlueHydrogen supply chain. #OOTT*. It just makes sense that the cost will be at least twice as much as LNG. If anything, we are surprised, its only twice as much. We suspect that is because they likely aren't reflecting the costs to build the entire supply chain for ammonia.

Energy Transition – Australia's energy transition accelerates

AUS bumps up timeline for coal power plant closure

Australia continues to move to progress its energy transition as it closes its largest black coal fired power station. Argus media reported Friday [LINK] that the 2,880 MW, Eraring plant, will closed 7 years earlier than planned with a new closure date of August 2025. This is believed to be following the increased competition for renewables. The plant will partially be replaced by a 700 MW battery that the Australian Origin Energy intends to install in the Hunter Valley region of New South Wales. The closure of the Eraring plant will be followed by 2 more plants (Bayswater and Vales Point) with closing dates in 2029 and 2030, leaving the 1,400 MW Mountain Pipe facility the remaining coal plant until its scheduled closure date of 2040. Coal generated 68% of New South Whales electricity in the past 12 months; Mount Piper generates 14% of NSW's. The closure of the plants is expected to reduce emissions significantly with Argus noting *"Origin estimated that Eraring's emissions were more than 12mn t of CO2e last year. AGL has said the closure of Liddell will reduce GHG emissions by 8mn t/yr of CO2e. The closure of their two coal-fired power plants will cut emissions by a total of around 20mn t of CO2e by the end of 2025, or 38pc of NSW's emissions from electricity and 11pc of emissions from the NEM."* The shutting of four coal-fired power plants will affect domestic NSW coal consumption, which totalled 25.8mn t in the 2019-20 fiscal year to 30 June or more than a quarter of domestic national use over the same period. The Australian federal government has warned of higher power prices and possible outages with the coal-fired power plant closures. This has been a consistent message since Australian energy minister Angus Taylor took up his role in August 2018. Renewables are expected to have lower operating costs than coal fired plants which is the key rationale behind the acceleration of the closure of the Eraring plant. Renewables accounted for about a third of power generation in the National Energy Market in the past 12 months, with it expected to extend the trend of increasing market share. Australia plans to be a leading producer of hydrogen for domestic use and support with a $3bn state funded investment plan for the expansion of hydrogen related projects. Our Supplemental Documents package includes the Argus report.

Capital Markets – Fed's Bullard "we've been surprised to the upside on inflation"

FED was surprised on inflation

We have to give St. Louis Fed President Jim Bullard for his use of the royal "we" when he said "*we've been surprised to the upside on inflation. There is a lot of inflation in the US economy. 7.5% on the headline CPI. These are numbers Alan Greenspan never saw*." Because it's like they don't know what is going on with day to day prices and cost of living. But we guess it's like the US food price index data that we have questioned for months as to how it isn't higher. It does feel like they are out of touch. We just don't know how that happens unless they don't do things like go to stores, talk to people. because if they did, they would be no different than others and question the data. Sometimes when things seem off, they are off. But it just seems like they haven't any real life experiences to question that things might be off.

Capital Markets – Much more to Emergencies Act than the talking points & headlines

Canada invokes Emergencies Act

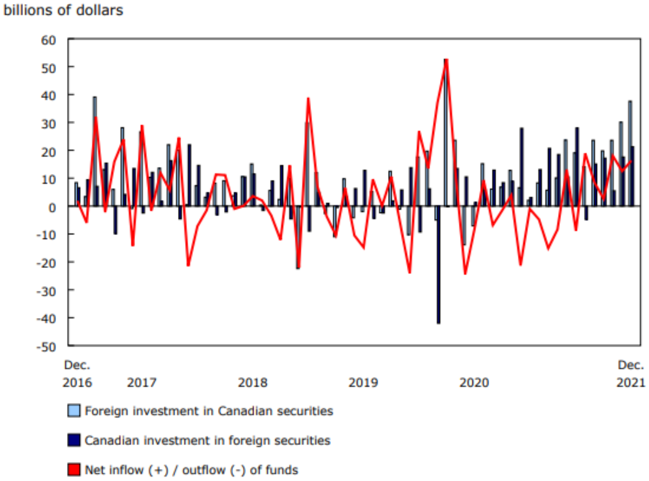
It's been a huge week in Canada with the invoking of the Emergencies Act raising major divisions. It was the only the second invoking of the Emergencies Act or its predecessor, War Measures Act, in peace time since WWII. We are trying to avoid the debate of left vs right. But we feel compelled to say something as it does impact capital in Canada. We did not just listen to the soundbites and read the reporting. We recommend reading some of the backup detail and not just listening to what the cabinet ministers are saying. For example, the cabinet ministers are stressing this is a temporary move, but in reading the backup detail, it was interesting to note that only certain items were specifically referred to as being temporary. If all of this was temporary, why would some items be referred to as temporary? The headlines are on how the chartered banks can freeze accounts and provide more info, but it is important to note that its much more than just Canadian chartered banks that are affected, it includes money managers, stockbrokers, etc. These other financial groups are well versed in working to not deal with the risk of money laundering. But this goes much more than that. It's really worth reading the backup to see there is much more than just freezing some Designated Person's account. The headlines are also on the protesters, but it's worth reading what the backup detail includes as a Designated Person – many more people are included beyond actual protesters. It's interesting to note that there hasn't been the level of resistance from the left even if just for the risk of future Emergencies Act repeats during peace time. We suspect that there would be more concern on the future if this had been a Conservative govt action. Our Supplemental Documents package includes some of the backup to the Emergencies Act.

Capital Markets – Canadian investors acquire $21.3 bn in foreign securities

International transactions in Cdn securities

Statistics Canada released Canada's international transactions in securities for December 2021 on Feb 17 [LINK]. Foreign investors acquired $37.6 bn of Canadian securities in December with the largest target in purchases being shares of trade and transportation companies. This marks the largest investment since April 2020 when a record investment was incurred at the outset of Covid. Non-residents added $20.6 bn of Canadian debt securities to their portfolios in December. Non-resident investors acquired $12.8 bn of money market instruments to their portfolios mainly made up of private corporate instruments. Long term interest rates continued their upward trend this month. Canadian investors acquired $6.3 bn of foreign debt securities in December which was the 11 consecutive month of investment in debt instruments. Investment activity was led by acquisitions of non–US foreign bonds and a divestment in non-US foreign shares. The report stated, *"Canadian investors added $6.3 billion of foreign debt securities to their portfolios, the 11th consecutive month of investment in these instruments. Acquisitions of US government bonds, the largest since July 2018, contributed the most to the investment activity in December. Canadian acquisitions of foreign securities reached $21.3 billion in December following strong purchases in November. After acquiring $7.4 billion of US shares in November, Canadian investors added $13.4 billion worth to their holdings in December. US stock prices, as measured by the Standard and Poor's 500 composite index, were up by 4.4% in December."* Below is a graph illustrating foreign investment in Canadian debt securities.

Figure 36: Foreign Investment in Canadian debt securities



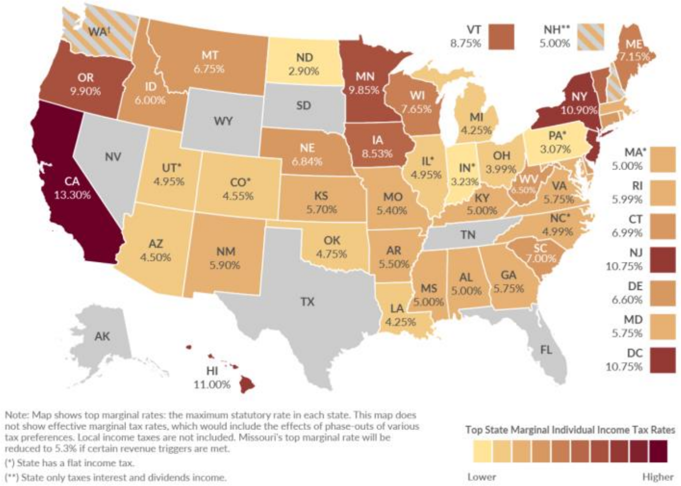
Source: Statistics Canada

Capital Markets – No surprise, California & New York are highest state income taxes

Marginal income tax rates in 2022

There is no surprise on which states have high income taxes vs those that have zero or low income taxes. We have been highlighting for years how many people we know have moved from high state income tax states to low state income tax states, especially as they also have the benefit of good weather. On Tuesday, the Tax Foundation [LINK] provided their updated look at 2022 US states individual income tax rates and brackets. Individual income taxes are a major source of the government revenue, accounting for 36% of total revenue. 43 states levy and income tax while 7 have no income tax at all; these states include Texas, Florida, Nevada, Wyoming, South Dakota and Tennessee. 41 of the states that have implemented an income tax, only tax wage and income while states like New Hampshire and Washington tax interest, dividend and capital gains income. Of those states taxing wages, nine have single-rate tax structures, with one rate applying to all taxable income. Conversely, 32 states and the District of Columbia levy graduated-rate income taxes, with the number of brackets varying widely by state. Kansas, for example, is one of several states imposing a three-bracket income tax system. At the other end of the spectrum, Hawaii has 12 brackets. The top marginal rates of taxation range from 2.9% in North Dakota to California who taxes 13.3%. California is the highest income tax state with New York and Hawaii next closest with 11% and 10.9% respectively. Below is a graphic depicting income taxation in the US.

Figure 37: State Individual Income Tax Rates and Brackets 2022



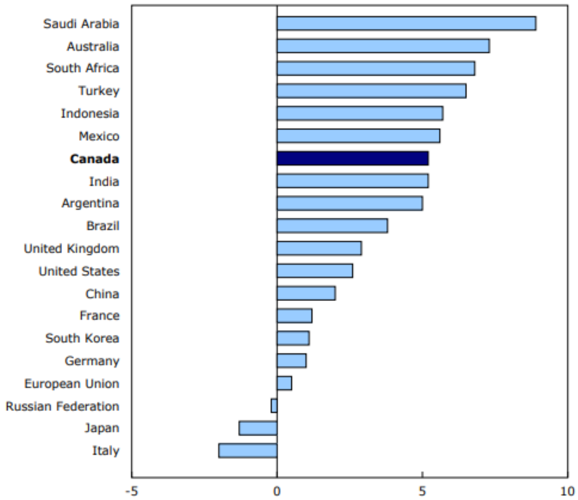
Source: Tax Foundation

Demographics – Canada's population grew faster than other G7 countries in 2016-2021

Developed countries are aging and that will be a major social and financial issue in the coming decades. One of Canada's relative advantages is our overall population is expected to age at a slower rate, in great part because immigration is keeping our population growing. Canada's population has grown at a rapid pace when compared to other developed nations. Stats Canada release its population Census data that covers the period from 2016-2021 [LINK] on Feb 9. While the pandemic halted population growth in 2020, it continued to be the fastest amongst G7 countries. Canada currently has ~37 million residents, approximately 1.8 million (5.2%) more than in 2016, with most of the increases occurring prior to the pandemic. Canada's population grew by a record 583,000 people (+1.6%) in 2019. The population growth was driven primarily through immigration and not fertility from 2016-2021 and was responsible for the slowdown since 2020, as border restrictions have made it more difficult to migrate between nations. For the first time, the population in the Maritimes grew at a faster pace than the prairie provinces, with PEI noting recording an 8% increase in population; the Yukon grew at the fastest rate from 2016-2021, up 12.1% over the period and BC was the third fastest growing province with a growth rate of 7.6%. Newfoundland and Labrador was the only province to observe a decline in all of Canada, down 1.8%. Canada's population has grown at nearly twice the rate of other G7 countries, with the UK as the next closest with a growth rate of ~3.0%, the US was right behind with a growth rate of ~2.9%. Canada's increase was due to higher immigration rates than peer nations within the G7, which has offset Canada's declining natural growth rate that fell from 0.3% in 2016 to 0.1% in 2021, unlike other G7 nations. Canada ranked 7th in population growth rates amongst G20 nations with Saudi Artabia at number 1 with a growth rate of ~9%. Below is a chart depicting population growth rates of G20 members.

Canada's population grew +5.8% since 2016

Figure 38: Population Growth Rates Amongst G20 Nations



Source: Statistics Canada

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].

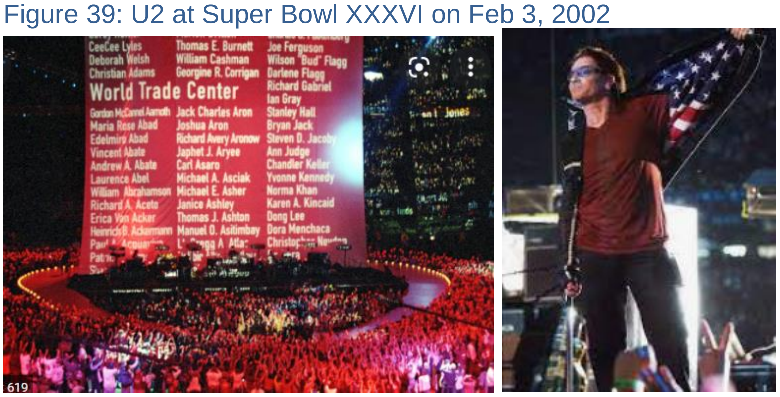
Misc Facts and Figures.

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.

My vote for best Super Bowl halftime show is still U2 at XXXVI

It was interesting to see the debate if last week's Super Bowl halftime show was the best ever or was it Prince in Super Bowl XLI or Bruce Springsteen in Super Bowl XLIII or name your pick. Mine is still U2 at Super Bowl XXXVI on Feb 3, 2002. I had just seen U2 on its Elevation Tour stop in Calgary on April 9, 2001. But it wasn't for that reason it was that this was the first Super Bowl after 9/11 and U2's song was a tribute to the USA and all the people who lost their lives on 9/11. As they play "where the streets have no name", the screen rolls up all the names of those who lost their lives on 9/11 on the airplanes, at the pentagon, World Trade Center, etc. There was a very dramatic part at around 5 min mark, when the projection of the names crumbles down with the imagery of how we all saw the World Trade Center Towers collapse. Then as the song reaches its end Bono opens up the his leather jacket and shows the stars and stripes inside. I can't imagine the passion, feeling and resolve that was felt by all our American friends at that moment. A good replay is at [LINK].

Figure 39: U2 at Super Bowl XXXVI on Feb 3, 2002



Source: CNN, USA Today

The new Valentine's Day practice for dinner reservations

I suspect that this will surprise many people but apparently there is a new growing Valentine's Day practice for restaurant reservations. One of my friends owns a good restaurant in Calgary. I asked how Valentine's Day was for business. He said was supposed to be packed all night, but turnout to have a huge number of no shows. He explained that, starting in the last five years or so, they have large number of no shows for big nights like Valentine's. Apparently, the new practice is for the man to make a number of reservations so, that night, the woman can choose one. And almost never will they call to cancel, they just don't show up. Or if they call to ask if they are coming, no one picks up. I explained what happens at better restaurants in Los Cabos at busy times such as Christmas week – they take the credit card to hold it and if you don't show up, they run a charge through it. He needs to do something as it is not fair that he will make sure there are all the fresh ingredients that don't get used.

Liberation of Kuwait was 31 years ago

It's hard to believe it was 31 years ago that the US led air campaign started (Feb 24, 1991) that led to retaking Kuwait from Saddam Hussein's Iraq. Saddam. Iraq had taken control of Kuwait in the summer of 1990. The US started the air campaign on Feb 24 and, by Feb 28, the rout was on and Iraqi troops were rushing to get out of Kuwait back to Iraq. But on the way out of Kuwait, they set on fire oil wells and the famous picture of burning oil wells in Kuwait. It caused a blackening of the skies over much of Kuwait.

Figure 40: Burning Kuwait oil wells Feb 1991

Source: Wikiwand

UK worst football club fan food

We look at UK press most days, in great to look at their “football” coverage. Last Sunday, The Sun posted “*SNACK OF THE NET Worst football club fan food revealed as Man Utd serves up scrambled egg with mashed potato*.” [LINK] The Sun had a number of pictures, but two jumped out were the Cheesy Chips for £4 (C$7) at Birmingham City and for £3.50 (C$6.15) at Weymouth. We have to love the Birmingham City cheesy chips being an order of chips with a piece of processed cheese placed on top. Our other thought was what about doing the Canadian thing and adding some gravy as it would make the Weymouth cheesy chips more of a poutine.

Figure 41: “Cheesy Chips” at Birmingham City (L) and Weymouth (R)

Source: The Sun

Liberals invoking the Emergencies Act reminds of the 1970 “October Crisis”

We didn’t have cable news or round the clock news in 1970, but anyone over 65 or so, remembers well the last time Canada invoked the Emergencies Act or its predecessor War Measures Act. This is only the 2nd time that Canada has invoked either of these acts in peacetime. Because even then, it did make a lot of news as it was the first ever peace time invoking of the War Measures Act. The prior two times being WWI and WWII. It was in the “October Crisis” in Quebec. The Canadian Encyclopedia summary is [LINK] “*The October Crisis refers to a chain of events that took place in Quebec in the fall of 1970. The crisis was the culmination of a long series of terrorist attacks perpetrated by the Front de libération du Québec (FLQ), a* *militant Quebec independence movement, between 1963 and 1970. On 5 October 1970, the FLQ kidnapped British trade commissioner James Cross in Montreal. Within the next two weeks, FLQ members also kidnapped and killed Quebec Minister of Immigration and Minister of Labour Pierre Laporte. Quebec premier Robert Bourassa and Montreal mayor Jean Drapeau called for federal help to deal with the crisis. In response, Prime Minister Pierre Trudeau deployed the Armed Forces and invoked the War Measures Act — the only time it has been applied during peacetime in Canadian history*."