Energy Tidbits

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Vitol's Muller on Russia's 7+ mmbd Oil/Products Exports "It is Impossible, Let Me Repeat, It is Impossible for the World to Get By Without All of That"

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. Our target is to write on 48 to 50 weekends per year and to post by noon MT on Sunday. The Sunday noon timing was because PMs said they didn't have research to read on Sundays and Sundays are a day when they start to think about the investing week ahead.

This week's memo highlights:

1. Vitol's Asia Head Mike Muller reminds it is impossible for the world to get by without all of Russia's 7 plus mmb/d oil and products exports. (Click Here)
2. Gazprom shuts down all deliveries on Nord Stream, no idea if it will resume supply before winter. (Click Here)
3. Is Iran just haggling on JCPOA details and not reopening big issues that the US said were resolved? (Click Here)
4. Mixed opinions on OPEC+ meeting tomorrow if they will cut or not cut. (Click Here)
5. California extends Diablo nuclear plant for 5 years, follows last Aug approval for five natural gas plants. (Click Here)
6. Please follow us on Twitter at [LINK] for breaking news that ultimately ends up in the weekly Energy Tidbits memo that doesn't get posted until Sunday noon MT.
7. For new readers to our Energy Tidbits and our blogs, you will need to sign up at our blog sign up to receive future Energy Tidbits memos. The sign up is available at [LINK].

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Natural Gas – Natural gas injection of +61 bcf, storage now -228 bcf YoY deficit

YoY storage at -228 bcf YoY deficit

The YoY storage deficit started the winter at -282 bcf YoY at Oct 31 and is now -268 bcf YoY. The EIA reported a +61 bcf build (+58 bcf expectations) for the Aug 26 week, which was above the 5-yr average build of +46 bcf, and above last year's injection of +20 bcf. Storage is 2.640 tcf as of Aug 26, decreasing the YoY deficit to -228 bcf vs -296 last week and is -338 bcf below the 5-year average vs -296 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 (08/26/21)		5-year average (2017-21)	
Region	08/26/22	08/19/22	net change	implied flow	Bcf	% change	Bcf	% change
East	614	598	16	16	676	-9.2	711	-13.6
Midwest	747	714	33	33	809	-7.7	811	-7.9
Mountain	157	153	4	4	190	-17.4	188	-16.5
Pacific	241	243	-2	-2	243	-0.8	273	-11.7
South Central	881	871	10	10	951	-7.4	995	-11.5
Salt	185	184	1	1	216	-14.4	239	-22.6
Nonsalt	696	687	9	9	735	-5.3	756	-7.9
Total	2,640	2,579	61	61	2,868	-7.9	2,978	-11.3

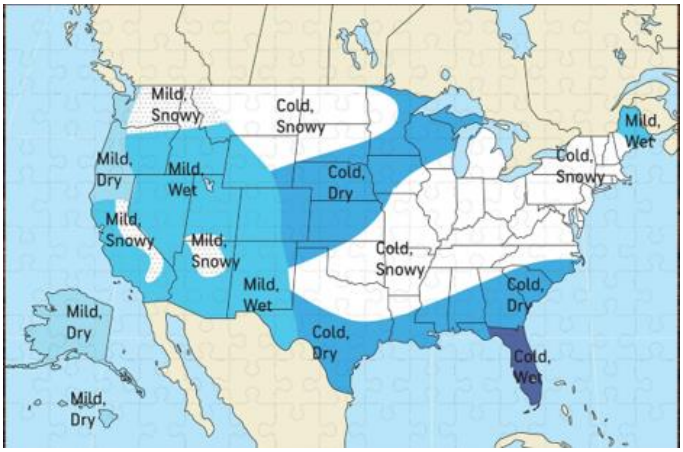
Source: EIA

Natural Gas – Old Farmer's Almanac calls for cold winter in the US

Old Farmer's Almanac calls for cold winter

Our normal comment at this time of year is that it's still early so long-term winter forecasts don't have much of an impact on natural gas markets going into Labor Day. And that's even moreso this year given the global shortage of natural gas and LNG post Russia/Ukraine. Plus, normally, the only time early winter forecasts tend to have an impact is when there is a clear view of an El Nino winter. On Aug 31, the Old Farmer's Almanac released its 2022-2023 Winter forecast [LINK]. The Old Farmer's Almanac is forecasting a cold winter for the eastern 2/3 of the US and a mild winter in the west 1/3 of the US. This should provide support for natural gas consumption. Looking at the regional assessments, it looks like a "tale of two winters" in the US during the colder months. They specifically highlight that winter temperatures will be colder than normal across most of the country in the northern and eastern states but milder at in western and southern regions. The Old Farmer's Almanac wrote "*Winter temperatures will be colder than normal across much of the country between the East Coast and Rockies. Snowfall will be greater than normal from central New England through northern North Carolina, from the Lower Great Lakes and the Ohio and Tennessee Valleys into the southern Plains, from the northern Plains into eastern Washington, and across the higher terrain of the southern Rockies and California. Freezing temperatures will also bring above-average snow totals to most areas in the eastern U.S. that typically experience snowfall."* Our Supplemental Documents includes the Old Farmers' Almanac release.

Figure 2: Old Farmer's Almanac Winter 2022-2023 Forecast

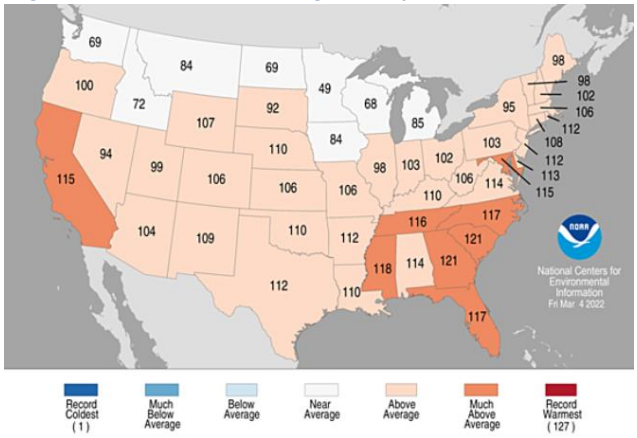


Source: Old Farmer's Almanac

Winter 2021-2022 was one of the warmest DJF in the US on record

US HH natural gas prices have been driven to these high levels by global LNG markets. But winter weather is always a key to natural gas prices. Last year, it didn't make a difference because of what happened to natural gas and LNG markets post Russia's invasion of Ukraine. As a reminder, HH was $3.82 on Dec 31, 2021 as it was a warm start to a warm winter. Dec/Jan/Feb was the 18th hottest winter in the last 127 years. It was very hot in almost all states. Below is NOAA's statewide average temperature maps for Dec/Jan/Feb. [LINK]

Figure 3: Statewide Average Temperature Ranks Dec 21-Feb 22



Source: NOAA

Natural Gas – US June gas production +0.9 bcf/d MoM to 97.7 bcf/d

US May gas production +4.5 bcf/d YoY

We continue to see support for the view that US shale/tight natural gas looks to have moved to stronger growth. US natural gas supply from both dry shale gas and association gas from shale/tight oil continues to be up strongly YoY. The EIA released its Natural Gas Monthly on Wednesday, [LINK], which includes its estimates for "actuals" for June gas production. The key takeaway from the June actuals is that June was +0.9 bcf/d MoM to 97.7 bcf/d and has surpassed the recent Nov/Dec 2021 peak of 97.0 bcf/d. June 2022 is +4.5 bcf/d YoY. Our Supplemental Documents package includes excerpts from the EIA Natural Gas Monthly.

Figure 4: US Dry Natural Gas Production

bcf/d	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	56.0	60.0	66.0	65.3	66.8	73.4	73.6	70.6	78.7	89.4	95.1	92.8	94.8
Feb	57.2	58.8	67.0	65.4	68.4	73.8	77.3	71.5	80.4	90.0	98.1	86.2	94.1
March	57.3	61.5	65.0	65.3	68.9	74.1	73.8	73.2	81.3	90.6	94.6	92.3	94.9
Apr	57.6	62.3	64.8	66.1	70.5	75.2	73.7	73.3	81.2	91.0	92.9	93.2	96.0
May	58.0	62.4	65.0	65.9	70.2	74.1	72.9	73.3	82.1	91.7	87.8	93.0	97.0
June	57.2	62.1	64.6	65.8	70.5	74.0	72.2	74.0	82.5	92.0	88.4	93.2	97.7
July	58.2	62.5	66.3	67.1	72.0	74.2	72.8	74.7	84.2	92.5	89.8	93.7	
Aug	58.9	63.2	66.0	66.9	72.4	74.3	72.2	74.7	85.9	94.8	90.2	94.3	
Sept	59.1	63.1	66.4	66.8	72.4	74.7	71.7	76.0	87.3	94.7	89.5	93.6	
Oct	60.1	65.1	66.5	67.0	73.1	74.2	71.4	77.3	88.4	96.0	88.9	95.6	
Nov	60.1	65.9	66.6	67.7	72.6	73.9	72.0	79.8	89.9	96.7	92.0	97.0	
Dec	61.0	65.6	66.0	66.5	73.2	73.9	71.2	80.4	89.5	97.0	92.5	97.0	
Average	58.4	62.7	65.9	66.3	70.9	74.2	72.9	74.9	84.3	93.0	91.6	93.5	95.7

Source: EIA

Natural Gas – US LNG exports +1.0 bcf/d YoY in June to 10 bcf/d

US June LNG +1.0 bcf/d YoY

As expected, US LNG exports were lower in June because of the Freeport LNG 2.2 bcf/d shut down on June 8. US LNG exports were down after monthly record of 11.7 bcf/d in March, and 11.3 bcf/d in May to 10.0 bcf/d in June. The Freeport LNG explosion was on June 8 so June would have included some Freeport LNG shipments. This is the first-time exports has been below 11 bcf/d since November 2021. The big driver to stronger (and higher downside support) US natural gas prices has been the ramp up in US LNG exports, which are up ~8 bcf/d over the past 3 years. This is over 2.5 tcf a year of added gas demand for US natural gas supply. On Wednesday, the EIA Natural Gas Monthly reported "actuals" for US LNG exports were 10.0 bcf/d in June, which is up +1.0 bcf/d YoY and down -1.3 bcf/d from May of 11.3 bcf/d. Note our table rounds to one decimal and the actual is 11.022 bcf/d for June. Below is our table of EIA's monthly LNG exports.

Figure 5: US LNG Exports (bcf/d)

(bcf/d)	2016	2017	2018	2019	2020	2021	2022
Jan	0.0	1.7	2.3	4.1	8.1	9.8	11.4
Feb	0.1	1.9	2.6	3.7	8.1	7.4	11.3
March	0.3	1.4	3.0	4.2	7.9	10.4	11.7
Apr	0.3	1.7	2.9	4.2	7.0	10.2	11.0
May	0.3	2.0	3.1	4.7	5.9	10.2	11.3
June	0.5	1.7	2.5	4.7	3.6	9.0	10.0
July	0.5	1.7	3.2	5.1	3.1	9.7	
Aug	0.9	1.5	3.0	4.5	3.6	9.6	
Sept	0.6	1.8	2.7	5.3	5.0	9.5	
Oct	0.1	2.6	2.9	5.7	7.2	9.6	
Nov	1.1	2.7	3.6	6.4	9.4	10.2	
Dec	1.3	2.7	4.0	7.1	9.8	11.1	
Full Year	0.5	1.9	3.0	5.0	6.6	9.7	11.1

Source: EIA

Natural Gas – US pipeline exports to Mexico flat MoM at 6.0 bcf/d in June

US pipeline exports to Mexico

The EIA Natural Gas Monthly also provides its "actuals" for gas pipeline exports to Mexico, which were 6.0 bcf/d in June, down 0.6 bcf/d YoY and flat MoM from May. US natural gas exports have been mostly stuck since Covid, but the completion of new pipeline infrastructure such as the Wahalajara system [LINK] should help increase US penetration further into Mexico. Below is our table of the EIA's monthly gas exports to Mexico.

Figure 6: US Pipeline Gas Exports To Mexico (bcf/d)

bcf/d	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	1.7	2.2	3.2	3.9	4.4	4.9	5.2	5.6	5.6
Feb	1.8	2.3	3.5	4.0	4.5	4.8	5.4	4.9	5.5
March	1.9	2.4	3.3	4.2	4.3	4.8	5.4	5.9	5.5
Apr	1.9	2.6	3.5	3.7	4.4	4.7	4.6	6.1	5.9
May	2.0	2.8	3.7	4.0	4.4	5.0	4.7	6.2	6.0
June	2.2	3.0	3.9	4.5	4.6	5.2	5.4	6.6	6.0
July	2.2	3.3	4.0	4.4	4.9	5.4	5.8	6.4	
Aug	2.1	3.3	4.3	4.4	5.0	5.4	6.0	6.2	
Sept	2.2	3.3	4.1	4.2	5.0	5.4	6.1	6.0	
Oct	1.9	3.2	4.2	4.2	4.9	5.5	6.0	6.0	
Nov	1.9	3.0	4.0	4.5	4.7	5.3	5.5	5.5	
Dec	2.1	3.2	3.6	4.4	4.5	4.9	5.3	5.4	
Full Year	2.0	2.9	3.8	4.2	4.6	5.1	5.5	5.9	5.7

Source: EIA

Natural Gas – Cheniere wants to further expand Corpus Christi LNG

Cheniere wants to expand Corpus Christi LNG

We always believe the best indicators for LNG strengths are if buyers will step up to make long term LNG supply purchase commitments and if LNG developers will spend the billions to move on a new LNG supply project. On Monday, we tweeted [LINK] "*#LNGSupplyGap. #Cheniere wants to expand #CorpusChristiLNG by adding Trains 8 & 9 (capacity 0.215 bcfd per train) projected in-service mid-2031. Will we see a late Sept FID for #LNGCanada Phase 2 to help fill the gap or can it be the rare brownfield that doesn't go? #NatGas #OOTT."* Our tweet included excerpts from Cheniere's FERC filing dated Aug 19 that indicated Cheniere wants to expand its Corpus Christi LNG by adding two more mid-scale trains, each train having 0.215 bcf/d capacity and with potential in-service in H2/2031. Yes 2031. We were surprised that the FERC filing noted construction could start in 2024 with in-service in H2/2031. We would have expected an earlier in-service. Our Supplemental Documents package includes excerpts from the Cheniere FERC filing.

Natural Gas – Bharat is hopeful TotalEnergies restarts Mozambique LNG in H1/23

Bharat on Mozambique LNG

Financial Express (India) reported on comments from the Bharat Petroleum annual meeting on Aug 29. Bharat is a 10% partner in the TotalEnergies Mozambique LNG project. Financial Express wrote "*While construction activities to develop the initial two trains of the LNG project in Mozambique were progressing as per schedule, security incidents during March-end 2021 in the Cabo Delgado province in Northern Mozambique led the operator (Total) to withdraw all project personnel from the site and declare force majeure for the project. "Now, with the efforts of the Government of Mozambique's forces, supported by a regional coalition, progress is being made in improving the security situation in the region, and the project will resume once the security situation is stabilised in a sustainable manner," BPCL CMD Arun Kumar Singh told shareholders of the company in the company's annual general meeting. Singh said that the company was hopeful that the project should take off*

from the first half of 2023." We listened to the replay of the Bharat webcast [LINK] but did not see these comments. In his overview comments, at 16:00 min mark, Singh said "*the security situation is improving and the consortium is working to an early restart to the project*". We aren't 100% certain if he said "early" despite listening to that section several times. In the Q&A, Singh was asked about major projects in Brazil and Mozambique. At the 20:10 min mark, "*now coming to Mozambique, almost same timeline, 2026*", which seemed like a reference to first cash flow timeline. Even though we didn't hear the comments in the Financial Express, we believe the comments we did hear are supportive of that reporting. Our Supplemental Documents package includes the Financial Express report.

No updates on TotalEnergies Q2 call for timing to restart Mozambique LNG

Here is what we wrote in our July 31, 2022 Energy Tidbits memo. "*TotalEnergies held its Q2 call on Thursday. Mgmt did not make any statements on the timing for the restart of the 1.7 bcf/d Mozambique LNG Phase 1 and there were no analyst questions on a restart timing. We have been noting our view that we didn't expect any restart until sometime in 2023 at the earliest.*"

TotalEnergies Mozambique LNG delay was the game changer to LNG markets

We have been highlighting TotalEnergies force majeure on its Mozambique LNG Phase 1 for the past 17 months as the game changing event for LNG markets. Phase 1 at 1.7 bcf/d is significant, but our view has been because TotalEnergies delaying Phase 1 of 1.7 bcf/d is actually leading to a delay of 5.0 bcf/d. This was the reason why, on April 28 2021, we posted a 7-pg blog "*Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?*" [LINK] We thought, and still think, there has been a major change to the outlook for LNG supply in the 2020s and one that is still being overlooked – there is a big new LNG supply gap starting around 2025 that is hitting faster and bigger than anyone expects. We saw Total's April 27, 2021 announcement of force majeure at its Mozambique Phase 1 LNG of 1.7 bcf/d was much more significant that viewed. We just didn't see market focused on the fact that this situation backs up an additional 3.3 bcf/d of LNG supply that is also being counted on in all LNG supply forecasts. Total's Phase 2 of 1.3 bcf/d was to follow, and Exxon's Rozuma Phase 1 of 2.0 bcf/d was originally expected to go FID in 2019 but is now not expected to have a FID decision until 2022 at the earliest. Mozambique is considered a premium LNG supply region for Asia and is in LNG supply forecasts. Total's original in service for Phase 1 is 2024. We had been warning that Mozambique has a major LNG market impact and its why we posted the April 28 blog. Its also why earlier we said that this is starting the clock running for other LNG projects wanting to go FID to make their mind up ie. like LNG Canada Phase 2. Our Supplemental Documents package includes our 7-pg April 28, 2021 blog.

Natural Gas – Shell Prelude 0.47 bcf/d FLNG should resume LNG loadings soon

Shell Prelude FLNG 0.47 bcf/d

Last week's (Aug 28, 2022) Energy Tidbits memo highlighting the news Shell reached a deal with the union to end the industrial action and get its 0.47 bcf/d Prelude FLNG back in operations. There was no forecast for when LNG cargos would resume after the last LNG cargo was July 6. But it sounds like LNG loadings should be resuming in a matter of days. On Monday, Bloomberg reported "*Shell resumed loading condensate shipments from the*

Prelude floating LNG export facility in Australia after operations were temporarily halted by a workers strike, according to people with knowledge of the matter." Then on Thursday, Bloomberg reported "*The facility must reduce condensate and LPG supply in storage tanks before returning to full production."* And "*Shell began process to resume LNG production at the Prelude floating export facility in Australia on Aug. 31 after operations were temporarily halted by a workers strike, according to people with knowledge of the matter."*

Figure 7: Shell Crux Project Overview

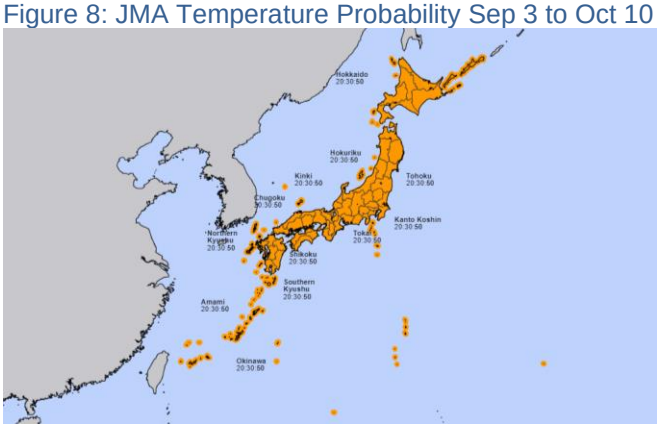
Source: Shell

Natural Gas – Continued hot weather forecast in Japan

Still hot in Japan

The hot weather continues in Japan with JMA forecasting warmer than normal temperatures through Sep and into Oct. Autumn hot weather is not the same driver as June/July/Aug, but Sept is still very hot and humid ie. Tokyo forecast for the next week is daily highs 30-33c. So a warm Sept is a positive for power demand, but, this summer, the high cost of LNG has pushed Japan's utilities to try to maximize fuel oil and coal for power generation and minimize natural gas consumption. The Japan Meteorological Agency posted its September 3 to October 2weather forecast [LINK] calling for much warmer than normal temperatures. Note the below map is for the next month, but the maps for each of the next two weeks is the same depicting hot weather.

Figure 8: JMA Temperature Probability Sep 3 to Oct 10



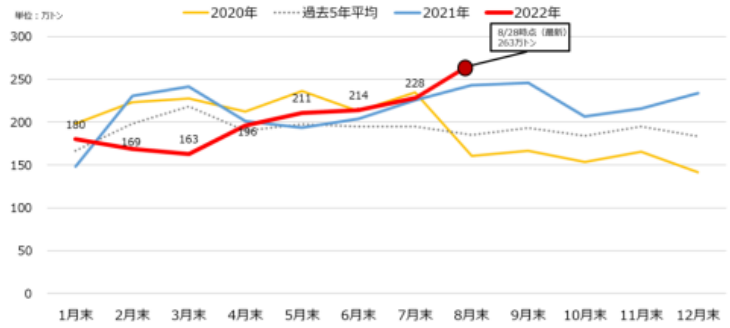
Source: Japan Meteorology Agency

Natural Gas – Japan's LNG stocks up +2.6% from last week

Japan LNG stocks +6.9% WoW

The risk for Japan in the winter is that they need full storage and continued LNG imports to avoid natural gas outages. That's because Japan's LNG stockpiles are not huge relative to LNG imports that have ranged from 7 to 14 bcf/d since Jan 1, 2021. Even at the high LNG stocks levels, it's only ~10 days of winter LNG imports. A cold winter or interruption in LNG imports could easily lead to a shortage. LNG stockpiles held by Japanese power producers have exceeded both last year's level and the 4-year average. Japan's METI weekly LNG stocks data was released on Wednesday [LINK]. LNG stocks at Aug 28 were ~126 bcf, +6.9% WoW from 118 bcf and slightly up from the 5-yr average of 117 bcf. Below is the LNG stocks graph from the METI weekly report.

Figure 9: Japan's LNG Stocks



Source: METI

Natural Gas – Russia's Power of Siberia gas supplies +60% YoY to China

Russia pipeline exports +60% YoY to China

On Wednesday, TASS reported Gazprom increased natural gas pipeline deliveries to China on the Power of Siberia pipeline by 60% YoY in the Jan-Aug. TASS wrote [LINK] "*"We are consistently increasing supplies via the Power of Siberia gas pipeline to China. And this year, we have several times updated the record for daily gas supplies in excess of contractual obligations in terms of daily contractual quantities. Our gas supplies to the Chinese market in eight months of 2022 compared to 2021 grew by 60%," the company's CEO said Alexey Miller."* TASS did not provide any detail numbers. But on July 27, 2022, CNBC reported [LINK] "*By volume, Gazprom's gas exports to China via the pipeline rose by 63.4% to 7.5 billion cubic meters during the first half of the year, according to Russian news agency Interfax."* This would be 1.46 bcf/d for H1/22. TASS also reported Gazprom's reminder that they plan to keep increasing Power of Siberia gas deliveries to China in 2023. TASS also wrote "*He added that Gazprom will definitely fulfill its obligations to supply gas to China in 2023, which needs more and more gas. A new resource base has also been prepared to increase supplies - gas from the Kovykta field will begin to flow in the Power of Siberia gas pipeline before the end of the year. The holding has also already begun to develop design and estimate documentation for the Far East gas supply route to China."* Our Supplemental Documents package includes the TASS report.

Figure 10: Power of Siberia gas pipeline

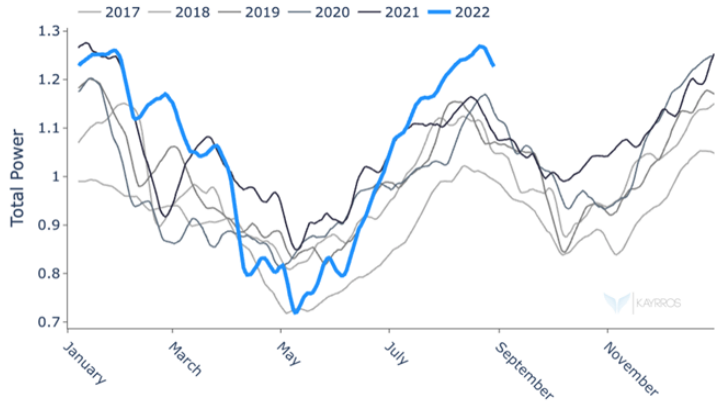
Source: Gazprom

Natural Gas – High LNG prices keep China fuel switching to coal

China switching to coal from LNG

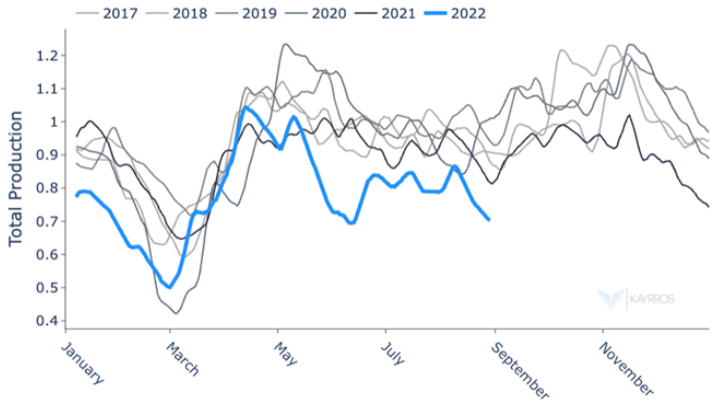
China may be increasing its natural gas pipeline imports from Russia, but it is doing so in the face of natural gas to coal switching with the high LNG prices. The high LNG price impact is shown by China's continued high coal power generation. And this is being done as a fuel switch and not because of industrial demand. We have previously noted Kayrros China data. Yesterday, Kayrros emailed out its Weekly Roundup, which included updated below graphs with the commentary "*China has long been the world economy's main engine but it has recently been sputtering. Coal power generation recently surged to near-records on a combination of drought, heat waves, and high LNG prices." "With red-hot summer temperatures finally abating, China's coal-fired power generation is coming off its peak, though it remains exceptionally elevated for the season." "In a mirror image of China's power generation, its cement output remains remarkably subdued amid media reports that some big construction firms are deserting construction sites and leaving buildings unfinished."*

Figure 11: China 7-day rolling coal-fired power generation



Source: Kayrros

Figure 12: China 7-day rolling cement production



Source: Kayrros

Natural Gas – Does Centrica want a deal before reopening Rough UK gas storage

Centrica approved to reopen Rough

On Tuesday, the UK announced [LINK] "*The North Sea Transition Authority (NSTA) has today granted the required approvals and consents to Centrica Offshore UK Limited (COUK), for Phase 1 of the Rough gas storage site off the East Coast of England in the Southern North Sea. COUK has now received all of the required NSTA regulatory approvals to commence gas storage operations."* Good news but it seems like the reports from July are still valid – Centrica is trying to get a deal done with the UK govt before moving on the reopening. Later on Tuesday, the Telegraph reported [LINK] "*The owner of Britain's largest gas storage facility has refused to say when the site will be reopened despite winning approval from regulators, amid talks with ministers over taxpayer funding. British Gas's parent company, Centrica, was on Tuesday night cleared by the North Sea Transition Authority to restart the mothballed Rough storage site off the Yorkshire coast as part of a scramble to improve the country's energy security. Centrica is free to begin filling Rough immediately as a result, but the company refused to comment on when it would begin to pump in gas. Chris O'Shea, Centrica's chief executive, has previously said it could re-open this winter, and this is understood to remain the plan."* Our Supplemental Documents package includes the Telegraph report.

In July, Centrica thought Rough UK natural gas storage can reopen for winter

The Telegraph report that Centrica wants a deal from the UK before proceeding to reopen Rough is in line with the July reports. Here is what we wrote in our July 31, 2022 Energy Tidbits memo. "*Centrica is trying to get a deal done with the UK govt so it can reopen its Rough natural gas storage for winter. On Thursday, Bloomberg reported "Centrica Plc, the owner of the Rough facility, is still hammering out a deal with the government on details including subsidies for getting the retired storage site back in regular operation. Capacity would be brought back gradually, providing further relief for surging gas prices next winter, too. "Physically it's possible, but there's a whole bunch of things that we need to go through and we are working on it right now," Centrica Chief Executive Officer Chris O'Shea told reporters on Thursday. "We are right now doing the engineering to make sure that it can physically happen*

and we're doing that at our own cost." And "Centrica will pay to make Rough operational but is seeking longer-term guarantees from the government on price, such as a contract for difference, O'Shea said." We recognize this is being portrayed as linked to Russia's invasion of Ukraine, but the reality is that last October, Centrica was already at reopening Rough because of the massive natural gas price spike (energy crisis) in Europe last year, well before Russia invaded Ukraine. And it's also a reminder example of why natural gas will cost more under the energy transition. The UK got more involved in talks in June (see our June 5, 2022 Energy Tidbits), and now O'Shea is saying Centrica can get this done soon if they can finalize the terms of a deal with the government."

Last Oct, Centrica talked about reopening its Rough UK natural gas storage

Here is another excerpt from our July 31, 2022 Energy Tidbits memo. "*On Tuesday, we tweeted [LINK] "Reminder #Centrica was already looking to reopen Rough #NatGas storage in Oct. The #EnergyTransition was already going to take longer, be bumpy & cost a lot more. RUS has just made it worse. Positive for #Oil #NatGas for the 2020s. #OOTT." Here is what we wrote in the Oct 31, 2021 Energy Tidbits "There was another good example of why energy, in this case natural gas, will cost a lot more under the Energy Transition. Reportedly, there are discussions to look to restart Centrica's Rough gas storage site that shut down four years ago. So 4 years ago, it wasn't worth spending the capex to fix the problems, but now it may now be worth spending the capex. It's a good example that illustrates why natural gas prices and energy should be higher in the 2020s. On Wednesday, Bloomberg reported "Rough Gas Storage Site May Be Reopened to Bolster Strategic Reserves. Britain's biggest energy supplier is in talks with the Government about reopening a mothballed gas storage facility in a bid to protect the industry from surging power costs. Centrica, the owner of British Gas, is seeking to restore the defunct Rough site off the Yorkshire Coast to boost the country's energy reserves. It comes after gas prices spiked to as much as 11 times normal levels in the wake of surging demand." Centrica reportedly talking about going back in to fix Rough storage so it can be restarted first as the major UK gas storage facility and then over time to hydrogen. And Centrica reportedly says don't need govt subsidies to do so, just can charge out to customers. This was abandoned because the cost to fix it wasn't worth it in 2017. The reality check is that the costs to fix it today have to be way higher than before. Yet Centrica can now make the math work by charging customers. ie. the costs of using storage are going much higher."*

Centrica shut down UK largest gas storage, Rough, in 2017

Our October 10, 2021 Energy Tidbits also included a recap of Centrica shutting down its Rough UK gas storage in 2017. At that time, we wrote "*One of the big criticism on the UK natural gas system is that there is a lack of gas storage. In September, Energy UK estimated there was 141 bcf in UK natural gas storage and wrote [LINK] "Britain has over 4bcm of storage capacity that can be called upon to deliver over one quarter of national gas demand on a cold winter's day. Gas is sent to storage facilities throughout the summer and at other times of the year to make sure we have gas supplies available when we need them." UK natural gas storage was much higher in 2017. In 2017, Centrica ceased operations at the largest UK gas storage*

facility, Rough. Our July 2, 2017 Energy Tidbits noted that, at the time of its cessation, Centrica estimated there was 183 bcf of recoverable cushion gas. They had massive problems with the storage that led to pre tax charge of £176 in 2016 results. Made the decision to shut it down in early 2017. We went back and couldn't see what the "working gas" level was prior to the problems. But Rough was the largest UK storage and believed to have represented something like 70% of the storage send out capacity. Rough was a depleted reservoir being used for storage. As a rule of thumb, we would use 50/50 split between cushion gas and working gas. So its probably reasonable to roughly assume working gas was about the same at 183 bcf. The closing of Rough is why UK has relatively low natural gas storage."

Natural Gas – Nord Stream is shut down, no ETA if it will restart for winter

Nord Stream is fully shut down

No one was particularly surprised that Gazprom found some operational defects during the 3-day Nord Stream maintenance. As a result, Nord Stream is fully shut down and there is no ETA as to when it might resume supply. (i) Nord Stream was supposed to resume deliveries at 6pm MT on Friday, but, at noon MT on Friday, Gazprom tweeted [LINK] the results of the technical maintenance that was "*carried out jointly with Siemens*". The tweet noted oil leakage issues and this was also signed by Siemens. And the key statement "*the detected faults and failures make it impossible to ensure the safe and trouble-free operation of the gas turbine engine. Therefore, it is required to take appropriate measures and suspend the operation of the Trent 60 gas compressor unit in view of the identified gross violations".* And Gazprom concluded "*gas transmission via the Nord Stream gas pipeline has been fully shut down until the operational defects in the equipment are eliminated*". We immediately tweeted [LINK] *"#NordStream is NOT resuming supply tonight. It is shut down. No ETA for how long it will be down or if it will resume any supply before the winter. #NatGas #LNG #OOTT."* There is no ETA if Nord Stream will resume natural gas supply before winter. (ii) Russia warned Nord Stream would restart except for technological problems caused by sanctions. We regularly refer to Kremlin spokesman Peskov's comments as he is experienced and normally gives good clues to what may happen. On Tues, he highlighted the risk to a Nord Stream restart – technological problems. we tweeted [LINK] "*Hmmm! Will #Gazprom resume #NordStream deliveries on Sept 3? Kremlin says "There is a guarantee that nothing interferes with supplies, EXCEPT for technological problems caused by sanctions". what a confidence builder. #NatGas #OOTT."* Then on Thursday, we tweeted [LINK] *"#NordStream. Peskov is an experienced spokesman. His 👇 comments today vs Aug 30 seem to increase the risk that Nord Stream doesn't resume Sept 3. Europe will know on the weekend one way or another. #NatGas #LNG #OOTT."* (iii) No surprise, Siemens says that doesn't make sense. Later on Friday, TASS reported [LINK] "*Siemens Energy says no technical reasons for stopping Nord Stream operation. The spokesperson for Siemens Energy added that it was a routine operation within maintenance work. Siemens Energy AG believes that there are no technical reasons to stop operation of the Nord Stream gas pipeline, a spokesperson for the German company told TASS on Friday. Earlier in the day, Gazprom reported that some damage had been found at the Nord Stream's last remaining compressor station, so it has to completely stop gas supplies via the route until the required maintenance is completed. "Such leaks do not normally affect the operation of a turbine and can be sealed on site. It is a routine procedure within the scope of maintenance work," the company said. The spokesperson for Siemens Energy added that it was a routine operation within maintenance*

work. "In the past, too, the occurrence of this type of leak has not led to a shutdown of operations," he said." Our Supplemental Documents package includes the Gazprom notice, and the TASS reports on Peskov's comments.

Natural Gas – EU industrial gas demand response is big and getting bigger

EU industrial natural gas demand

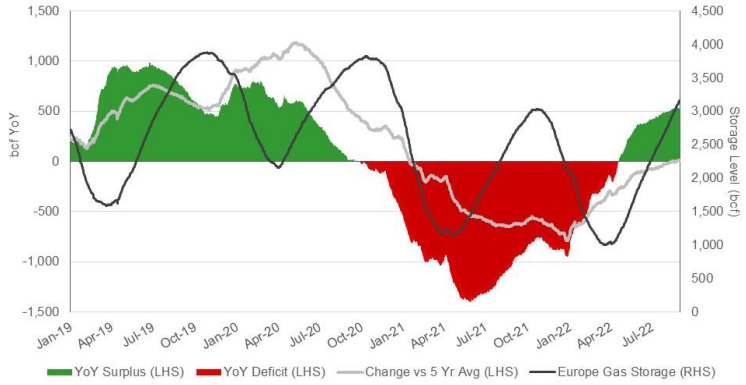
It's too bad there isn't real time data on natural gas demand response in Europe because we have to believe industrial demand is down significantly and going even lower. We have noted how big fertilizer companies started cutting back a year ago and have continued to shut down fertilizer production. And how big metal producers have been cutting back. Every week, we could pick stories such as reports this week on Spanish clay tile producers shutting down. It's not just big industrial natural gas consumers, now the big new story in the face of rising natural gas and electricity prices in Oct is how small businesses in the UK and elsewhere are being forced to close up. We don't have real time current data, but it's hard for anyone to dispute that industrial and now commercial natural gas consumption is going down significantly and going even lower. We believe this is the key reason why Europe natural gas storage is filling up.

Natural Gas – Europe storage is now +12.94% YoY ie. 80.35% full vs 67.41%

Europe storage now 80.35% full

It looks like the continued strong LNG imports and industrial demand response are having a big impact. Even with the reduced volumes on Nord Stream, Europe storage continues to have increasing YoY levels. Europe gas storage began the year in a YoY deficit, but the YoY Europe storage gap changed to a YoY storage surplus and it continues to build this week. Europe gas storage started the winter down 18.52% YoY and is now a YoY surplus of 13.09%. Inventories are rising all across Europe, as is normal during spring and early summer. 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 turned to surplus after months of the deficit tightening. Thanks to the warm weather and US LNG, storage as of Aug 31 is at 80.35%, which is +12.94% greater than last year levels of 67.41% and are +0.36% above the 5-year average of 79.99%. Below is our graph of Europe Gas Storage Level.

Figure 13: Europe Gas Storage Level



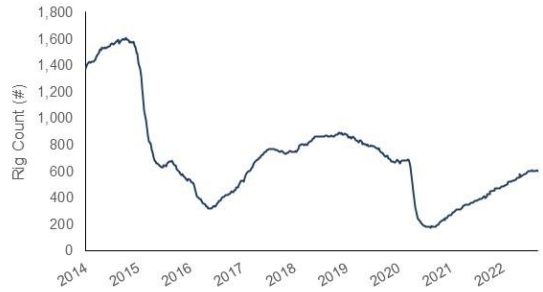
Source: Bloomberg

Oil – US oil rigs -9 at 596 oil rigs at Sep 2

US oil rigs -9 WoW

Baker Hughes released its weekly North American drilling activity data on Friday. This week US oil rigs were -9 at 596 oil rigs. It looks like US oil have finally seen some change as oil dips again below $90. US oil rigs have been rangebound for the past 11 weeks between 594 to 605 oil rigs. Oil rigs are +424 off the bottom of 172 in Aug14/2020 week. US oil rigs hit their 2020 peak at 683 on March 13 and have since fallen by -87 to 596 oil rigs (-13%). The post-Covid peak is 605 oil rigs, which has been hit twice in the past 11 weeks, on July 29 and Aug 26. US gas rigs were +4 WoW at 162 rigs as HH still continues to be above $8.

Figure 14: Baker Hughes Total US Oil Rigs



Source: Baker Hughes

Oil – US frac spreads -5 to 282 spreads for the week ending Sept 2

Frac spreads -5 to 282

Mark Rossano (C6 Capital Holdings) held his weekly US frac spread recap for the week ending Sept 2 on the Primary Vision network. YouTube video is at [LINK]. For the week ending Sept 2, US frac spreads at the high point in the week were -5 to 282 spreads. Here are some of this comments on the week. Rossano said "*There was only a drop in the Permian. There were some one here but there were increases in other spots*". In explaining why a drop this week, he quoted his CTO, who said "*this year is similar to 2019 from many points of view. Running spreads had suggested a decline in the last week of August as well as a recovery in the next two weeks"*. Rossano said they've been talking about that Sept and

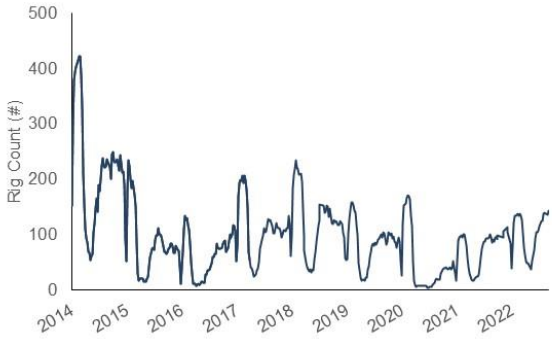
Oct push and still think that is going to happen. He expects frac spreads to get to 290 to 295 by maybe Sept 23. This seems lower than last week, when he saw a set up to push in Sept to 300 to 305 spreads. Rossano thinks US oil production to get to 12.2 to 12.3 mmb/d for the year end 2022 exit.

Oil – Total Cdn rigs up +7 WoW at 208 total rigs, +56 rigs YoY

Cdn rigs up WoW

Total Cdn rigs were up at 208 total rigs. Cdn oil rigs were +7 at 143 rigs. Cdn gas rigs were flat at 65 rigs. Cdn rigs have been in a bit of a pause with WTI ~$90 and plunged AECO. Total rigs are now +195 since the June 26, 2020 all-time low. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 92 and Cdn gas rigs were 60 for a total Cdn rigs of 152, meaning total Cdn oil rigs are +56 YoY and total rigs are +54 vs 2019.

Figure 15: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production +0.1 mmb/d at 12.1 mmb/d

US oil production +0.1 mmb/d WoW

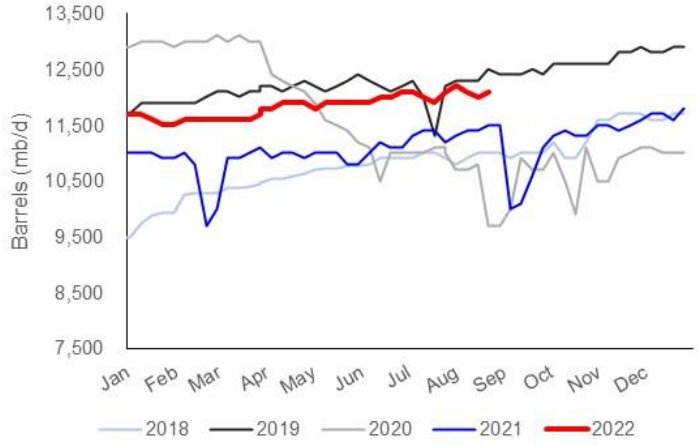
US oil production was up +0.1 mmb/d to 12.1 mmb/d for the week ended Aug 26 after a decrease last week. US oil production has been range bound between 11.9 to 12.1 mmb/d for the past 16 weeks. Lower 48 production drove total production and was +0.1 mmb/d at 11.1 mmb/d this week, with Alaska having immaterial change. US oil production is up YoY at +0.6 mmb/d but is still down significantly at -1.0 mmb/d since the 2020 peak of 13.1 mmb/d on March 13.

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

Source: EIA

Figure 17: US Weekly Oil Production



Source: EIA, SAF

Oil – EIA Form 914, US oil production hits post Covid high of 11.816 mmb/d in June

EIA Form 914 June

The EIA released its Form 914 data [LINK] on Wednesday, which is the EIA's "actuals" for June US oil and natural gas production. (i) June oil production of 11.816 mmb/d is a post Covid high, surpassing Nov 2021 of 11.790 mmb/d. June 2022 is still down -0.921 mmb/d from March 2020 (pre-covid) and +0.528 mmb/d YoY. (ii) June was +0.201 MoM vs a slightly revised up May of 11.615 mmb/d (was 11.585 mmb/d). Part of the MoM increase was North Dakota that was still impacted in May from the blizzards. (iii) The actuals for June were slightly below the EIA weekly estimates, as well as the EIA STEO July had for June. (iv) Federal Offshore Gulf of Mexico had the largest MoM change with a increase of +183,000 b/d. North Dakota was up +36,000 mmb/d to 1.089 mmb/d as it made a recovery from the blizzards in April.

Figure 18: EIA Form 914 US Oil Production

State	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2022	11,369	11,316	11,701	11,668	11,615	11,816						
2021	11,124	9,925	11,326	11,305	11,356	11,356	11,347	11,277	10,918	11,569	11,790	11,634
2020	12,852	12,842	12,797	11,914	9,713	10,442	11,006	10,577	10,921	10,457	11,196	11,168
2019	11,869	11,673	11,913	12,149	12,154	12,218	11,902	12,486	12,590	12,809	13,000	12,978
2018	10,001	10,281	10,467	10,500	10,435	10,641	10,897	11,392	11,443	11,509	11,886	11,945
2017	8,875	9,110	9,166	9,101	9,185	9,111	9,247	9,250	9,517	9,669	10,085	9,983
2016	9,202	9,066	9,101	8,874	8,835	8,676	8,662	8,690	8,544	8,804	8,903	8,816

Source: EIA

Figure 19: EIA Form 914 US Oil Production vs Weekly Estimate

Source: EIA

Oil – Trans Mountain expansion completion now anticipated in Q4/23

Trans Mountain Expansion update

On Monday, Trans Mountain released its Q2/22 results [LINK], which included an update on their Trans Mountain Expansion Project (TMEP). (i) Doesn't sound like much progress over past few months. In the Q2/22 report, Trans Mountain said '*Pipeline construction overall stands at over 50 per cent complete*". Whereas in the Q1/22 report in May, they said "*As of May 5, 2022, construction of the TMEP has progressed to approximately 55 per cent completion*.". There was no indication in the Q2/22 report that construction was slower than expected over the past few months. But, unless they are changing their meanings, it looks like they didn't advance their overall completion % status. (ii) Anticipate completion in Q4/23. In the Q2/22 report, Trans Mountain said "*Overall on the Project we anticipate substantial*

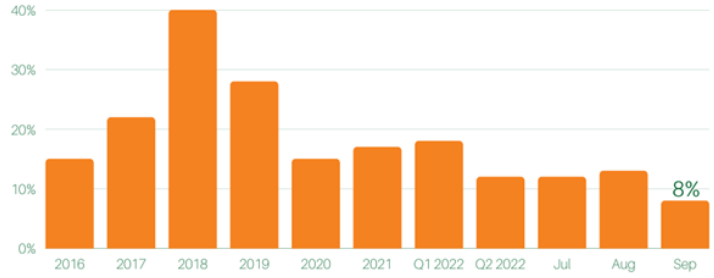
construction progress throughout summer and fall and we are targeting to be 80 per cent complete by year-end 2022", and "*Trans Mountain anticipates completion of the Project in the fourth quarter of 2023.".* Trans Mountain didn't give a specific completion date in the Q1/22 report, but, in their big Feb costs overrun release, Trans Mountain said "*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."* We don't recall any other formal completion dates from Trans Mountain, but most seemed to be expecting a by yr-end 2023 instead of a Q2/23 completion date. Our Supplemental Documents includes the Trans Mountain Q2 release.

Oil – Trans Mountain apportioned by 8% for Sept

Trans Mountain apportionment

On Thursday, Trans Mountain released an update [LINK] on its capacity for the month of September. Total system nominations are apportioned by 8% for Sep (Aug was 13%), meaning 8% of demand for the pipeline exceeds its capacity. Trans Mountain reminds that it has been running at full capacity and has seen regular monthly apportionment for over a decade ie, the clear sign for a need for expansion. The Trans Mountain apportionment update also includes a bit of an apportionment 101. Trans Mountain wrote "*When a pipeline experiences significant and prolonged apportionment like in the case of the existing Trans Mountain Pipeline, it's one signal that more capacity is needed. Apportionment can bring with it a discounting of prices as producers compete to sell what they can through the pipeline before having to use another pipeline or other modes of transport to another, less profitable market. It can also mean the buyers at the end of the pipeline are forced to source their shortfall of supply from alternate, less desirable sources*." Below is a chart which shows the average apportionment since 2016. Our Supplemental Documents package includes the Trans Mountain release.

Figure 20: Trans Mountain Pipeline Apportionment



Source: Trans Mountain Pipeline

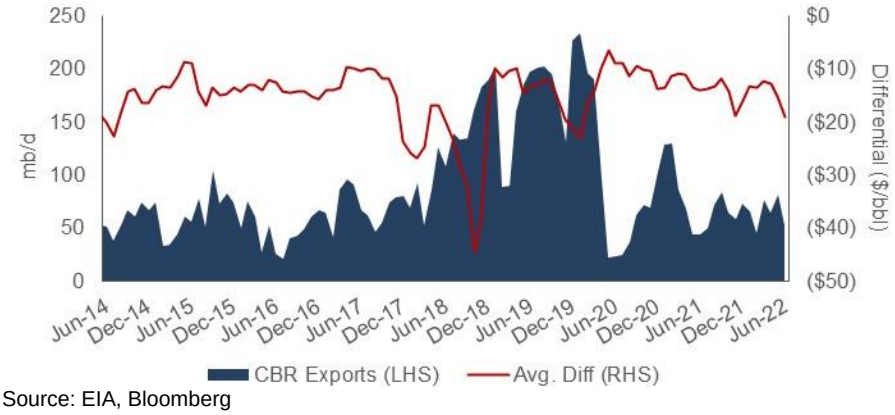
Oil – Cdn crude by rail imports to Gulf Coast up 20% YoY in June to 53,000 b/d

Cdn CBR imports to Gulf Coast up 9,000 b/d YoY

The EIA posted its monthly "U.S. Movements of Crude Oil by Rail" [LINK] on Wednesday, which also had good insights on Cdn crude by rail. Canadian CBR volumes to PADD 3 (Gulf Coast) were 53,000 b/d in June, which is down 29,000 b/d MoM from May, and up ~9,000 b/d YoY vs May 2021. There were no revisions to last months data. The WCS-WTI differential widened in June to average -$18.98/bbl from -$15.28 in May, which is normally high enough

to incent crude by rail to the Gulf Coast. Below is our graph of Cdn CBR exports to the Gulf Coast.

Figure 21: Canada CBR Exports to US Gulf Coast vs WCS Differential



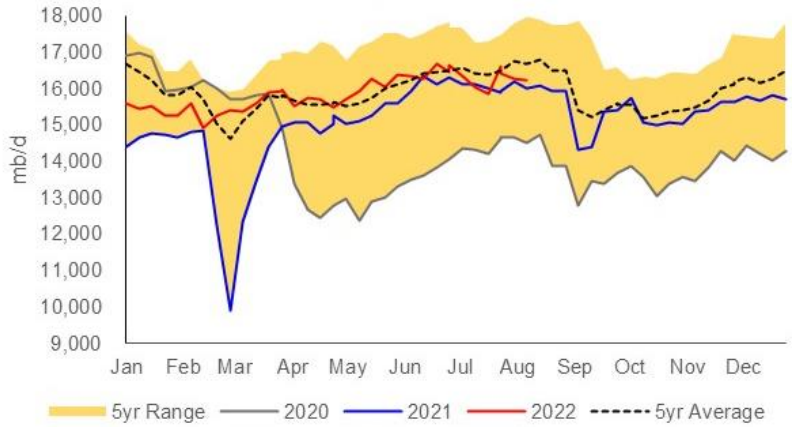
Source: EIA, Bloomberg

Oil – Refinery inputs -0.017 mmb/d WoW at 16.238 mmb/d

Refinery inputs down WoW

September is normally a turnaround month for refineries in the US and that means less crude oil inputs into refineries. The EIA crude oil input to refinery data is for the week ended Aug 26. The EIA reported crude oil inputs to refineries down -0.017 mmb/d to 16.238 mmb/d for the week ended Aug 26 and are +0.300 mmb/d YoY. Refinery utilization was down to 1.1%, which is +1.4% YoY. Note that hurricane season in the US is here, with the official start of the season on June 1. Total products supplied (i.e., demand) increased WoW, down 0.734 mmb/d to 20.073 mmb/d, and Motor gasoline was up +0.0157 mmb/d at 8.591 mmb/d from 8.434 mmb/d last week. The 4-week average for Motor Gasoline was down -0.604 mmb/d YoY to 8.874 mmb/d. The 4-week average of Total Demand was down -1.377 mmb/d YoY to 20.026 mmb/d.

Figure 22: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA

Oil – BP Whiting 435,000 b/d refinery is being restarted after the minimal fire damage

BP Whiting 435,000 b/d refinery

Last week's (Aug 28, 2022) Energy Tidbits memo noted the good news for Cdn oil companies that the Wednesday fire at BP's 435,000 b/d Whiting (Indiana) refinery only had minimal damage and the refinery was expected to restart operations last weekend. On Friday, Bloomberg reported "*BP has restored electricity to its Whiting, Indiana, refinery after completion of repairs as planned, company says in emailed update. * All five boilers are back online and steam has been restored to the refinery * "Repairs have been completed as planned and we are continuing to work around the clock to bring the plant back to normal operations".*

Oil – US "net" oil imports down 0.006 mmb/d WoW at 1.989 mmb/d

US "net" oil imports down WoW

US "NET" imports were down 0.006 mmb/d to 1.989 mmb/d for the Aug 19 week. US imports were down 0.215 mmb/d to 5.956 mmb/d. US exports were down -0.213 mmb/d to 3.967 mmb/d. The WoW decrease in US oil imports was driven by US's Top 10 imports by country which were up by 0.351 mmb/d from Top 10. Some items to note on the by country data. (i) Canada was down this week by 0.741 mmb/d to 3.093 mmb/d. (ii) Saudi Arabia was up 0.083 mmb/d to 0.330 mmb/d this week. (iii) Colombia was up 0.146 at 0.289 mmb/d. (iv) Ecuador was down -0.047 mmb/d at 0.231 mmb/d. (v) Iraq was up 0.176 mmb/d to 0.401 mmb/d. (vi) Mexico was down -0.063 mmb/d to 0.330 mmb/d.

Figure 23: US Weekly Preliminary Oil Imports by Major Countries

(thousand b/d)	June 17/22	June 24/22	July 1/22	July 8/22	July 15/22	July 22/22	July 29/22	Aug 5/22	Aug 12/22	Aug 19/22	Aug 26/22	WoW
Canada	3344	2887	3803	3827	3481	3308	3,673	3,351	3,455	3,834	3,093	-741
Saudi Arabia	760	701	398	634	242	516	500	412	244	247	330	83
Venezuela	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	374	743	702	610	877	639	815	710	661	503	440	-63
Colombia	228	215	213	213	405	150	328	174	214	143	289	146
Iraq	100	76	362	302	454	165	369	181	163	225	401	176
Ecuador	124	59	142	149	57	150	243	212	36	278	231	-47
Nigeria	43	201	171	79	136	143	57	161	253	72	137	65
Kuwait	0	0	0	0	0	0	0	0	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0	0	0
Top 10	4,973	4,882	5,791	5,814	5,652	5,071	5,985	5,201	5,026	5,302	4,921	-381
Others	1,253	1,116	1,048	861	867	1,093	1,357	970	1,106	869	1,035	166
Total US	6,226	5,998	6,839	6,675	6,519	6,164	7,342	6,171	6,132	6,171	5,956	-215

Source: EIA

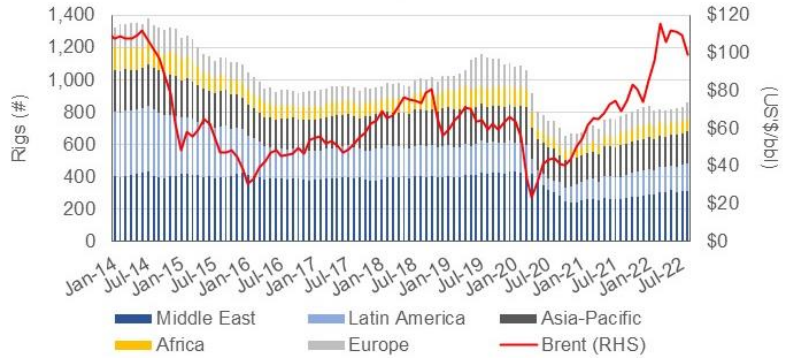
Oil – Baker Hughes International rigs +27 MoM to 860 rigs in August

International rigs +27 MoM

Baker Hughes posted its monthly update to international rigs on Friday. (i) Total international rigs were +27 rigs MoM to 860 rigs in August. (ii) Ukraine, who has had almost no activity in the last few months was surprisingly up this week at +13 rigs from 10 active rigs in July to 23 active rigs in August. Saudi Arabia decreased by 4 rigs MoM while Egypt was up +3. Indonesia was -1 MoM and up +3 YoY from June 2021. Libya's rig activity has been hit by internal conflict and uncertainty, with rigs down from 15 in March, to 7 in April, and to 2 in August. Russia has been hit in the major project area, Sakhalin, with rigs dropping to zero in May and June after maintaining a steady 5 rigs for 17 months. (iii) August of 860 rigs were +11% YoY from 777 in August 2021, but still down 22% vs pre-Covid March 2020 of 1,058 rigs. The YoY rig count is as followed: Asia-Pacific +1, Africa +2, Europe -1, Latin America +34, and the Middle East +47. The key YoY themes have seen rigs continue to return to the North Sea with the UK and Norway up +4 and +2 rigs respectively. Lain America continues

to be strong with Columbia and Argentina both up YoY at +14 and +13 respectively. Middle East is the key YoY increase region led by Iraq +13 rigs YoY, UAE +12 rigs YoY, and Saudi Arabia +10 rigs YoY. Below is our graph of international rigs by region and avg monthly Brent price.

Figure 24: Baker Hughes International Rig Count and Brent Price



Source: Baker Hughes, Bloomberg

Oil – Vitol, it is impossible for the world to get by without all of RUS 7 mmb/d exports

Vitol on Russia oil & products exports

There is a major oil risk coming up over the next few months – what will happen with Russia's 7+ mmb/d of oil and products exports and can the West find a way for Russia oil to keep flowing (their Russian price cap idea) and for Putin to not stop oil & products exporting? (i) It is impossible for the world to get buy without Russian oil and products exports. Earlier this morning, we tweeted [LINK] *"#Vitol's @michaelwmuller "[RUS] exports of 7+ mmbd of crude oil & products combined are an even greater % of the global supply picture. It is impossible, let me repeat, it is impossible for the world to get by without all of that". Great podcast @sean_evers . #OOTT."* Mike Muller is Vitol's Asia Head and said "*I think we have to bear in mind that Russia's production is a much larger number than Iran's production so you can't draw parallels about sanctions taking effect in Russia in the same way as Iran because Russia has the capability to produce 11 mmb/d of oil. That's 11% of global supply. And its exports of 7 plus mmb/d of crude oil and products combined are an even greater percentage of the global supply picture. It is impossible, let me repeat, it is impossible for the world to get by without all of that."* (ii) Absent some resolve, Europe's sanctions on Russia oil kick in in early December. Our Aug 14, 2022 Energy Tidbits noted RBC Helima Croft view that it will mean 2 mmb/d of Russian oil that will cut out of Europe market and either looking for a home or shut in. (iii) G7's price cap on Russia oil seeks to keep Russia oil flowing but forcing an effective lower price to Russia. The challenge will be how many countries will also sign on to this price cap concept. (iv) And then the big question is what will Russia do? Surely no one expects they won't do something. Look at what they are doing on natural gas. Russia said this week they wouldn't deliver oil to any country supporting the price cap. And then we have to ask if Russia will do non-oil actions against these countries? (v) If we loop back to Muller's point that the world needs "all" of Russia's 7 plus mmb/d exports of oil and products, it's why we think there is a major risk to oil coming up over the next few months.

Oil – Opinions split on cut or no cut at tomorrow's OPEC+ ministerial meeting

OPEC+ meeting Sept 5

It seems like opinions are fairly evenly split between no cut or cut at the 32nd OPEC and non-OPEC Ministerial Meeting (ONOMM) being held tomorrow, Monday September 5, 2022. The meeting will be via video conference once again. The next planned in-person meeting isn't expected until the December meeting at the OPEC offices in Vienna. Last week's (Aug 28, 2022) Energy Tidbits highlighted Saudi Energy Minister Abdulaziz's comments and how his comments moved oil markets up $6 in a week where oil would have been expected down with negative economic data, FED Chair Powell's gloomy Jackson Holes speech and more seeing the probability of a near term JCPOA. This week, oil was hit as markets had a delayed reaction to Powell's speech. There were no comments from Abdulaziz this week, which isn't a surprise. Rather, he will be saving his comments for tomorrow.

Oil – Saudi nest egg, big boost to net foreign assets in June with $120 Brent

Saudi net foreign assets

We continue to see key financial reasons why Saudi Arabia is going to do all it can to maintain high oil prices for the foreseeable future. And we continue to believe the #1 financial theme for Saudi Arabia in the 2020s will be their continued, and likely increasing, use of Other People's Money as they try to transition their country to MBS's Vision 2030. We believe this has been obvious with how Saudi Arabia's net foreign assets dropped by about $300 billion over seven years. We were surprised that markets and oil watchers didn't pay attention to the Saudi net foreign assets data ie. what we call their nest egg to help them thru the Energy Transition. However, it looks like ~$120 Brent in June gave a big boost to Saudi revenues as Saudi Arabia's net foreign assets at June 30 were up $13.0b MoM to $448.5b vs $435.5b in May, but down $3.6b from $452.1b in Nov 2020. Saudi Arabia is far from going broke but there has been a huge decline in the last 8 years, but it is still a very big nest egg. This net foreign asset depletion is why we have been highlighting that the primary financial theme for Saudi Arabia in the 2020s is getting Other People's Money (OPM) to fund as much of their Vision 2030 as possible. And no question, accessing OPM has helped to slow down and temporarily pause the decline in net foreign assets, at least up until the past few months. Saudi Arabia's central bank (SAMA) doesn't provide explanations for the monthly swings. But it looks like it is trending back towards November levels as oil prices remain elevated. Saudi net foreign assets on July 31 of $445.6b are up $8.16b YoY from $437.4b at July 31, 2021. The peak in Saudi net foreign assets was $737.0b on Aug 31, 2014, which means there has been a decline of >$280.0b, or approx. $3.0b per month for that period. We believe this is why there has been such a big push in the last few use to get OPM so Saudi doesn't keep depleting its nest egg. And why we call this the #1 financial theme for Saudi Arabia in the 2020s – the increasing use of Other People's Money. And not just in Saudi Aramco, although we do expect to see more equity and bond sales from Aramco. Below is our graph of Saudi Arabia net foreign assets updated for the June 30 data.

Figure 25: Saudi Arabia Net Foreign Assets

Source: Bloomberg

Oil – JCPOA, Is Iran just haggling because they don't see any deal pre 9/11?

JCPOA momentum this week flipped to doubt

Last week, the JCPOA momentum was all to the positive with increasing expectation for a near term JCPOA with the US statements on how the deal kept getting closer. This week, the JCPOA momentum flipped post Iran's response and the week reported US statement *"We can confirm that we have received Iran's response through the EU. We are studying it and will respond through the EU, but unfortunately, it is not constructive*." There is no question that the US messaging was that there wasn't the same positive momentum to a deal, rather it was taking steps backwards away from a deal. It's hard to misinterpret the US disappointment that Iran's comments weren't constructive. But the unanswered question is if this was Iran's haggling to see if they can get any last minute wins (price breaks). We have to believe Iran wasn't expecting a deal in any event prior to 9/11 as they would think the optics wouldn't be great to do a deal before 9/11. And is Iran looking at a deal window being sometime between 9/11 and perhaps a few weeks ahead of the midterms? If so, did they see this window as an opportunity to do some last minute haggling for any wins, even if small? Or is it as some believe that Iran would never do a deal? One way or another, we should have a much better feel sometime in the second half of September.

We didn't hear the US say Iran has reopened the big issues

We recognize that the US message was clear on Iran not being constructive but what we didn't see were comments from the US that Iran has backed away from or is trying renegotiate the big issues. This is why we used the term haggling and not renegotiating. If, as we believe, Iran wasn't expecting a deal before 9/11, why not haggle for last minute breaks. We have to believe that the US would be loudly saying if Iran is backing away from the apparent agreement on the big issues. We can't say we saw every US administration but we didn't see the US saying Iran's not being constructive meant they were backing away from the apparent agreement on the big issues. Our view has been that if the big issues have been resolved, how can Biden walk away from one of his priorities. And it would be his big international success. Here is what we wrote in the Aug 24, 2022 Energy Tidbits. "*We thought US State Dept spokesperson Ned Price's comments at his Tues press briefing seemed to point to more momentum for a return to the JCPOA. (i) Big issues have been largely*

settled. We tweeted [LINK] "Hmmm! is this #Biden messaging for return to #JCPOA? Big issues are fine, other items are details? @StateDeptSpox just now "the big issues have been discussed. they have been tabled. We believe they have been largely settled." Seems consistent with 👇Feb 1 tweet. #OOTT"." We thought it was significant that Price highlighted the big issues have been largely settled. On a massive deal and one of this priority for Biden, we have trouble believing Biden would walk away if the big issues have been resolved. (ii) No greater challenge to US national security. We also tweeted [LINK] "Hmm! 3 separate @StateDeptSpox comments point to US return to #JCPOA. no greater challenge to US national security than Iran w/ nuke, deal will be dead if no longer in national security interest to pursue, big issues have been largely settled. See 👇 SAF Group transcript. #OOTT." There were separate comments at the Tues press conference that would seem to point to why it looks hard (nearly impossible?) for the US to walk away now. Price also said there is no greater challenge to US national security than Iran with a nuclear weapon and the JCPOA deal will be dead as soon as it is no longer in our national interest to pursue. If he says the big issues are largely resolved, how can Biden walk away?

Biden's Sept 14 briefing to key Congress members plays to post 9/11 timing

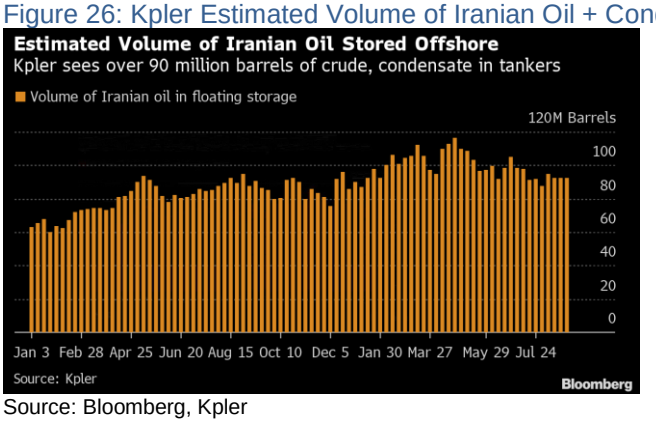
Perhaps the best indicator for no real signal on JCPOA until after 9/11 was the Politico Friday report [LINK] that Biden's Iron envoy is scheduled to brief key Congress members on Sept 14. Politico said this was based on a Sept 2 memo so it would have been set up after the US came out with their views that Iran's response was not constructive ie. this wasn't set up based on the positive momentum a week ago. Politico said "*President Joe Biden's Iran envoy is scheduled to brief members of Congress in a classified setting about the status of nuclear negotiations with Tehran, according to a Sept. 2 memo obtained by POLITICO. The briefing, which is for members of the House Foreign Affairs Committee, is scheduled for Sept. 14, according to the memo. U.S. Special Envoy for Iran Rob Malley, along with Brett McGurk, White House Middle East coordinator, last briefed Congress on the status of the talks on June 15."*

Oil – If a JCPOA, first wave of Iran oil will be floating storage

Iran floating oil storage

There will be many logistical items to resolve if there is a JCPOA, but we would expect the first wave of oil to be Iran oil and condensate that is sitting in floating storage. There are various estimates for how oil and condensate is in floating storage, but we reference Kpler estimates. Last Sunday night, we tweeted [LINK] "*IF a #JCPOA, the first wave of Iran #Oil & #Condensate will come from floating storage. @Kpler estimates 93 mmb of oil + condensate in floating storage. Per @iamsharoncho report "Iran May Drain Offshore Crude Oil Cache If Nuclear Deal Reached". #OOTT".* Note the 93 mmb is both oil and condensate. Our Supplemental Documents package includes the Bloomberg report.

Figure 26: Kpler Estimated Volume of Iranian Oil + Condensate Stored Offshore



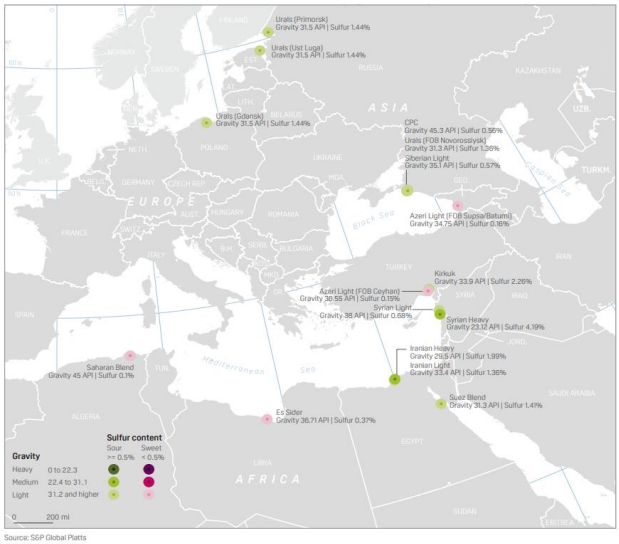
Source: Bloomberg, Kpler

Oil – Iran's oil would be a good crude quality replacement for Urals crude to Europe

Iran oil similar to Russia Urals

Here is what we first wrote on this in our March 13, 2022 Energy Tidbits. "*On Wednesday, we tweeted [LINK] on a good reminder from the Gulf Intelligence daily Podcast [LINK] that Iran's crude oil quality would be a good replacement for Russian Urals crude oil to Europe. We tweeted "#JCPOA. Good reminder from @gulf_intel podcast. Matt Stanley @starfuels reminds Iran light matches API and H2S very well and is a good substitute RUS Urals. See below @SPGlobalPlatts crude specs map. #OOTT". Our tweet included the below Platts map that noted crude qualities for Russia were Urals (Primorsk) 31.5 API 1.44% H2S, Urals (Ust Luga) 31.5 API 1.44% H2S, and Urals Gdansk 31.5 API 1.44% H2S, which compares to Iranian Light 33.4 API 1.36% H2S*."

Figure 27: Platts Specifications Guide Europe and Africa Crude Oil



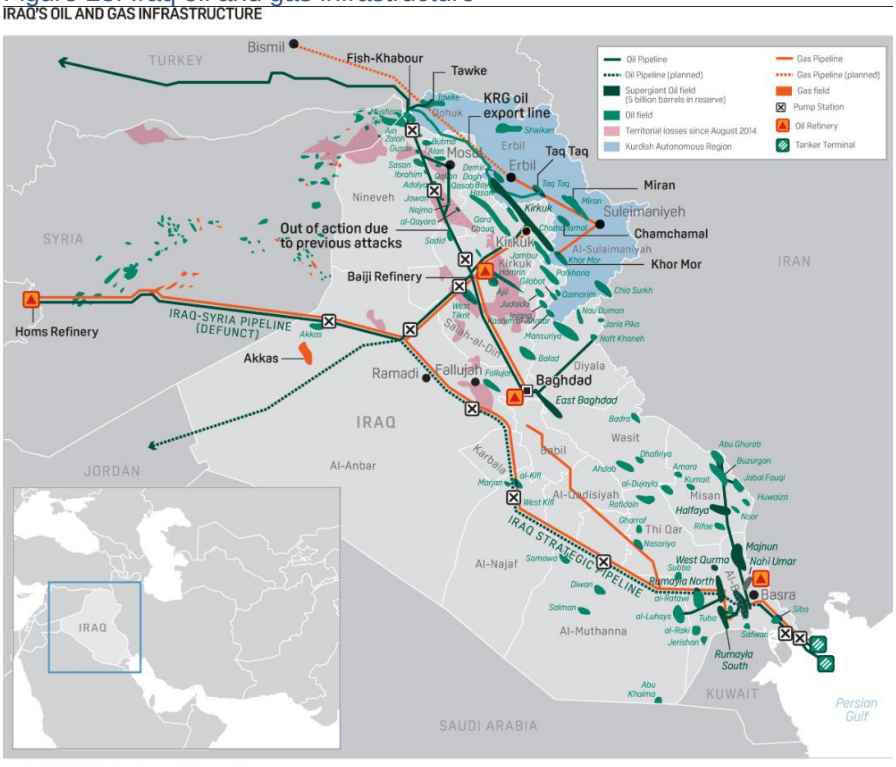
Source: Platts

Oil – Iraq oil watch increases as violence/clashes hit Basra in southern oil rich Iraq

Iraq fighting moves south to Basra

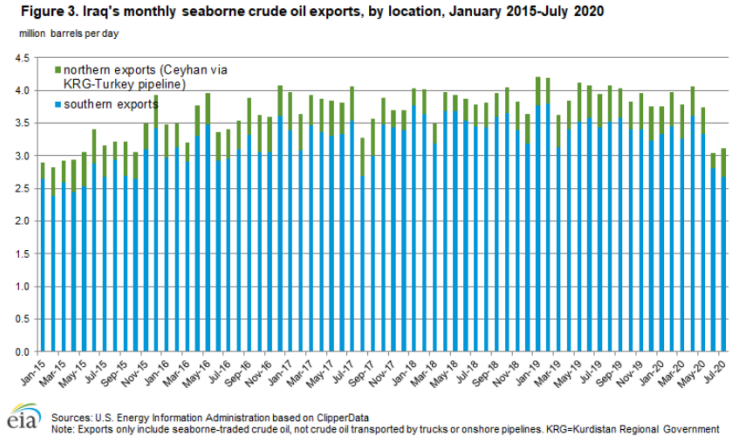
As of our 7am MT news cut off, we have not seen any reports for any Iraq oil fields being shut down due to fighting. But this week, the risk to Iraq oil supply being impacted increased by the reports of fighting in Basra. Basra is the major city in southern Iraq, which includes the vast majority of Iraq's oil production and oil exports. On Friday, we tweeted [LINK] "*Need to keep our eye on Iraq with @Reuters reporting "Clashes in Iraq's Basra kill four as crisis flares in oil-rich south". Basra and surrounding south region is the heart of Iraq oil production and #Oil exports. Thx @SPGlobal for map, @EIAgov for export split. #OOTT."* Reuters reported [LINK] "*Clashes among rival Shi'ite Muslim militants in the Iraqi city of Basra have killed at least four people, security officials said on Thursday, as violence from a worsening political crisis hit the south of the country. The unrest began with two days of intense street fighting in Baghdad earlier in the week, the worst the Iraqi capital has seen for years. The crisis amounts to a power struggle between the powerful Shi'ite cleric Moqtada al-Sadr and mostly Iran-aligned Shi'ite parties and paramilitary groups. Both sides have tried to exert their control over formation of a new government since an election in October. The struggle began with political moves in parliament and the judiciary, went to the streets as Sadr withdrew from the political process and staged protests during the summer, and then degenerated into violence at the end of August."* Below is the Platts map and EIA oil export split graph attached to our tweet.

Figure 28: Iraq oil and gas infrastructure



Source: Platts

Figure 29: Iraq's monthly seaborne crude oil exports by location Jan 2015-July 2020



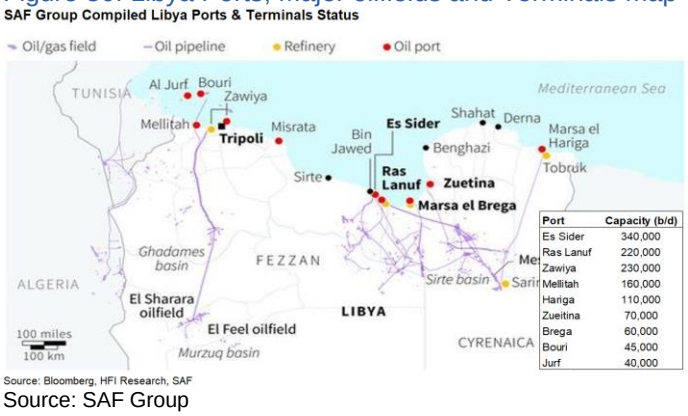
Source: EIA

Oil – Increased fighting on Tripoli outskirts raise risk for a return to East vs West war

Fears Libya could return to war

The Libya story this week was increased fighting on the south and west outskirts of Libya, and also reports of what appears to be increased preparedness for fighting. Unless things abruptly return to no armed fighting, the markets will look at increased risk for a return to East vs West fighting for control of Libya. And, if so, the risk for Libya oil production (currently >1.2 mmb/d) to sharply decline. This week, we didn't see any reports of production being shut in due to conflict. Note that as of our 7am MT news cut off, we did not see any reports of any significant overnight battles in Tripoli.

Figure 30: Libya Ports, Major oilfields and Terminals map



Source: Bloomberg, HFI Research, SAF

Source: SAF Group

Oil – Vitol Mike Muiller oil insights today on spare capacity and China

Vitol Asia Head Mike Muiller

We are big fans of the Gulf Intelligence Daily Energy Markets PODCASt, in particular their 1st Sunday of each month that features Vitol Asia Head Mike Muiller as we always get different oil market insights. There were three oil insights that jumped out at us this morning. (i) Earlier

in the memo, we noted Muller's statement that "*It is impossible, let me repeat, it is impossible for the world to get by without all of that"* referring to Russia's 7 plus mmb/d of oil and products exports. (ii) Lack of oil spare capacity. Earlier this mornng, we tweeted [LINK] "*"there needs to be a risk premium for the lack of spare capacity in #Oil markets" reminds #Vitol @michaelwmuller as Abdulaziz expressing a willingness to take oil off the market is a reminder "we're not going to see everybody producing flat out". Great podcast @sean_evers #OOTT".* Muller said "*But we have to bear in mind that in oil, there is less oil in the US SPR. That's at something like 20, 30 year lows after the interventionist measures that were enacted by the Biden Administration with a whole bunch of other countries acting in concert with that. And, at the same time, the period of price stabilization after Covid, OPEC+, is also over. and there is a big question mark over the what's next. So, by expressing a willingness to take oil off the market in response to either oil coming into the market from Iran sanctions being dropped or from lack of demand in China due to Covid repression measures, it's just serves as a reminder that we're not going to see everybody producing flat out. And therefore, I think we do need to bear in mind that there needs to be a risk premium for the lack of spare capacity in oil markets*." (iii) Muiler recognizes that the headlines on China right now are negative to demand driven by Covid, but looks for China strengthening energy consumption to end the year. Earlier this morning, we tweeted [LINK] "*Usual great China insights from #Vitol @michaelwmuller China #Oil views. Yes headlines right now are Covid impact, but post Oct 16 Congress opening up of travel restrictions & CN using very formidable reserves to crank up industries like cement, asphalt, road building, etc. #OOTT."* Muller said "*So I think you are going to see headlines dominated by the ever-present, ever-grand story and the fact that it was the Chinese construction sector, which is energy intensive of course, etc which weighed down on all the various indices we are looking at. But that's the very sector the government is now looking to boost and bolster with their very formidable reserves. So I think they are taking steps to counter that and I look forward to seeing evidence of greater outputs in industries like cement, ashphalt and paving, road building, etc which China still has some ways to go in certain provinces that haven't yet seen the huge wave of investments where literally in the last two decades, they have built a highway system equivalent to the interstates in the USA, criss-crossing various affluent provinces. So I think there is some running room to go in China."* (iv) Our Supplemental Documents package includes the transcript we created for Muller's comments this morning.

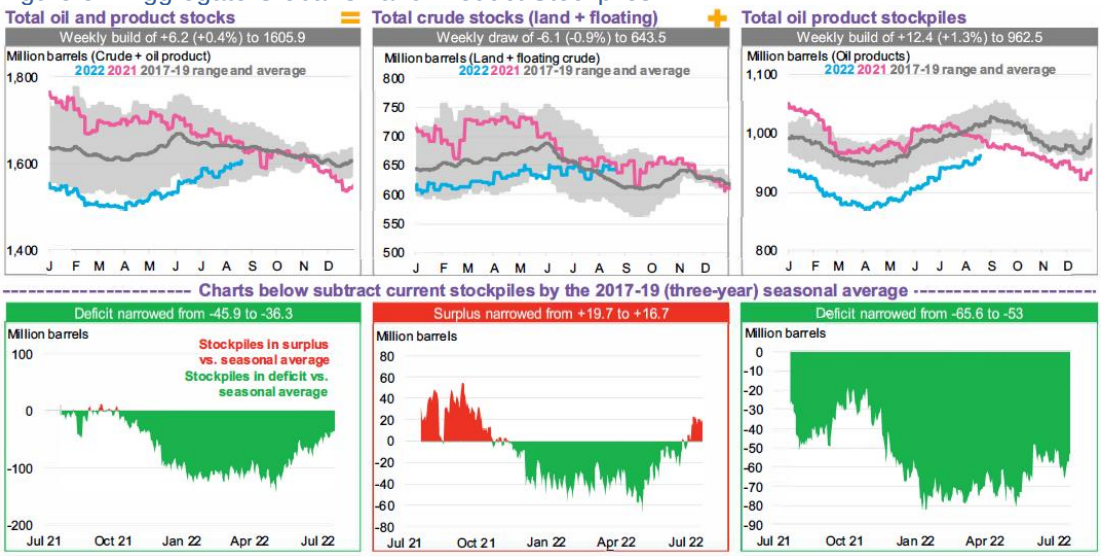
Oil – BNEF: global oil and product stocks deficit narrowed

BNEF's global oil inventories

For those with a Bloomberg terminal we recommend flipping thru BloombergNEF's "Oil Price Indicators" weekly that comes out on Mondays as it provides good charts depicting near-term global oil demand and supply indicators. The global oil and products stockpile deficit narrowed for crude and products from 65.6 mmb to 53.0 mmb. The stockpile deficit against the five-year average (2015-19) widened from 51.7 mmb to 53.5 mmb. Total crude inventories increased by 0.9% to 643.5 mmb, including global floating inventories. Product stocks were up 1.3% WoW with the stockpile deficit against the 3-year average narrowing from 65.6 to 53.0 mmb. Gas oil and middle distillate stocks have narrowed against their three-year average deficit (2017-2019) from 43.4 mmb to 41.1 mmb. Jet fuel consumption by international departures increased by 3,700 b/d WoW while consumption by domestic passenger departures decreased by 32,400 b/d. The global mobility index increased over the past week, up 0.5% in the week to Aug 25. Below is a snapshot of aggregate global

stockpiles. Our Supplemental Documents package includes excerpts from the BloombergNEF report.

Figure 31: Aggregate Global Oil and Product Stockpiles



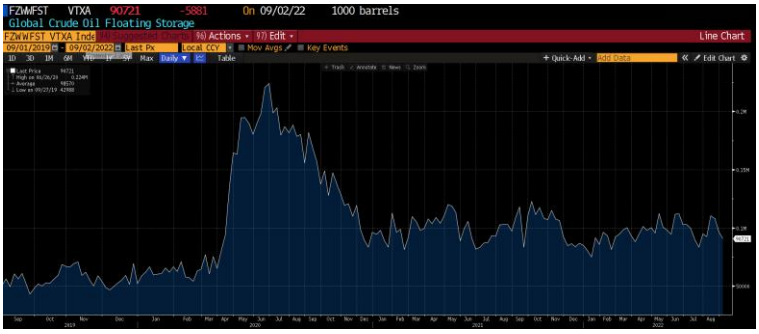
Source: Bloomberg

Oil – Vortexa crude oil floating storage 90.72 mmb as of Sept 2, -5.88 mmb WoW

Vortexa crude oil floating storage

We are referencing the Vortexa global crude oil floating storage data posted on the Bloomberg terminal as of Noon MT yesterday. Note that these estimates get revised over the course of the week and the revisions can go back months. We do not check daily for the revisions, so our comments today on the new estimates are compared to the prior weeks Vortexa estimates posted on Bloomberg on Aug 27 at noon MT. (i) As of Noon MT yesterday, Bloomberg has posted Vortexa crude oil floating storage estimate for Sept 2 was 90.72 mmb, which is -5.88 mmb WoW vs revised down Aug 26 of 96.60 mmb. Note Aug 26 of 96.60 mmb was revised down -2.49 mmb vs the 99.09 mmb posted on Bloomberg as of noon MT on Aug 27. (ii) Note that the last five weeks were revised down. Comparing yesterday''s estimates vs the estimates posted on Aug 27 at noon MT: Aug 26 revised -2.49 mmb. Aug 19 revised -2.65 mmb. Aug 12 revised -0.40 mmb. Aug 5 revised -1.8 mmb. July 29 revised -1.46 mm. (iii) With the revisions, crude oil floating storage over the past two months looks to be +/- 100 mmb, but with a couple of recent weeks at 110 mmb. (iv) Also remember Vortexa revises these weekly storage estimates on a regular basis and we do not track the revisions through the week. (v) Sept 2 estimate of 90.72 mmb is -133.34 mmb vs June 26, 2020 peak of 224.06 mmb. (vi) Note that the below graph goes back 3 years and not just 2 years as floating oil storage was in the big ramp up period in Q2/20 as Covid started to have a huge impact. Sept 3 of 90.72 mmb is +40.13 mmb vs pre-Covid on Sept 2, 2019 of 50.59 mmb. Sept 2 estimate of 90.72 mmb is -18.18 mmb YoY vs 108.90 mmb on Sept 3, 2021. (vii) Below are the last several weeks of estimates made as of yesterday noon MT, Aug 27 at noon MT, and Aug 20 at noon MT.

Figure 32: Vortexa Floating Storage as of Sept 2 posted on Bloomberg Noon MT yesterday



Source: Bloomberg, Vortexa

Figure 33: Vortexa Estimates Posted Sept 3 noon MT, Aug 27 noon MT, Aug 20 noon MT

Posted Sept 3, noon MT

FZWWFST VTXA Inde | 09/01/2019 - 09/02/2022

Date	FZWWFST VT... Last Px
Fr 09/02/2022	90721
Fr 08/26/2022	96602
Fr 08/19/2022	107.78k
Fr 08/12/2022	110.311k
Fr 08/05/2022	92630
Fr 07/29/2022	94907
Fr 07/22/2022	83291
Fr 07/15/2022	89341
Fr 07/08/2022	99602
Fr 07/01/2022	102.815k
Fr 06/24/2022	103.064k

Aug 27, noon MT

FZWWFST VTXA Inde | 08/25/2019 - 08/26/2022

Date	FZWWFST VT... Last Px
Fr 08/26/2022	99094
Fr 08/19/2022	110.429k
Fr 08/12/2022	110.706k
Fr 08/05/2022	94431
Fr 07/29/2022	96372
Fr 07/22/2022	87209
Fr 07/15/2022	89237
Fr 07/08/2022	99286
Fr 07/01/2022	102.682k
Fr 06/24/2022	102.696k
Fr 06/17/2022	111.583k

Aug 20, noon MT

FZWWFST VTXA Inde | 08/18/2019 - 08/19/2022

Date	FZWWFST VT... Last Px
Fr 08/19/2022	104.631k
Fr 08/12/2022	111.571k
Fr 08/05/2022	91956
Fr 07/29/2022	91904
Fr 07/22/2022	84582
Fr 07/15/2022	86346
Fr 07/08/2022	95063
Fr 07/01/2022	94835
Fr 06/24/2022	93158
Fr 06/17/2022	103.26k
Fr 06/10/2022	101.878k

Source: Bloomberg, Vortexa

Oil – Caixin PMI for August is below 50 at 49.5, after last month at 50.4

Caixin PMI down in August

One of the big oil negatives in the past month has been how increasing Covid lockdowns have pushed thoughts/hopes for a return to better growth in China. So it shouldn't have been a big surprise, when the Caixin China Manufacturing PMI data for August [LINK] was released on Wednesday night (North America time) and the index showed the rate of improvement continued to deteriorate from June's 13-month high. On Wednesday, we tweeted [LINK] *"China Caixin PMI for Aug 49.5 v Est 50.2 & July 50.4. "renewed fall in total new business at Chinese manufacturers" "1st drop in sales for 3 months" "generally subdued mkt conditions, power cuts & lingering COVID-19 impacts had all dampened overall sales" Thx @IHSMarkitPMI #OOTT".* June 2022 was the highest PMI since May 2021. IHS wrote "*The Caixin China General Manufacturing PMI came in at 49.5 in August,down from 50.4 the previous month. A resurgence of Covid-19 infections, coupled with a prolonged heat wave, weighed on the manufacturing sector."* Our Supplemental Documents package includes the Caixin China PMI for August.

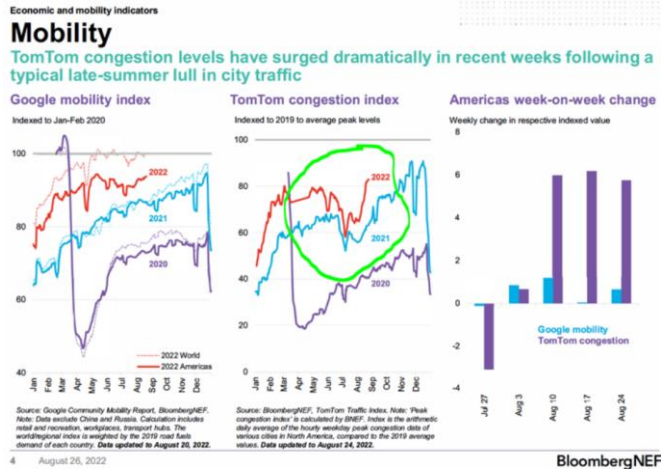
China Covid lockdowns across China increased this week.
One of the oil and world economy stories this week were increasing Covid lockdowns in particular when lockdowns hit Chengdu in Sichuan province. Chengdu is a major industrialized city with over 20 million people. But the lockdowns are widespread across China. On Thursday, we retweeted [LINK] a Global Times (China state media) report on covid. We tweeted "*China Covid lockdowns aren't stopping. China locks down Chengu (Sichuan), in addition to multiple places across CN ie. Central CN Henan Province, Dalian in NE CN Liaoning, Lanxi in S NE CN Heilongjiang, parts of Shenzhen in south CN Guangong. #OOTT."* The Global Times report "*Chengdu in SW China's Sichuan tightens management to curb the fast spreading of the latest Omicron BA.2.76 flare-up*." [LINK]

Oil – Demand "response" not "destruction" from US drivers to gasoline prices

US drivers show demand "response"

On Tuesday, we tweeted [LINK] *"#Gasoline demand response. #TomTom congestion index shows YoY gap narrowed to almost zero as US gas prices went >$5, but drivers went back on the road & YoY gap widened as soon as gas prices went below $5 on way to $4 and now $3.85. Thx @BloombergNEF Danny Adkins. #OIl #OOTT."* And [LINK] "*should have said, it's a reminder of demand "response" but not demand "destruction" in the short/mid term. #OOTT."* Our tweet included the below graph of TomTom congestion index from BloombergNEF's US Oil Indicators Weekly. The graph shows the demand "response" as the YoY gap narrowed to almost zero as US gasoline prices rocketed up to over $5, but is also shows how the YoY gap widen as gasoline prices dropped below $5 on the way to $4 and now below $4. It's why we say it's demand "response" and not demand "destructdion".

Figure 34: BloombergNEF Mobility Indicators



Source: BloombergNEF

Shell sees demand response to high oil prices but not demand "destruction"
We still believe many are calling demand destruction to what really is demand response. Here is what we wrote in our July 31, 2022 Energy Tidbits. "*We have been highlighting one of the key overlooked concepts on high oil and gasoline prices and oil demand is that there is a difference between demand "response" and demand*

"destruction". Before the Shell Q2 earnings call, Shell CEO was on Bloomberg TV and made what we thought were very bullish comments on the outlook for oil. We tweeted [LINK] "Buckle up! Bullish #Oil. @TomMackenzieTV asks signs of demand destruction? @VanBeurdenShell "see demand RESPONSE.. but demand DESTRUCTION of liquids side, No. because there is very very little elasticity when it comes to that". Much more incl limited OPEC+ spare capacity. #OOTT.' Van Beurden does not see demand destruction of liquids, but we should note does see demand destruction of natural gas to some degree in Europe. We made a transcript of the key sections [LINK]. At 0:30 min mark, Van Beurden "Energy markets are tight, and will remain tight and volatile, I think, not only for the remainder of this year but also well into next year." At 1:55 min mark, re oil prices, Van Beurden "Let's look at the facts. Demand hasn't fully recovered yet. And supply is definitely tight. There is lot of talk about limited spare capacity in OPEC+ and we subscribe to that theory as well. There is not a lot that can come out of say shales in North America. Of course, the release from the Strategic Petroleum Reserve has helped a bit but listen that's not a price management tool, so there is a limit that can be done there as well. And even thought of course we focus a lot on Russia, as a matter of fact the amount of crude oil coming out of Russia has not really diminished an awful lot. That may still come of course when the sanctions start to bite next year. So I think that where we are today, there is more upside than downside when it comes to the oil price". At 2:45 min mark, Mackenzie "are you seeing any signs Ben of demand destruction?" Van Beurden "I think you see demand response. What we see for instance, US gasoline demand is down a few percentage points compared to 2019. And of course, we see still a little bit of lagging effect in China because of Covid and the rolling lockdowns. And there are some areas where the recovery has not been complete, like still for instance in aviation. But demand destruction of liquids side, No. Because there is very very little elasticity when it comes to that. On the Gas [Natural Gas] side, that's a different story thought. What I do see in Europe of course with the very very high gas prices we are experiencing at the moment, we see a lot of LNG being bid away from Asia into Europe. But of course, there is limited supply coming on extra. There I would see an accelerated transition away from gas into renewables. But that is not something that will happen in a matter of a few quarters, that will take a little bit longer. In the meantime, I think LNG will remain very very buoyant for years to come."

Oil – Braemar "*shipping sector is the most exciting it has been in years*"

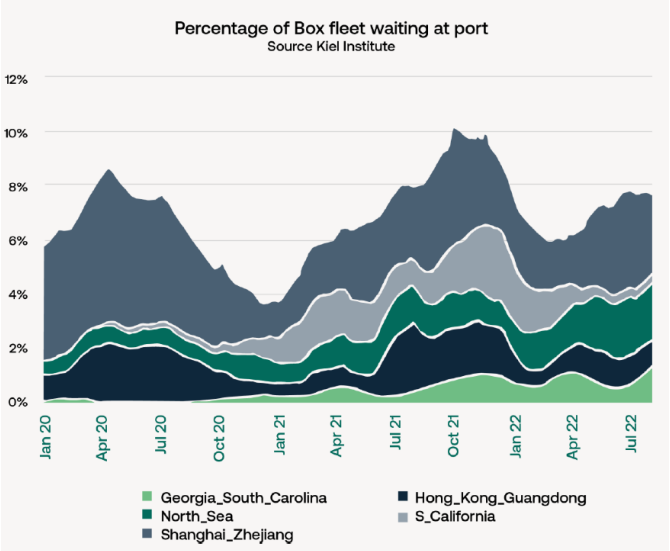
Braemar's shipping outlook

No one should have been surprised to see Braemar Shipping Service's comments on shipping in the Q2 results on Tuesday. We tweeted [LINK] "*Continued strong #BunkerFuel demand. @BraemarPLC "shipping sector is the most exciting it has been in years" "growth in ton-mile..." Also get your Xmas shopping early as port congestion "reversion to normality is unlikely to reach its endpoint before mid-2023". #OOTT."* There aren't earnings calls, so we had to rely on Braemar's slide deck, which included comments such as "*shipping sector is the most exciting it has been in years*", "*on track to double profits by 2024*". The slide deck was positive on the results, forecasts and outlook.

Braemar: port congestion reversion to normality not before mid 2023

The second part of our Braemar tweet said "*Also get your Xmas shopping early as port congestion "reversion to normality is unlikely to reach its endpoint before mid-2023".* Our tweet included the below graph with the Braemar comments "*Container charter market continues to be supported by port congestion. This is partly attributed to labour shortages and logistical bottlenecks. The reversion to normality is unlikely to reach its endpoint before mid-2023."*

Figure 35: Braemar: Percentage of Box fleet waiting at port



Source: Braemar

Oil – Relief to global shipping, Aframax tanker only temporarily blocked Suez Canal

Temporary clogging up of Suez Canal

On Wednesday, the global shipping sector had a scare of a potential blockage in the Suez Canal when an Aframax tanker, AFFINITY V, got stuck in the Suez Canal and temporarily clogged up traffic. Everyone had immediate memories of how the Ever Given blocked the Suez Canal for six days in March 2021. But fortunately, the clogging up was only temporary. At 6pm MT on Aug 31, we tweeted [LINK] "*#SuezCanal. looks like tanker is now moving again with tugboat assistance. Thx @TankerTrackers. #OOTT #LNG".*

Oil – Lufthansa cancelled all German departures with one-day pilots strike

Lufthansa 1-day pilots strike

One of the problems with being an analyst is that we see news and wonder what the math says. Let's be clear, there is no significant impact on oil demand from Lufthansa passengers who decided to drive or take a train instead of waiting to rebook because of the one-day pilot strike. But we would still like to know the math. It's too bad there isn't daily data for driving as it would have been good to run the numbers on the one-day strike this week by pilots that forced Lufthansa to cancel all flight departures from all German airports. It's only a one-day strike so not any significant impact, but it would be interesting to know how many more miles were driven because people ended up driving instead of waiting to rebook their flight. The strike impacted any Lufthansa planes taking off from a German airport to either domestic or

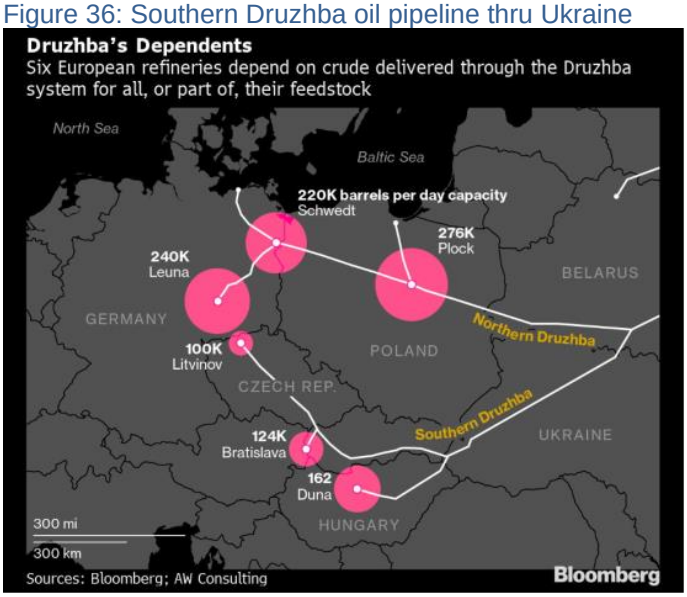
international locations. International passengers, possibly other than some with short flights to neighbouring countries, would to the most part rebook. But we have to believe most would rebook. But we also would believe that many domestic passengers would either hop on the train or drive instead of waiting to rebook. On Thursday, we tweeted [LINK] "*A 1-day Pilots strike forces #Lufthansa to cancel all departures from German airports on Sept 2. long distances fliers will be rebooked, wonder what the math is for #Diesel #Gasoline consumption is from local fliers who will take a train or drive? #OOTT*"

Oil & Natural Gas – IAEA's multiple risks to Zaporizhzha nuclear power plant

IAEA worries about Zaporizhzha

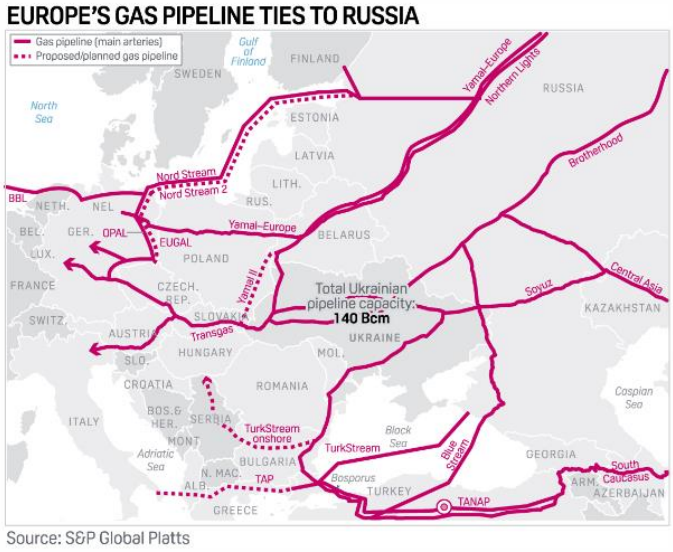
We continue to be reminded of the potential disaster or Black Swan event in the Ukraine – damage to a nuclear power plant that leads to fallout. That would be a disaster to the people of Ukraine and adjoining countries, in particular Poland, from winds. We would expect that any disaster event would have a big impact on oil and natural gas markets as we have to believe any oil and natural gas pipelines would come to a halt. The world has been increasingly concerned that something bad could happen to the Russian controlled Zaporizhzha nuclear power plant in the Ukraine as a result of Russia/Ukraine fighting around the plant. The fear has been that a missile or something causes damage and leads to some sort of nuclear fallout. That concern remains and there are other concerns raised post the IAEA's Director General Grossi Thursday trip to the Zaporizhzhya nuclear plant. Yesterday, we tweeted [LINK] "*ICYMI, @rafaelmgrossi post #ZaporizhzhiaNPP visit. Yes, worries a lot military action could cause physical damage. But access to off-site power is "matter of enormous concern" as needed or "cooling systems for the reactors cannot work". Thx @IsaCNN @business. #OOTT".* No question, Grossi is concerned about a military mistake causing physical damage. But, if anything, he highlighted a "*matter of enormous concern*" – the access to offsite power. Grossi said "*The same code we are applying to off-site power plant. This has also been a matter of enormous concern and interest around the world, because as you know, if you don't have off-site power supply, the cooling systems for the reactors cannot work. If they -- and if they cannot work, these can lead to a major accident. We have seen on several occasions, that there have been blackouts or interruptions of one or two or three of the lines feeding the plant from outside. At the moment, there's -- there are two operational, and what we know also is that, when there was one situation of a total, complete blackout, that these are the generators operated normally."* Grossi also highlighted the problem with getting spare parts for ongoing operations. And also the increasing people risk from having the different groups of people working together. Our Supplemental Documents package includes excerpts from the Bloomberg transcript of the CNN interview with Grossi.

Figure 36: Southern Druzhba oil pipeline thru Ukraine



Source: Bloomberg

Figure 37: Europe's gas pipeline ties to Russia



Source: Platts

Oil & Natural Gas – Updated EIA China country brief

We continue to recommend adding the EIA's country analysis briefs to reference libraries as good quick references, in this case its new EIA country executive summary [LINK] on China. China is the most populated country in the world and was the largest producer and consumer of energy in 2020, the EIA expects that their demand will only continue to increase. An

EIA's Country Brief on China

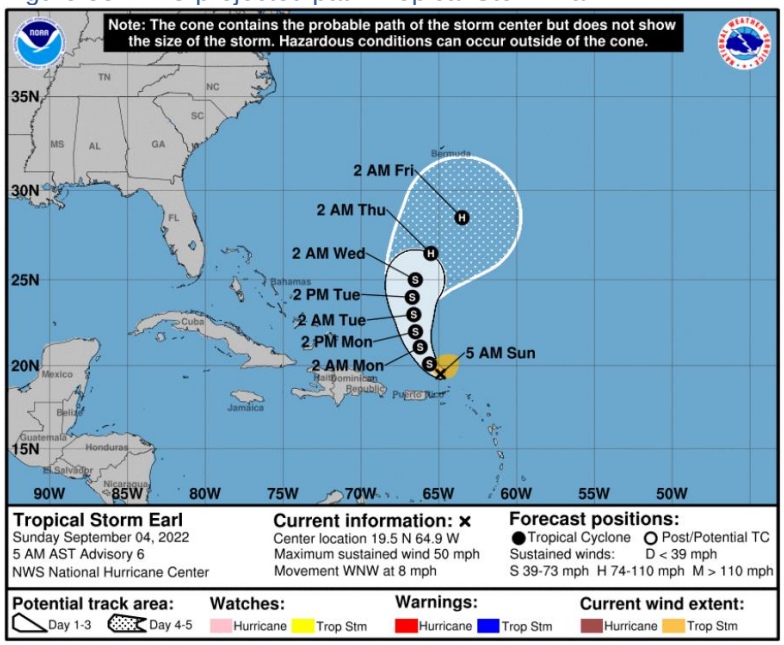
estimated 15.3 mmb/d of petroleum and liquids were consumed in China in 2021, up 0.84 mmb/d from the year prior. Diesel (24%) and gasoline (23%) accounted for the largest shares of oil products consumed since 2000. The COVID-19 pandemic decreased industrial and economic activity and energy use within China, and the resurgence of COVID-19 cases and China's policy of localized lockdowns are likely to make the Chinese government's 2022 target GDP growth of 5.5% more difficult to achieve. China was the 5th largest producer of petroleum and liquids in the world over 2021 with most of the production coming from legacy fields that requires expensive oil recovery methods to sustain it's production. The Chinese government emphasizes the importance of production May 2022 and set the domestic crude oil production target of ~1.5 bnb for 2022, a 2% increase from 2021 targets; National oil companies have announced capex will increase by 4.6% over the course of the year. China's refining sector has undergone some changes recently that include eliminating market advantages for some refiners and improving efforts to decarbonize. China's refining capacity is set to increase to accommodate the growing demand for petroleum products; an additional 1.1 million b/d of capacity will be added by the end of 2022. Zhejiang's Rongsheng facility's Phase II began commercial operation in early 2022 with 400,000 b/d of capacity. China is the largest importer of crude in the world with Saudi Arabia being a significant source of it's total imports. In 2021 China imported 10.3 mmb/d of crude, down from 2020 by 0.5 mmb/d. Russia was China's second-largest source of crude oil imports in 2021. Crude oil imports from Russia began to increase following new upstream production from Eastern Siberian fields, construction of pipeline and transmission infrastructure between the countries. China's natural gas production has been steadily rising during the past several years. China's NOCs produced an estimated 7.4 tcf of natural gas in 2021, 8% higher than in 2020. Natural gas accounted for 9% of China's total energy consumption in 2021. China's natural gas consumption rose by 13% in 2021 to 13.4 tcf from 11.9 tcf in 2020. Several factors have contributed to growth in natural gas consumption during the past few years, poor air quality and a decrease in the availability of hydropower. China has recently become the fifth largest importer of LNG in the world, at 3.8 tcf in 2021, to accommodate the growing gap between supply and demand for natural gas. Our Supplemental Documents package includes the EIA country brief.

Oil & Natural Gas – No tropical storms/hurricanes in Gulf of Mexico

No hurricanes in Aug in GoM

It continues to be unusually quiet for tropical storm/hurricane activity in the Gulf of Mexico with zero activity over the past several weeks. However, there were two developments this week with Hurricane Danielle in the middle of the Atlantic Ocean and Tropical Storm Earl that is north of the Caribbean islands looking to turn into the Atlantic away from the US East Coast. Below is NOAA's National Hurricane Center's Tropical Storm Earl path as of 3am MT today.

Figure 38: NHC projected path Tropical Storm Earl



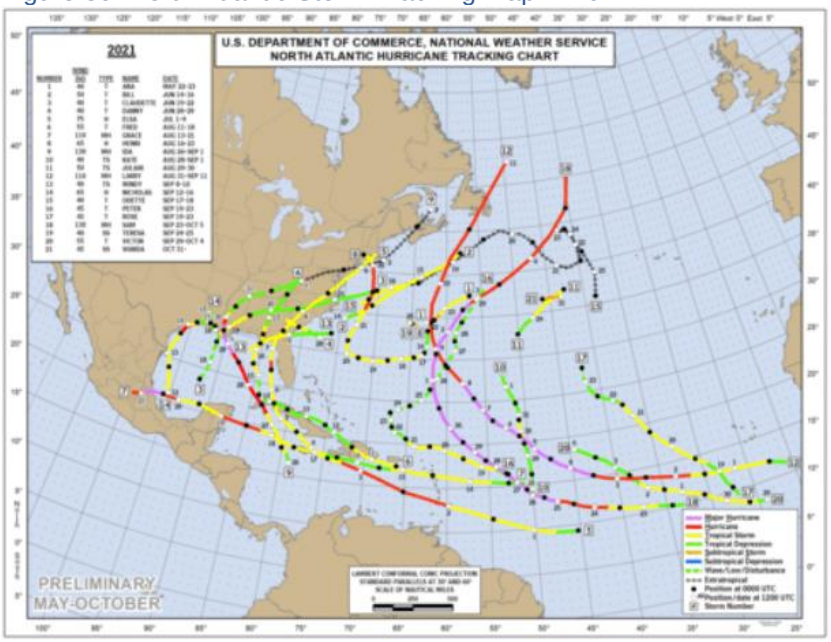
Source: NOAA

Oil & Natural Gas – Puerto Rico tends to be a good marker for GoM hurricane risk

Hurricane risk GOM vs Atlantic

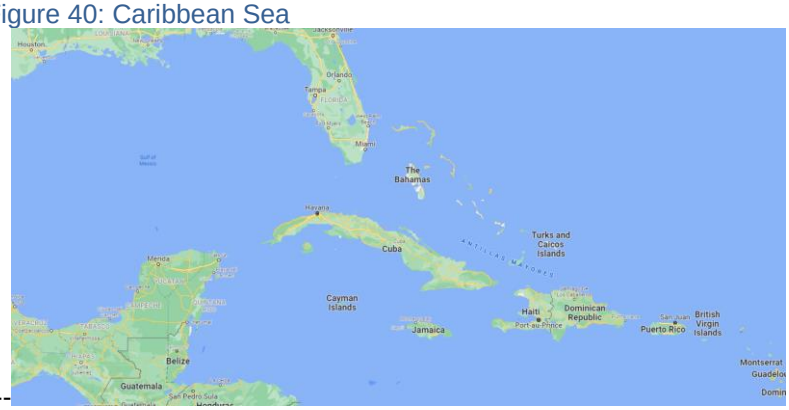
It may have been very hot this summer in Texas and Louisiana, but the good weather news is that it continues to be another week of no hurricane activity in the Gulf of Mexico. This week's activity are in the Atlantic coast side. The hurricane forecasts are looking for an active September, so we remind of a good marker for potential storms to come into the Gulf of Mexico – Puerto Rico. On August 7, we tweeted [LINK] "*Forecasting Atlantic hurricane paths is impossible even for experts. But hurricane risk to GoM #Oil #NatGas #LNG #Refinery tends to increase if hurricanes are south of Puerto Rico. See 👇 excerpt SAF Group Dec 5, 2021 Energy Tidbits [LINK] #OOTT*". Here is what we wrote in the Dec 5, 2021 Energy Tidbits "*Is normally not a perfect correlation but the 2021 Atlantic hurricane season was for the early indicator for risk to the GoM oil and gas being if the tropical storm/hurricane hits north of Puerto Rico or not. This year, all the storms/hurricanes that were north of Puerto Rico went into the Atlantic and all that were south of Puerto Rico went into the GoM. Below is NOAA's 2021 tracking map*."

Figure 39: North Atlantic Storm Tracking Map in 2021



Source: National Hurricane Center

Figure 40: Caribbean Sea



Source: Google Maps

Energy Transition – ISO New England: energy transition needs reliable natural gas

ISO New England's reality check

There was another reality check that the energy transition isn't ready for prime time this week with the ISO New England "*Draft ISO/EDC/LDC Problem Statement and Call to Action on LNG and Energy Adequacy*". We recognize it's tough for the ISO to be blunt in a Democrat state but we think they would have more support if they used more straight talk and just said the clean energy world is not ready for prime time. They may not have said that, but it's the implication. On Wednesday, we tweeted [LINK] "*Must read# #EnergyTransition reality check from @isonewengland. "In sum, we believe that, for the clean #EnergyTransition to be*

successful, the region must continue to have reliable supplies of #NatGas for home heating & electricity". Fits 👇12/09/21 tweet 2022 Predictions #OOTT." There is so much more in the draft. ISO New England notes that they have fallen into the Europe trap of not committing to long term deals so infra can't be built. They highlight the need to reduce "*imported*" LNG ie. Need Jones act relief to be able to access cheaper US LNG that is HH linked as opposed to spot LNG prices. ISO New England say they need LNG for longer under the energy transition for reliable power. And they say multiple times until the alternative forms of long duration energy storage are built. We still believe long duration storage will be the energy game changers whenever they get to storage being able to send out for days and not hours. There is much more in the Draft. Our Supplemental Documents package includes the ISO New England draft.

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

Our ISO New England tweet said it "*Fits 👇12/09/21 tweet 2022 Predictions".* Our #1 prediction for 2022 was that energy leaders will have to admit the energy transition wasn't working as planned and changes were needed. This was before Russia invaded Ukraine. Our Dec 12, 2021 Energy Tidbits memo was titled "*Time for 2022 Predictions: Our #1 is More Leaders Have a #MacronMoment & Admit Energy "Transition" Needs Changes*." In that memo, 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".

A #MacronMoment can take three forms

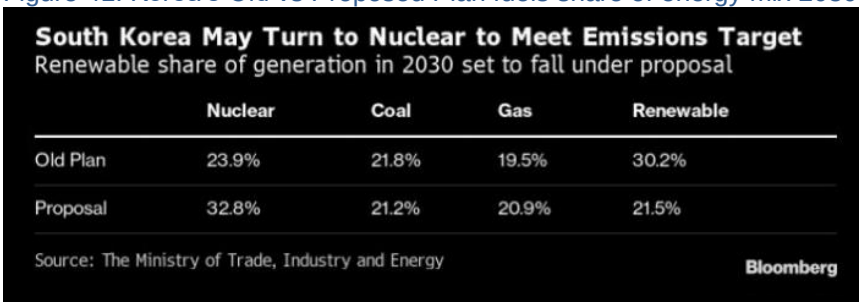
In the Dec 12, 2021 Energy Tidbits, we also wrote "*We use the term "Macron Moment" and the #MacronMoment as when an energy transition leaders come to the realization that the energy transition will take longer, be bumpy and cost more ie. it just won't be ready for prime time and they need to change their plans on how quickly they get rid of oil and natural gas. We are already seeing politicians start to publicly have a #MacronMoment but, so far, it has come in three forms of admission as noted below*."

Energy Transition – Korea slashes wind/solar share of target 2030 energy mix

Korea slashes solar and wind targets

It looks like Korea is having a reality check on the need to provide reliable, available and affordable energy. And that means they are slashing their targeted share of solar and wind in their energy mix to 2030. Korea President Yoon Suk-yeol was elected in the spring and part of his vision was to reverse prior President Mon's nuclear reactor phase-out policy and crank up nuclear as the best path to net-zero emissions. So no surprise, Korea is proposing a big crank up in nuclear power in its energy mix. But it is not doing so at the cost of fossil fuels to accelerate the move to net zero, rather they plan to do so at the cost of solar and wind and not really changing the fossil fuels share of energy mix. And this proposed mix would be a big hit to intermittent solar and wind in the 2030 energy mix. On Wednesday, we tweeted [LINK] *"#Korea to slash #RenewableEnergy share of 2030 energy mix target from 30.2% to 21.5%. #Coal down 21.8% to 21.2%. #NatGas up 19.5% to 20.9%. #Nuclear big winner 23.9% to 32.8%. Adds to #LNG demand as all imports are via LNG. Thx @HEESU_LEE #OOTT."* On Tuesday, Bloomberg reported on the proposed new Korea energy mix. Bloomberg wrote "*South Korea plans to scale down its reliance on renewable energy sources and boost nuclear generation to meet its tougher climate goal. Renewable energy should account for 21.5% of generation capacity by the end of the decade, according to a draft of the nation's long-term power supply plan, down from 30.2% under the previous version, the energy ministry said Tuesday in a statement, citing a government advisory group. Most of the gap would be met by nuclear while coal and gas are little changed from the prior proposal."* Our Supplemental Documents package includes the Bloomberg report.

Figure 41: Korea's Old vs Proposed Plan fuels share of energy mix 2030



Source: Bloomberg

Energy Transition – California extends Diablo nuclear power plant for 5 yrs

California extends Diablo nuclear life

California may not admit it, but they are the latest to take action to try to avoid electricity outages in the 2020s. We have seen coal power returned, nuclear power returned and more natural gas. In California's case, it's nuclear and natural gas. And California can't blame this on Russia. We really wish leaders would openly acknowledge the deficiencies of trying to rely on intermittent solar/wind without having truly long-duration storage sendout capability. If they did, then we believe they could set a more realistic plan to reach their priority to reduce emissions without causing an energy crisis for years on end. But, at least we are seeing politicians take actions to deal with the intermittency. California is the latest example as they faced potential electricity shortfalls most days this week and continuing. (i) Extending nuclear power for 5 years. On Friday, we tweeted [LINK] *"CA may not say it, but realize reliable, available #Electricity needs #NatGas #Nuclear. 09/01/22 CA SB-846 extends Diablo Nuclear power for 5 yrs to 2030. 08/17/21 California Energy Commission order for 5 temp #NatGas plants for min 5 yrs operations.* See 👇12/09/21 tweet. #OOTT." On Thursday , the California legislature approved SB-846 that extends the life of the Diablo nuclear power complex by at least 5 years. It also provided financial support for this move with a reported $1.4b forgivable loan to PG&E. (ii) Aug 17, 2021 order for 5 temporary natural gas plants for minimum 5 years. Our tweet also noted an item from our August 22, 2021 Energy Tidbits. On Aug 17, 2021, the California Energy Commission approved an order Temporary Power Generator Licensing order that provided for 5 natural gas plants by Oct 31, 2021 on at temporary basis for a minimum of 5 years. Our Supplemental Documents package includes the NPR reporting on SB-846. [LINK]

California approved adding 5 natural gas plants a year ago in Aug 2021

As a reminder, a year ago, California approved adding five natural gas plants. Our Friday tweet also noted an item from our August 22, 2021 Energy Tidbits. Here is what we wrote "*We recognize that this is a terrible year for California with the massive wildfires and drought along the west coast, which has really put California's power security at risk. No question it is a brutal year. But we also think its important to look at their recent 2-step natural gas actions and recognize its more than just dealing with 2021, rather its an acknowledgement that they need natural gas for longer. (i) Step 1 was to increase natural gas generation thru Oct 31. The purposed for this was to get California thru the 2021 wildfire season risk. On Aug 2, we tweeted [LINK] "#NatGas power generation to increase thru Oct 31 as CA to pay large energy users to move to backup generation ie #NatGas. #EnergyTransition greenwashing? @GavinNewsom critical times causes forgot to say wildfires don't just hurt transmission, also cut #Solar generation efficiency." On July 30, California proclaimed a state of emergency that will see them pay large energy users to go to their backup generation, so positive for natural gas as these large energy users get paid to go to their natural gas power. Interestingly, Gov Newsom's release went on about their moving to clean energy and its almost an after thought that they are allowing these emergency measures. And clearly no mention of natural gas being the backup power. (ii) Step 2 was this week's approval for 5 natural gas power generators for up to 5 years. The expectation is that these 5 new natural gas generators will be in place before the end of Sept to help provide more support for this 2021 wildfire season, but the part that seemed to be overlooked is that these are*

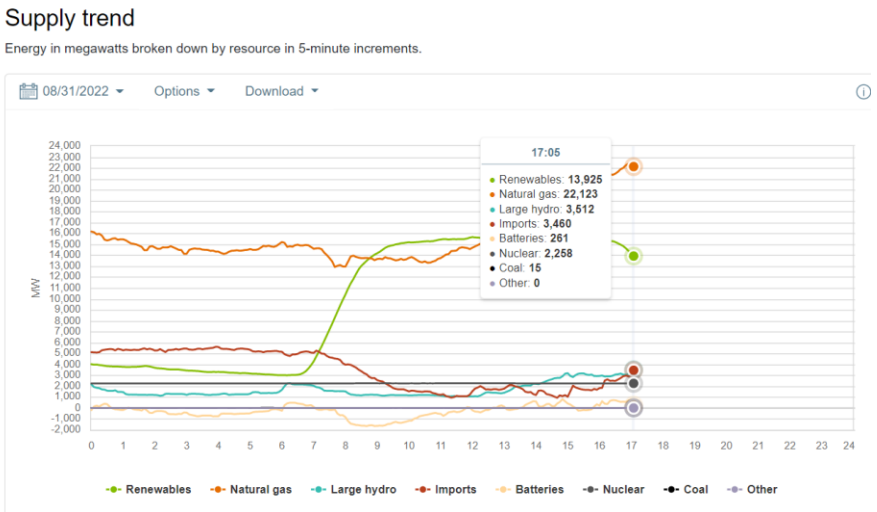
approved for 5 years. So while this is being messaged as needed to provide power support for 2021, the reality is that this is being put in place for the next 5 years."

Natural gas saves the day

Energy Transition – Natural gas saved the day for California daily power needs

It was a tough week for California electricity needs and California was forced to warn on potential outages and the need for electricity savings. And, as seen before, natural gas was the saving factor. We didn't tweet this every day, but the electricity story every day was the strong natural gas generation including a big ramp up staring around noon each day to fill the gap with the daily fall off in solar. On Wednesday, we tweeted [LINK] "*#NatGas stepping up as usual to carry the load during peak California power demand as #Solar starts to quickly decline. Below is the link to live @California_ISO power supply by fuel updated as of 5:05pm PT. #OOTT [LINK].*" Our Supplemental Documents package included the CAISO power mix at 5:05pm on Aug 31. The graphs were basically the same on other days.

Figure 42: California Power Supply Trend as of 5:05pm PT on Aug 31



Source: CAISO

EV charging in California

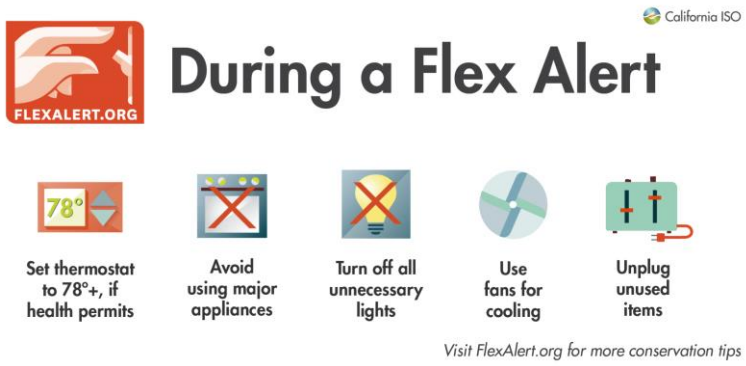
Energy Transition – California's electricity Flex Alert also hit EV charging

There was a good reminder this week of EVs also get impacted when electricity supply get tight. On most days this week, the California Independent System Operator had their Flex Alert to avoid power outages. On Wednesday, we tweeted [LINK] "*@California_ISO extends #FlexAlerta to Thurs Sept 1 ie. from 4-9pm, set thermostat to 78F or higher, avoid using major appliances and charging #EVs, turn off all unnecessary lights. #NatGas #OOTT."* The CAISO Flex Alert Conservation Actions included both before 4pm and peak 4pm to 9pm actions. The 4pm to 9pm actions include "*Set thermostat to 78 degrees or higher, if health permits. Avoid using major appliances and charging electric vehicles. Turn off all unnecessary lights*." Our Supplemental Documents package includes the CAISO Flex Alert.

California really doesn't want to remind EV drivers to abide by charging rules

We have to believe some California EV drivers will continue to charge their EVs during peak hours as California really doesn't want to remind EV drivers not to charge their EV during peak 4pm – 9pm. It's like they have a rule but don't really want to enforce it on EV drivers. And they actually give cover to an EV driver not following the rules by not including EV charging consistently on what not to do during peak hours. On Friday morning, CAISO tweeted [LINK] "*Reminder: A #FlexAlert has been issued for today, Sept. 2, from 4-9 p.m. due to high heat and heightened energy demand. Read the news release: Read the news release: https://bit.ly/3ReGPB5*." The linked press release is in line with Flex Alert noted above that includes charging EVs in 4pm to 9pm as one of the actions Californians should not be doing to helpl with the grid. Yet on Friday afternoon, CAISO's separate Flex Alert twitter account included a tweet at 4pm PT [LINK] "*A #FlexAlert is in effect for today, Sept. 2, from 4 p.m. to 9 p.m. Help reduce stress on the power grid by flexing your power with some of these tips*." The tweet included the below help chart, which conveniently omits EV charging despite it being part of the Flex Alert guidelines. Note that yesterday afternoon, CAISO extended the flex alert thru today's peak.

Figure 43: Flex Alert tweet Sept 2, 2022



Source: CAISO

Energy Transition – UK EVs op cost saving vs ICE now down to 27%

UK EVs losing fuel cost advantage

Last week's (Aug 28, 2022) Energy Tidbits memo highlighted the Ofgem increased price cap and how that means UK households will get hit with +80% energy price on Oct 1. And we also included Ofgem's warning that "*the market for gas in the winter means that prices could get significantly worse through 2023*." No surprise, the much higher cost of electricity means that the cost of charging EVs is up significantly. On Monday, we tweeted [LINK] "*Looks like UK #EVs will soon lose op cost saving vs #ICE. @TomBarnardWords linked report, yr ago save 75% in switch, now just 27%. But @ofgem 👇 Aug 26 warned energy price cap "could get significantly worse through 2023". #NatGas #OOTT."* Our tweet referenced an Electrifying Aug 27 report [LINK] that said "*Energy price rises – does an electric car still make financial sense? In a word, yes. But the gap is narrowing and you'll need to do some sums and make sure you choose how and where to charge to make you make the most of the possible savings. A year ago, the average electric car driver would see the cost to fuel their*

car drop by about 75% after making the switch, even when charging at peak rates during the day. Now the saving is just 27% on an average car." We remind of Ofgem's comments last week, where they warned natural gas prices could get significantly worse through 2023. If so, the 27% op cost advantage will likely be down to zero. Our Supplemental Documents package includes the Electrifying report.

Delta's large SAF deal

Energy Transition – Delta's large SAF deal = jet fuel for ~10 UK-NYC flights

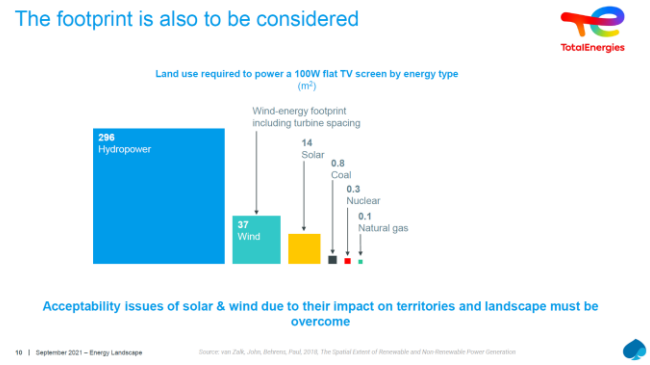
On Tuesday, Delta Airlines posted an article [LINK] advising of an agreement with DG Fuels, LLC that "*could provide Delta with 385 million gallons of unblended sustainable aviation fuel, while helping to expand availability of SAF in the underserved marketplace*." And "*Anticipated to begin delivery by the end of 2027, DG Fuels is planning to deliver 55 million gallons of SAF annually for seven years. The SAF will likely use timber waste, corn stover and cotton gin waste as feedstock and is expected to reduce lifecycle greenhouse gas emission by between 75%-85% compared to conventional jet fuel, which aligns with Delta's goal as a founding member of the First Movers Coalition."* No one will disagree that it reducing emissions is positive for the world. And baby steps do make a difference over time, but the Delta announcement is much like prior announcements in that it will take decades to decarbonize air travel. It looks like the 55 million gallons of SAF year is enough to fuel approx. 10 one-way London to New York flights. Pre-Covid, Delta was flying over 90 trans Atlantic flights every day and is still well above 70 dailly trans Atlantic flights. We tweeted [LINK] "*#JetFuel will be hard to decarbonize is an undestatement. #DeltaAirlines sustainable aviation fuel deal, 55 mn gal/yr, or ~3,600 b/d is enough SAF for ~ten 1-way flights London-NYC per day. vs Delta flies >70 trans Atlantic per day. #OOTT.* It's a small drop in the bucket. Our Supplemental Documents package includes the Delta posted article. [LINK]

TotalEnergies highlighted the land competition/shortage for food vs SAF

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

in fact, on the planet. So and I agree with you that the competition with agriculture and -- will be also limited to the first generation biofuels." Separately, they referred to their below chart on one of the challenges for solar and wind is that they need a huge amount of land to produce the same energy as other sources."

Figure 44: Land use of relative energy sources



Source: TotalEnergies

Elon on oil and gas

Energy Transition – Elon Musk says need oil & gas otherwise civilisation will crumble

On Monday morning, we tweeted [LINK] "*Reality check from @elonmusk "Realistically I think we need to use oil and gas in the short term, because otherwise civilisation will crumble", #EnergyTransition "will take some decades to complete". #Oil #NatGas #LNG are stronger for longer. Thx @terjesolsvik. #OOTT "* Reuters reported on comments from Elon Musk on the sidelines of an energy conference in Norway. Reuters quoted Musk saying "*Realistically I think we need to use oil and gas in the short term, because otherwise civilisation will crumble"*. Reuters then added "*Asked if Norway should continue to drill for oil and gas, Musk said: "I think some additional exploration is warranted at this time." "One of the biggest challenges the world has ever faced is the transition to sustainable energy and to a sustainable economy," he said. "That will take some decades to complete."* Our Supplemental Documents package includes the Reuters report. [LINK]

Musk's warning is like Putin's abandoning gas may put humans back in caves

On Monday morning, we also tweeted [LINK] "*Did @elonmusk 's reality check replay Putin's Nov 2019 warning that without #NatGas, humanity will once again end up in caves. without hydocarbons humanity will not be able to preserve its civilisation. See 👇SAF Group 11/24/19 Energy Tidbits excerpt. #OOTT."* Here is what we wrote in our Nov 24, 2019 Energy Tidbits memo. "*Putin: abandoning natural gas may put humans back in caves. Last week's (Nov 17, 2019) Energy Tidbits memo noted the FT report [LINK] the European Investment Bank was phasing out lending to fossil fuel projects by 2021 including natural gas. We tend to agree with Putin that if the environmental push means puts natural gas at risk along with coal, then there is a real risk to the future reliability of the electricity supply around the world. We just wouldn't describe the way he did. On Wed, we tweeted [LINK] "How could i not note Putin's comments "discarding the purest hydrocarbon like gas seems utterly bizarre", re the complete abandonment of hydrocarbons "it seems to me that the human race*

may find itself again in caves". Hope not!" Putin had a lengthy Q&A at the Russian Investment Forum on Wed. And he jumped in on the potential abandonment of natural gas. Putin said "In this sense, neglecting a pure hydrocarbon such as natural gas is, in my opinion, uncalled for, because it is the purest hydrocarbon out there. When ideas like this are promoted, it sounds like humanity will once again end up in caves, but this time because it will consume nothing, if all energy is reduced to zero, or if we rely solely on solar energy or wind energy or tidal energy. Today's technology is such that without hydrocarbons, nuclear energy or hydropower, humanity will not be able to survive or preserve its civilisation. This must be taken seriously or, as people say, in an adult-like manner." Later in the memo, we note his comments on US oil production and Russia not going to use technologies that drive fracking."

Energy Transition – A very long time before electric air travel is significant

Electric air travel

Earlier in the memo, we noted the challenge for Sustainable Aviation Fuel (SAF) to have any significant impact on jet fuel consumption and why we say jet fuel will be hard to decarbonize is an understatement. There was a celebrated (by the climate change side) electric air travel development last week that we didn't see until it was brought to our attention this week with the report that Icelandair participated in the first passenger flight of an electric airplane. No one should be surprised that there is this passenger electric air travel considering the progress on electric drones. But the flight reminded that it will be a very long time before there is any significant commercial electric air travel. The flight carried two passengers and were in a two-seater Pipistrel manufactured in Slovenia. But the Pipistrel capabilities are for max weight of 600 kg and can only carry one passenger, other than the pilot. It has an endurance of up to 50 minutes and can reach a maximum horizontal speed of 182 km/h. Wind conditions will obviously have a big impact on the capacity. One of our good friends flies private smaller high end jets and would never plan to fly more than 3 hrs for a jet with 3 hr 40 min capacity just in case he had to divert or ran into unexpected delays such as being lined up to land. Putting wind aside, if this was a true commercial flight, we would assume the pilot will leave at least 20 to 25 min capacity just in case there are any unplanned events, this would mean a max distance of probably 100 km for two people. There is a long way to go. Our Supplemental Documents package includes the Icelandair report.

Figure 45: Pipistrel electric airplane

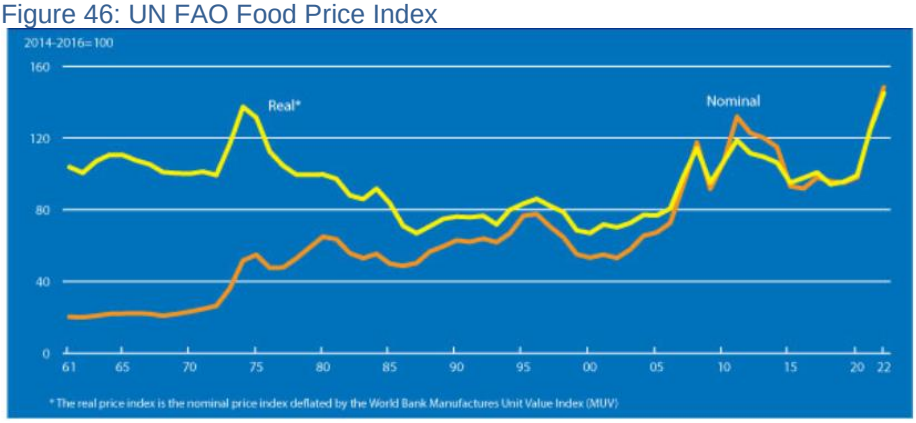
Source: Icelandair

Capital Markets – UN FAO Food Price Index registered another decline in August

UN food price index +7.9% YoY

There isn't an explanation for the factors driving the numbers, but there was another decline in the UN global food price index for August 2022. It was +7.9% YoY, but that is down huge from the all-time record highs of +33.6% YoY seen in March 2022. On Friday, the UN posted its monthly update of its FAO Food Price Index [LINK] titled "*FAO Food Price Index drops for the fifth consecutive month in August".* Note this is on a Real price basis. The FFPI averaged 138.0 points for August 2022, which was -1.9% MoM and slightly lower YoY. The drop in the FFPI in August was spaced out across all price indexes. The Vegetable oil index was down -3.3% MoM, marking another retreat from April's all time high. The Sugar Price Index was down -2.1% MoM and the Dairy Price Index was down -2.0% MoM though still +23.5% YoY. The Meat Price Index was down 1.5% MoM, driven by poultry meat prices amidst tight global supplies. Below is the all time FFPI graph. Our Supplemental Documents package includes the UN FAO Food Price Index update.

Figure 46: UN FAO Food Price Index



Source: UN

Capital Markets – Toronto region home prices down 19.1% since Feb 2022

Toronto region home prices

On Thursday, the Toronto Regional Real Estate Board posted the August statistics for sales and average sales price [LINK]. August sales were up small vs July. In August, there were 5,627 sales with an average sales price of $1,079,500, up small vs July of 4,900 sales and average sales price of $1,073,730. It may be coincidental but the peak average sales price was in February 2022 at $1,334,123, and then five consecutive monthly declines until August was up small vs July. August sales price of $1.079,500 is down 19.1% VS February 2022. And August is now only up 0.9% YoY vs August 2021 of $1,070,201. Our Supplemental Documents package includes excerpts from the Toronto Regional Real Estate Board Aug sales data.

Figure 47: Toronto Regional Real Estate Board #Sales & Average Sales Price

Monthly Statistics 2021

January	6,887	$966,001
February	10,925	$1,044,910
March	15,627	$1,097,319
April	13,613	$1,090,414
May	11,903	$1,108,124
June	11,052	$1,089,012
July	9,339	$1,061,724
August	8,549	$1,070,201
September	9,010	$1,135,027
October	9,743	$1,155,624
November	8,980	$1,162,539
December	6,014	$1,157,861
Annual	**121,642**	**$1,095,339**

Monthly Statistics 2022

January	5,595	$1,242,076
February	9,032	$1,334,123
March	10,876	$1,299,470
April	7,955	$1,253,435
May	7,245	$1,211,888
June	6,445	$1,146,249
July	4,900	$1,073,730
August	5,627	$1,079,500
September		
October		
November		
December		
Year to Date	**57,675**	**$1,224,216**

Source: Toronto Regional Real Estate Board

Demographics – Elon Musk also shares Putin's need population growth concern

Elon worries about low birth rates

There was another area that Elon Musk's comments in Norway reminded us of Putin – his concerns on the need for population growth. Media was too busy trying to get a laugh on Elon doing his part by having 9 or 10 kids, but the Reuters report wrote "*He also voiced concerns over birth rates, echoing remarks he made in a Twitter post late last week on the risks of "population collapse". "One of my less obvious things to be concerned about is the birth rate, and I think its important that people have enough babies to support civilisation so that we don't dwindle away," Musk said."* This reminded us of Putin's greatest concern for Russia – its shrinking population. Here is what we wrote in our Dec 26, 2021 Energy Tidbits "*Putin's big press conference comments on Russia's population reminded us of an item we forgot to include in our Dec 5, 2021 Energy Tidbits – Putin's greatest concern is the shrinking Russia population. This week, Putin noted "There are issues that cannot but cause concern, including life expectancy, which has slightly decreased from 71.5 to 70.1 years." The item we forgot to include was Putin's comments at the "Russia Calling! Investment Forum" on Nov 30. [LINK]. Putin was asked "What keeps you awake at night?" In the sense, "What is your greatest concern?". Putin responds "We have domestic issues typical of Russia, primarily demographic problems. We had two natural declines in our demographic development: during World War II or the Great Patriotic War, as we call it, in 1943–1944, and in the early and middle 1990s after the collapse of the Soviet Union. There was an equal drop in the birth rate. It was the lowest in 1999 – I believe a little over 1,200,000. In 2006, we already had almost two million births – more than 1,900,000. This problem has acquired a systemic and economic character due to the shortage of workforce in the labour market. We have a little over 80 million there and our losses amount to 1.1–1.2 percent a year. In this context, demographics is one of our main problems both for humanitarian and economic considerations, and because we need to strengthen our statehood as well. I will not enumerate all the measures and instruments we are using and intend to continue using in the future in order to tackle this problem. In general, we managed to get things moving in the recent past. Overall, we understand what we can do and know how to do it."*

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.

Sept 8, 1972, Phil Esposito's memorable hockey interview post 5-3 loss

We have to believe the most memorable hockey game interview was given by Phil Esposito following the Soviet Union beating Team Canada 5-3 in Vancouver in the 4th and final game in Canada to take a 2-1-1 lead going to the Soviet Union for the final four games. The game was marked by the strong booing against Team Canada by the Vancouver hockey fans. Post the game, Phil Esposito stayed on the ice to be interviewed by the famous sportscaster Johnny Esaw. They had just lost, the fans were loudly booing them, it was hot in the rink then Espo gave his passionate comments. And don't forget Team Canada was widely expected to easily beat the Soviet Union. Some of Espo's comments were "*for the people across Canada, we tried. We gave it our best. For the people who booed us, geez… all of us guys are really disheartened and we're disillusioned and we're disappointed in some of the people. We cannot believe the bad press we've got, the booing we've got in our own buildings. Every one of us guys, thirty-five guys who came out to play for Team Canada, we did it because we love our country. If the fans in Russia boo their players like some of the Canadian fans – I'm not saying all of them – some of them booed us, then I'll come back and apologize to each and everyone of the Canadians*." Here is the link to his interview. [LINK]

Figure 48: Team Canada's Phil Esposito Sept 8, 1972

Source: YouTube

There is a difference between Farmer's Almanac vs Old Farmer's Almanac

This week we highlighted the Old Farmer's Almanac winter forecast and last week's (Aug 28, 2022) Energy Tidbits highlighted the Farmer's Almanac winter forecast. The difference is that the Farmer's Almanac started over 200 years ago in 1818, whereas the Old Farmer's Almanac started in 1792. The Old Farmer's Almanac started life as the Farmer's Almanac but added the old in 1832. We have to believe there weren't strict naming rights in 200 years ago, when the Farmer's Almanac started up in 1818 using the same name as the original Farmer's Almanac.

Canmore's 14-yr old Adele Sanford has two hole-in-ones in same game

Have to give a shout out to local Canmore, Alberta resident 14-yr old Adele Sanford. On Aug 21, 2022, the Canmore Golf & Curling Club tweeted [LINK] "*Most golfers dream of making a hole-in-one. Adele did it twice today! For real. During club Championships to boot. It's made for an exciting day around here!* 💪💪💪." What is impressive is that Adele has only been golfing for a year. She shot a personal best of 92. Even Golf Digest picked up the story [LINK] that wrote "*Sanford's first hole-in-one came on the 12th hole. After that she told herself "I don't really care how I play, I just got a hole-in-one!" Three holes later she made another one. "The first hole-in-one was I felt was kind of lucky," she told Global News. "Then the second hole-in-one I just proved myself and I ended up being very happy with that." But not everyone initially believed it … including Sanford's own mother, a golfer herself who thought she was being pranked when she heard the news. She hadn't had cell service much of the day when a friend told her of her daughter's unlikely feat. 'She said, 'there's two,' and I thought, now, you don't even know how to play golf. That's impossible. It didn't happen," Kim Sanford said. "I got pretty teary when I found out it was true. I've been golfing since I was a kid and I've never hit a hole-in-one. It's pretty amazing." If you're wondering why Adele's own mother said her daughter doesn't even "know how to play golf," there's one last stinger to this story: Sanford has been playing golf less than a year, after picking up the game last summer. Not a bad way to start your playing career if you ask us. Not bad at all."*