Energy Tidbits

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Buckle Up! EU Sets $60 Price Cap on RUS Oil, Russia Ready to Reduce Oil Production if EU Importers Apply Price Cap

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. EU sets $60 price cap on Russia oil, Russia says will reduce oil production to any European countries that apply the price cap. (Click Here)

2. Quick OPEC+ virtual meeting today, no change to Oct 5 production quotas set for Nov 2022 thru Dec 2023. (Click Here)

3. China leadership highlighting its Covid actions moving into a new phase, pointing to a formal relaxation coming soon. (Click Here)

4. BC govt "We wish to affirm that we are very close to an agreement [with Blueberry First Nations] and are discussing final issues." (Click Here)

5. EIA actuals for Sept US oil production of 12.268 mmb/d, +634,000 b/d YTD and +208,000 b/d vs weekly estimates (Click Here)

6. Pease 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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YoY storage at -89 bcf YoY deficit

Natural Gas – Natural gas draw of -81 bcf, storage now -89 bcf YoY deficit

We should see a return to widening the YoY deficit in gas storage primarily because last Dec was the hottest on record. This winter started with a YoY storage deficit of -101 bcf YoY on Oct 28 but had flipped to a +4 bcf YoY surplus for Nov 11 storage data. This week is a -89 bcf YoY deficit. The EIA reported a -81 bcf draw (-86 bcf expectations) for the Nov 25 week, which were much larger draws vs both the 5-yr average of a -34 bcf draw, and last year's draw of -59 bcf. Storage is 3.483 tcf as of Nov 25, with a now YoY deficit of -89 bcf YoY vs -62 bcf YoY surplus last week and is -86 bcf below the 5-year average vs -39 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 (11/25/21)		5-year average (2017-21)	
Region	11/25/22	11/18/22	net change	implied flow	Bcf	% change	Bcf	% change
East	840	866	-26	-26	870	-3.4	868	-3.2
Midwest	1,040	1,063	-23	-23	1,046	-0.6	1,043	-0.3
Mountain	197	203	-6	-6	207	-4.8	208	-5.3
Pacific	226	232	-6	-6	263	-14.1	288	-21.5
South Central	1,181	1,200	-19	-19	1,187	-0.5	1,161	1.7
Salt	314	318	-4	-4	335	-6.3	324	-3.1
Nonsalt	867	882	-15	-15	852	1.8	838	3.5
Total	3,483	3,564	-81	-81	3,572	-2.5	3,569	-2.4

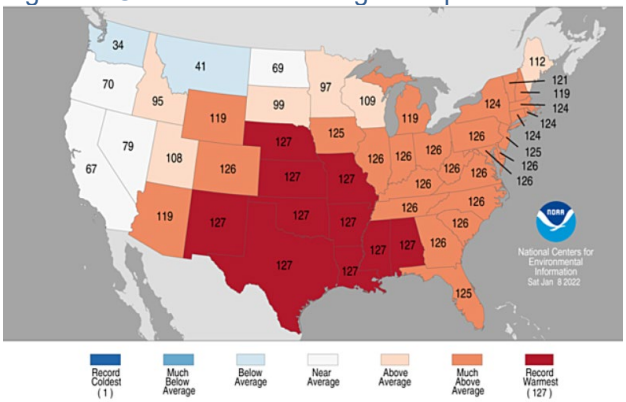
Source: EIA

Dec 2021 was the hottest on record

Natural Gas – Dec 2021 was the #1 hottest Dec in the last 127 years

As noted above, we should see a widening of the YoY deficit in storage over the balance of 2022, but that will be driven by the fact that Dec 2021 were very hot. Our Jan 16, 2022 energy Tidbits memo noted NOAA's recap of Dec 2021 climate that showed Dec 2021 was the hottest Dec in the last 127 years. [LINK]. The average temperatures across all Lower 48 states was 39.3 degrees F, 6.7 degrees F above the 20th century average for December. Below is NOAA's map for the state average temperature ranks for Dec 2021.

Figure 2: US Statewide Average Temperature Ranks December 2021



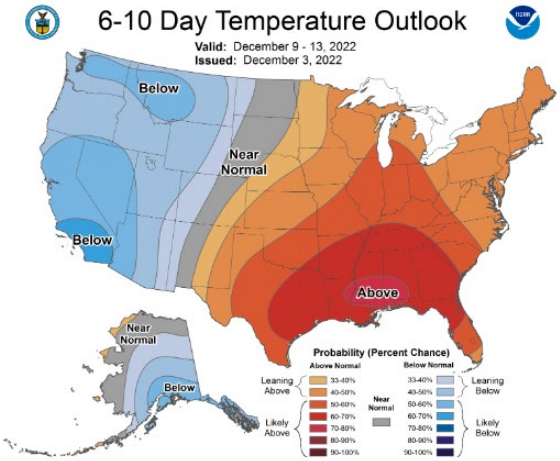
Source: NOAA

Natural Gas – NOAA expects warm temps for next week or so, then turning normal

It looks like warmer than normal temperatures in the eastern half of the US are likely to continue for another week or so. Yesterday's NOAA 6-10 day outlook for Dec 9-13 show a much warmer than normal temperature in the eastern half, and its new 8-14 day outlook for Dec 11-17 show a return to noraml temperatures across most of the US. Below are NOAA's 6-10 day and 8-14 day temperature outlooks as of yesterday afternoon.

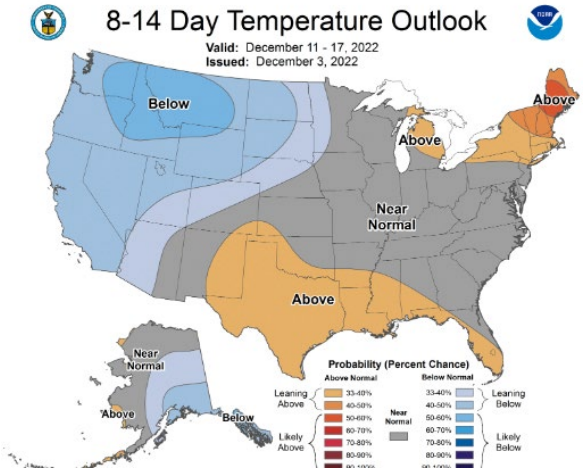
NOAA 6-10 & 8-14 day temp outlook

Figure 3: NOAA 6-10 day temperature outlook as of Dec 3



Source: NOAA

Figure 4: NOAA 8-14 day temperature outlook as of Dec 3



Source: NOAA

Natural Gas – US September gas production 99.9 bcf/d, continuing to move higher

There is no change to the US natural gas story that US natural gas supply, driven by shale/tight natural gas, continues to be up strongly YoY. The EIA released its Natural Gas

US September gas production +6.3 bcf/d YoY

Monthly on Wednesday, [LINK], which includes its estimates for "actuals" for September gas production. The key takeaway from the September actuals is that September (+0.7 bcf/d MoM to 99.9 bcf/d) is at its highest point and now comfortably above the pre-Covid February 2020 level of 98.1 bcf/d. September 2022 is +6.3 bcf/d YoY. Our Supplemental Documents package includes excerpts from the EIA Natural Gas Monthly.

Figure 5: 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	95.3
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	94.5
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	95.4
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	96.5
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	97.7
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	98.5
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	98.5
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	99.2
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	99.9
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	97.3

Source: EIA

Natural Gas – US pipeline exports to Mexico down MoM to 5.6 bcf/d in September

The EIA Natural Gas Monthly also provides its "actuals" for gas pipeline exports to Mexico, which were 5.6 bcf/d in September, which was down 0.3 bcf/d YoY and down 0.2 bcf/d from August. There were no material revisions to last month's data. Mexico's unchanged production over the past five years has created the need for increased US pipeline exports to Mexico as Mexico builds out its domestic natural gas infrastructure. Below is our table of the EIA's monthly gas exports to Mexico.

US pipeline exports to Mexico down MoM

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	6.1
Aug	2.1	3.3	4.3	4.4	5.0	5.4	6.0	6.2	5.8
Sept	2.2	3.3	4.1	4.2	5.0	5.4	6.1	6.0	5.6
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	5.8

Source: EIA

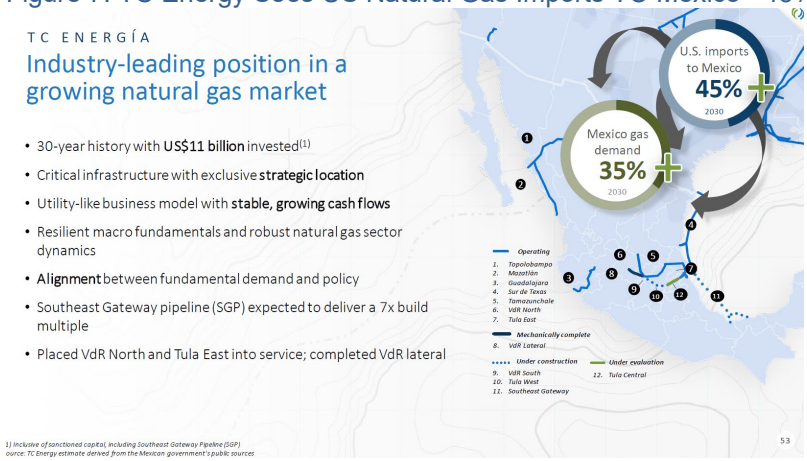
Natural Gas – TC Energy sees Permian natural gas +3 bcf/d to Mexico by 2030

One overlooked upside to US natural gas in the 2020s is that the growth Mexico infrastructure projects are starting to kick in. Yesterday, we tweeted [LINK] "*Positive for US #NatGas for 2020s. It's not just increasing #LNG exports, it's also Mexico. Mexico #NatGas demand from 9 bcfd to 12 bcfd in 2030. @TCEnergy expects MEX #NatGas pipeline imports from Permian +45% from 6 bcfd in 2022 to 9 bcfd by 2030. #OOTT.*" The growth in Mexico natural gas demand is a big plus to the Permian. For the last few years, every time we write on Mexico's natural gas production, we say it is still stuck below 5 bcf/d and that any increase

Increasing Permian gas exports to Mexico

in Mexico natural gas demand has to be met by increasing natural gas or LNG imports. For the past 5+ years, other than a few months, Mexico gas production was below 5 bcf/d. Mexico's natural gas demand growth and growing infrastructure was one of the key growth themes at TC Energy's investor day on Tuesday. Mgmt's slide deck included the below slide and mgmt said "*We expect Mexican natural gas demand to increase by 3% per year across the country from 9 Bcf to 12 Bcf in 2030, with strategic government projects creating over 1 Bcf a day of incremental gas demand in the southeast alone by 2025. Now given Mexico's limited natural gas production, this increase in demand will likely be served by supplies in the U.S. and more specifically the Permian as we believe Mexican imports from the Permian are likely to increase by 45% from 6 Bcf a day in 2022 to 9 Bcf by 2030.*"

Figure 7: TC Energy Sees US Natural Gas Imports TO Mexico +45% to 2030



Source: TC Energy

Natural Gas – US LNG exports up MoM in Sept at 9.8 bcf/d

US September LNG exports

The new EIA Natural Gas Monthly estimates US LNG exports for September were 9.8 bcf/d and this is a reminder that the US LNG export data is available about two weeks prior to the Natural Gas Monthly. This is the same number as in the DOE monthly LNG data that was posted on Nov 16. Here is what we wrote in our Nov 20, 2022 Energy Tidbits. "*As a reminder, the US Dept of Energy posts monthly US LNG export data at least a week before the EIA (part of the US Dept of Energy) posts US LNG export data in its monthly Natural Gas Monthly report (next report is Nov 30). Normally, the data points are the same. On Wednesday, the DOE posted its LNG Monthly for US LNG exports in September. [LINK] The headline numbers as the US exported 9.8 bcf/d of LNG in Sept, which was down 1.6% MoM vs August 2022, and +3.7 YoY vs Sept 2021. Our table below is rounded numbers to one decimal and the actual Sept exports were 9.83 bcf/d. Reminder, US LNG is down because of the continued outage at Freeport LNG, which is 2.2 bcf/d." The DOE reported "Top five countries of destination, representing 61.4% of total U.S. LNG exports in September 2022 to France (57.9 Bcf), United Kingdom (48.0 Bcf), Netherlands (30.9 Bcf), Spain (24.7 Bcf), and South Korea (19.7 Bcf)." Below is our table of EIA's monthly LNG exports."* Our Supplemental Documents package includes excerpts from the DOE LNG Monthly.

Figure 8: 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	9.7
Aug	0.9	1.5	3.0	4.5	3.6	9.6	9.7
Sept	0.6	1.8	2.7	5.3	5.0	9.5	9.8
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	10.7
Full Year bcf	186.8	707.5	1,083.1	1,819.4	2,390.0	3,560.8	2,913.3

Source: EIA, DOE

Natural Gas – A 2-week delay to Freeport LNG restart now end of Dec

Freeport LNG restart another 2 weeks

On Thursday, we tweeted [LINK] "*Another delay for #FreeeportLNG restart. now end Dec instead of mid Dec. if they do a train by train restart, then hitting ~2 bcf/d is likely not until later Jan. thx @SStapczynski @David_Stringer. #OOTT #NatGas.*" (i) On Thursday, Bloomberg reported "*Freeport LNG expects to restart its Texas plant around year-end and is continuing to work to obtain necessary clearances, co. spokesperson Heather Browne said in an emailed statement. * "Based upon current progress, and subject to us continuing to meet necessary regulatory requirements, we now anticipate that the restart of our liquefaction facility to be achieved around year-end," Browne said * NOTE: The new timeline is as much as 2 weeks later than outlined in a statement last month, when co. said it was aiming to start "initial production" in mid-Dec. with full operations."* (ii) Our tweet noted that the expectation is that the restart is on a train by train basis, which is why we expect it will likely take most of the month to go from zero to ~2 bcf/d.

Natural Gas – BC affirms they are "very close" to Blueberry First Nations deal

BC/Blueberry First Nations deal coming soon?

We missed this big news for the Cdn oil and gas sector and for LNG Canada that came out last Saturday dinner time. BC issued "*Ministers' joint statement on status of negotiations with Blueberry River First Nations"* [LINK] that had a very clear message that a deal is coming. BC said ""*We wish to affirm that we are very close to an agreement and are discussing final issues. As such, we have initiated early engagement with select industry groups and other Treaty 8 Nations on a proposed agreement to hear their feedback and consider adjustments.*" It's hard to take this anyway other than BC has the framework that BC and Blueberry First Nations are comfortable with, but they will talk to industry and other First Nations to see if they should "consider" making any "adjustments". So even if BC considers and tries to make changes, these are adjustments and not new deal points. It's hard for anyone to not believe a deal is essentially done and is coming soon. Our Supplemental Documents package includes the BC release.

This very close to a deal is not what we had been hearing

The BC government release is pretty clear – they see a deal near and it seems like the major issues have been agreed. We were surprised by the bullish statements in the BC release, primarily because we had been hearing that the Blueberry First Nations ask was too big for even BC to accept. But clearly, the chatter we had been hearing was wrong.

A Blueberry First Nations deal is a big operational positive for Cdn natural gas

If BC is guiding to a near-term deal with the Blueberry First Nations, it will be a big operational positive and big relief to Cdn natural gas. And surely BC is getting the BC Oil & Gas Commission geared up to catch up and get back to normal licensing and approvals on Blueberry First Nations lands. NE BC players should be able to get going on a regular winter drilling season do its normal adding natural gas production capacity for the spring. Tie-in of wells and new production can happen. Approvals of any new gas processing facilities, etc. Basically get back to regular licensing of the NE BC natural gas business.

Have to believe there will be added costs to BC natural gas

One big wildcard will be who pays for this deal with the Blueberry First Nations. The negotiations have been going on for over a a year. The Blueberry First Nations will be getting more money in some way, shape or form. We assume some or most will be paid over the coming year. But, someone has to pay. The BC press release closed "*our commitment is to share more with British Columbians as soon as possible*". If the Blueberry First Nations is getting more and BC commits to share more with British Columbians, then we have to believe there will some additional costs that end up on BC natural gas over the coming years.

Maybe this has been why BC hasn't signed off on LNG Canada Phase 2 FID

We wonder if the lack of a BC deal with Blueberry First Nations is why BC hasn't either signed off or rejected LNG Canada's request for BC's views on a potential LNG Canada Phase 2 FID. It makes sense. If Blueberry First Nations had negotiating leverage given the need to crank up drilling to supply natural gas for LNG Canada's 1.8 bcf/d Phase 1, the need for another 1.8 bcf/d of natural gas supply for a LNG Canada 1.8 bcf/d Phase 2 would give even more leverage to Blueberry First Nations. Our Oct 23, 2022 Energy Tidbits noted the first BC confirmation that they were looking at LNG Canada Phase 2. We then wrote "*Natural Gas – BC says it is in discussions with LNG Canada on potential Phase 2. It looks like it is coming down to British Columbia to decide if LNG Canada will proceed with its brownfield 1.8 bcf/d Phase 2. We have a clear statement from British Columbia that they are in discussions with LNG Canada on their wish for the potential Phase 2. Last week's (Oct 16, 2022) Energy Tidbits highlighted the separate comments from Canada Deputy Prime Minister Freeland and External Affairs Minister Joly that seemed to point to LNG Canada Phase 2 coming and that the Liberals would be onside. We haven't seen comments from the BC Govt on Phase 2 until this week. On Monday, we tweeted [LINK] "#LNGCanada 1.8 bcfd Phase 2 FID. Liberals seem onside see 👇 @cafreeland. BC. @brentcjang reports @BruceRalston "LNG Canada has expressed the wish to explore the possibility of proceeding with Phase 2, and we're engaged in discussions with them. #OOTT [LINK]." The Globe and Mail wrote "In a recent media briefing in Kitimat, however, LNG Canada chief executive officer Jason Klein said LNG from B.C. will play a crucial role in helping displace coal used in Asia for electricity generation. "The climate challenge isn't a B.C. challenge. It is a global challenge," Mr. Klein said. "It's not just about displacing coal. It's also about getting people out of energy poverty around the world." He said Shell, Petronas and the*

three other co-owners of the megaproject will ultimately decide whether it makes economic sense for Phase 2 to use lower-carbon hydroelectricity from BC Hydro to power motors to produce LNG. There isn't sufficient infrastructure today for BC Hydro to provide enough hydro power for electric-drive technology at the Kitimat facility, but new transmission lines are possible. B.C. Energy Minister Bruce Ralston, who is the cabinet minister responsible for BC Hydro, said electrification would be an important aspect of LNG Canada's potential expansion. "LNG Canada has expressed the wish to explore the possibility of proceeding with Phase 2, and we're engaged in discussions with them," Mr. Ralston said."

Natural Gas – Still seems TC Energy expects LNG Canada Phase 2 FID

TC Energy on LNG Canada Phase 2

We listened to TC Energy's investor day on Tuesday. We tweeted [LINK] "*1st question @TCEnergy investor day was on Phase 2 for #CoastalGasLink & #LNGCanada. See 👇 transcript, seems like TC still believes LNG Canada partners will FID 1.8 bcf/d Phase 2. Each 1.8 bcf/d LNG Canada Phase is material to ~16 bcf/d BC/Alberta #NatGas supply. #OOTT."* TC Energy has been bullish on the potential for LNG Canada 1.8 bcf/d Phase 2. And their comments on the investor day reinforce that view. We created a transcript of mgmt's comments in the Q&A and attached that transcript to our tweet. "*SAF Group created transcript of excerpts from TC Energy Investor Day on Nov 29, 2022. Items in "italics" are SAF Group created transcript. Q&A. 7:40am MT Analyst re Coastal Phase 2, are you in active discussions or how are the cost overruns impacting those discussions? Bevin Wirzba (Executive VP Strategy and Corporate Development Group Executive, Canadian Natural Gas Pipelines and Liquids Pipeines). "…. our relationship is extremely strong at this point. We have the LNG Canada team co-located with us in our building now and in the field…… We've been working really hard alongside them and with them as they're pursuing considering Phase 2 development of the project ….."that work is underway and the strength of the LNG global market that Stan pointed out is a key driver in seeing the LNG partners ambition to seek Phase 2. So right now, we're highly confident that we can provide a good solution and it is part of the economic recovery of our overall project if our LNG Canada customers take FID on the project."*

LNG Canada Phase 1 sets up Cdn supply squeeze like in the US today

We don't believe most appreciate the significance of the 1.8 bcf/d LNG Canada Phase 1 is to BC/Alberta natural gas. Here is what we wrote in our June 12, 2022 Energy Tidbits memo. "*Yesterday, we also tweeted [LINK] a reminder that the under construction LNG Canada Phase 1 of 1.8 bcf/d sets up a similar natural gas supply squeeze as being seen today in the US. And this is just from the under construction LNG Canada Phase 1. We tweeted "#LNGCanada Phase 1 is 1.8 bcfd already sets up Cdn #NatGas supply squeeze like in US. >10% of BC/AB #NatGas supply 16 bcfd ie. like US #LNG exports now ~12 bcfd vs ~100 bcfd total supply. LNG Canada Phase 2 adds another 1.8 bcfd. Cdn nat gas looks very good thru 2030. #OOTT". The US currently exports ~12 bcf/d vs total US natural gas supply of ~100 bcf/d. LNG Canada Phase 1 is 1.8 bcf/d vs BC/Alberta natural gas supply of ~16 bcf/d. The math is very similar. LNG Canada and Shell have never been specific on the exact timeline but have noted that they expect first LNG by the middle of this decade ie.*

inferring late 2024. And our tweet reminded that LNG Canada Phase 2 is another 1.8 bcf/d for a total of the two phases being 3.6 bcf/d.

Figure 9: TC Energy Coast GasLink Now ~75% Complete

Source: TC Energy

Natural Gas – Mexico's natural gas production still stuck below 5 bcf/d, +1.6% YoY

On Monday, Pemex reported [LINK] its oil and gas data for October. Pemex reported natural gas production of 4.795 bcf/d, which was +1.6% YoY but -0.06% MoM. For the past 5 years, an ongoing theme of the Mexican energy sector, has been their inability to grow domestic natural gas production. Other than a few months, Mexico's natural gas production has been stuck below 5 bcf/d since Sept 2017. Mexico's unchanged production over the past five years has created the need for increased US pipeline exports to Mexico as Mexico builds out its domestic natural gas infrastructure. And as noted earlier, TC Energy sees big growth in US natural gas pipeline exports to Mexico. Pemex does not provide any commentary along with its production data. Below is our ongoing table of Pemex reported monthly natural gas production.

Mexico natural gas still stuck below 5 bcf/d

Figure 10: Mexico Natural Gas Production (bcf/d)

Natural Gas Production bcf/d	2016	2017	2018	2019	2020	2021	21/20	2022	22/21
Jan	6.162	5.326	4.910	4.648	5.005	4.848	-3.1%	4.713	-2.8%
Feb	6.122	5.299	4.853	4.869	4.942	4.854	-1.8%	4.646	-4.3%
Mar	6.030	5.383	4.646	4.857	4.946	4.839	-2.2%	4.766	-1.5%
Apr	5.921	5.334	4.869	4.816	4.827	4.671	-3.2%	4.740	1.5%
May	5.841	5.299	4.827	4.841	4.460	4.730	6.1%	4.702	-0.6%
June	5.881	5.253	4.840	4.843	4.754	4.727	-0.6%	4.744	0.4%
July	5.785	5.216	4.856	4.892	4.902	4.725	-3.6%	4.815	1.9%
Aug	5.686	5.035	4.898	4.939	4.920	4.656	-5.4%	4.796	3.0%
Sept	5.619	4.302	4.913	5.017	4.926	4.746	-3.7%	4.798	1.1%
Oct	5.583	4.759	4.895	4.971	4.928	4.718	-4.3%	4.795	1.6%
Nov	5.515	4.803	4.776	5.015	4.769	4.751	-0.4%		
Dec	5.380	4.811	4.881	5.024	4.846	4.697	-3.1%		

Source: Pemex

Natural Gas – Long-term LNG deal, Sempra/INEOS Energy sign a 20-year agreement
There haven't been many long-term LNG deals over the past six months because most, if not all the available long term LNG supply available before 2025 was locked up in the July 2021 to July 2022 rush. Rather, the long term deals now being done are for long term supply starting in 2026 or late. On Thursday, Sempra Infrastructure and INEOS Energy Trading announced their new agreement which will span 20 years and ship 0.21 bcf/d with expected first shipment in 2027 [LINK]. The two companies announced a heads of agreement on June 21, 2022. In our June 26 memo we wrote, "*on Wednesday, Sempra Infrastructure and INEOS Energy Trading announced [LINK] they have entered into a heads of agreement for the long-term supply of LNG from Sempra Gulf Coast LNG portfolio of projects under development. We tweeted [LINK] '#LNGSupplyGap forcing #LNG users/traders to lock up long term supply. EU's INEOS Energy Trading is latest, HOA to lock up 0.18 bcf/d for 20 yrs from #Sempra proposed #PortArthurLNG or #CameronLNG Phase 2. #NatGas #LNG look strong thru 2030. #OOTT'".* This deal was initially quoted at 0.18 bcf/d when the heads of agreement was announced in June, but since has increased to 0.21 bcf/d. David Bucknall, CEO of INEOS Energy explains *"this agreement is a critical part of our new global LNG supply chain that will enable us to deliver cleaner and reliable energy to our businesses and customers."* Justin Bird, CEO of Sempra Infrastructure also commented on the deal *"we are excited to finalize our commercial relationship with INEOS as a valued long-term LNG off-taker from the Port Arthur LNG Phase 1 development project. We look forward to advancing this project so we can begin delivering new supplies of U.S. LNG to our European partners, as they pursue more secure energy for their customers."* Sempra Infrastructure is a US-based energy company focused on the energy networks, LNG, and net-zero solutions. INEOS is a global manufacturer of petrochemicals, speciality chemicals, and oil products located in the UK. Our Supplemental Documents package includes the Sempra Infrastructure release.

Asia is still well in front of Europe in securing long term LNG supply
Our March 13, 2022 Energy Tidbits memo noted that Europe LNG buyers were starting 9 months behind the wave of Asian LNG buyers who started to lock up long term LNG supply starting in July 2021. The LNG supply crunch is not a 2022 development. Rather, it was clear in H1/21 that there was a major sea change in LNG outlook. We turned very bullish on LNG outlook for the 2020s once TotalEnergies went force majeure on its Mozambique LNG in April 2021. We posted our April 28, 2021 blog *"Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?"* as we thought the market had overlooked that this force majeure backed up 5.0 bcf/d of Mozambique LNG that was originally planned to start in phases in 2024. And that this would create an earlier and larger LNG supply gap in the mid 2020s. Then we started to see validation of this view when Asian LNG buyers in July made an abrupt change to their LNG contracting and pivoted to trying to lock in long term LNG supply. On July 14, 2021 we posted our 8-pg "*Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs".* Here is an excerpt from the blog "*The last 7 days has shown there is a sea change as Asian LNG buyers have made an abrupt change in their LNG contracting and are moving to lock in long term LNG supply. This is the complete opposite of what they were doing pre-Covid when they were trying to*

renegotiate Qatar LNG long term deals lower and moving away from long term deals to spot/short term sales. Why? We think they did the same math we did in our April 28 blog "Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?" and saw a much bigger and sooner LNG supply gap driven by the delay of 5 bcf/d of Mozambique LNG that was built into most, if not all LNG supply forecasts. Asian LNG buyers are committing real dollars to long term LNG deals, which we believe is the best validation for the LNG supply gap. Another validation, Shell, Total and others are aggressively competing to invest long term capital to partner in Qatar Petroleum's massive 4.3 bcf/d LNG expansion despite plans to reduce fossil fuels production in the 2020s. And even more importantly to LNG suppliers, the return to long term LNG contracts provides the financing capacity to commit to brownfield LNG FIDs. The abrupt change by Asian LNG buyers to long term contracts is a game changer for LNG markets and sets the stage for brownfield LNG FIDs likely as soon as before year end 2021. It has to be brownfield LNG FIDs if the gap is coming bigger and sooner. And we return to our April 28 blog point, if brownfield LNG is needed, what about Shell looking at 1.8 bcf/d brownfield LNG Canada Phase 2? LNG Canada Phase 1 at 1.8 bcf/d capacity is already a material positive for Cdn natural gas producers. A FID on LNG Canada Phase 2 would be huge, meaning 3.6 bcf/d of Cdn natural gas will be tied to Asian LNG markets and not competing in the US against Henry Hub. And with a much shorter distance to Asian LNG markets. This is why we focus on global LNG markets for our views on the future value of Canadian natural gas." Our Supplemental Documents package includes our April and July blogs.

There have been 12.59 bcf/d of long-term LNG supply deals since July 1, 2021

We first highlighted this abrupt shift to long term LNG supply deals in our July 14, 2021 8-pg "*Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs".* We included a table of the deals done in that short two week period. We continue to update that table, which now shows 12.59 bcf/d of long term LNG deals since July 1, 2021. 65% of the deals have been by Asian LNG buyers, but we are now seeing rest of world locking up long term supply deals post Russia/Ukraine. China has been particularly active in this space, accounting for 75% of all Asian LNG buyers in long term contracts since July 1, 2021. Below is our updated table of Asian and Europe LNG buyers new long term supply deals since July 1, 2021. This table has been amended to include the incremental +0.03 bcf/d in the Sempra/INEOS Energy deal.

Figure 11: Long Term LNG Supply Deals since July 1, 2021

Long-Term LNG Buyer Deals Since July 1, 2021							
Date	Buyer	Seller	Country	Volume	Duration	Start	End
			Buyer / Seller	(bcf/d)	Years		
Asian LNG Deals							
Jul 7, 2021	CNOOC	Petronas	China / Canada	0.30	10.0	2022	2032
Jul 9, 2021	CPC	QatarEnergy	Taiwan / Qatar	0.16	15.0	2022	2037
Jul 9, 2021	Guangzhou Gas	BP	China / US	0.13	12.0	2022	2034
Jul 12, 2021	Korea Gas	QatarEnergy	Korea / Qatar	0.25	20.0	2025	2045
Sep 29, 2021	CNOOC	QatarEnergy	China / Qatar	0.50	15.0	2022	2037
Oct 7, 2021	Shenzhen	BP	China / US	0.04	10.0	2023	2032
Oct 11, 2021	ENN	Cheniere	China / US	0.12	13.0	2022	2035
Nov 4, 2021	Unipec	Venture Global LNG	China / US	0.46	20.0	2023	2043
Nov 4, 2021	Sinopec	Venture Global LNG	China / US	0.53	20.0	2023	2043
Nov 5, 2021	Sinochem	Cheniere	China / US	0.12	17.5	2022	2040
Nov 22, 2021	Foran	Cheniere	China / US	0.04	20.0	2023	2043
Dec 6, 2021	Guangdong Energy	QatarEnergy	China / Qatar	0.13	10.0	2024	2034
Dec 8, 2021	S&T International	QatarEnergy	China / Qatar	0.13	15.0	2022	2037
Dec 10, 2021	Suntien Green Energy	QatarEnergy	China / Qatar	0.13	15.0	2022	2037
Dec 15, 2021	SPIC Guangdong	BP	China / US	0.03	10.0	2023	2033
Dec 20, 2021	CNOOC Gas & Power	Venture Global LNG	China / US	0.26	20.0	2023	2043
Dec 29, 2021	Foran	BP	China / US	0.01	10.0	2023	2032
Jan 11, 2022	ENN	Novatek	China / Russia	0.08	11.0	2024	2035
Jan 11, 2022	Zhejiang Energy	Novatek	China / Russia	0.13	15.0	2024	2039
Feb 4, 2022	CNPC	Gazprom	China / Russia	0.98	30.0	2023	2053
Mar 24, 2022	Guangdong Energy	NextDecade	China / US	0.20	20.0	2026	2046
Mar 29, 2022	ENN	Energy Transfer	China / US	0.36	20.0	2026	2046
Apr 1, 2022	Guangzhou Gas	Mexico Pacific Ltd	China / Mexico	0.26	20.0	n.a.	n.a.
Apr 6, 2022	ENN	NextDecade	China / US	0.20	20.0	2026	2026
Apr 22, 2022	Kogas	BP	Korea / US	0.20	18.0	2025	2043
May 2, 2022	Gunvor Singapore Pte	Energy Transfer LNG	Singapore / US	0.26	20.0	2026	2046
May 3, 2022	SK Gas Trading LLC	Energy Transfer LNG	Korea / US	0.05	18.0	2026	2042
May 10, 2022	Exxon Asia Pacific	Venture Global LNG	Singapore / US	0.26	n.a.	n.a.	n.a.
May 11, 2022	Petronas LNG	Venture Global LNG	Malaysia / US	0.13	20.0	n.a.	n.a.
May 24, 2022	Hanwha Energy	TotalEnergies	Korea / France	0.08	15.0	2024	2039
May 25, 2022	POSCO International	Cheniere	Korea / US	0.05	20.0	2026	2036
June 5, 2022	China Gas Holdings	Energy Transfer	China / US	0.09	25.0	2026	2051
Jul 5, 2022	China Gas Holdings	NextDecade	China / US	0.13	20.0	2027	2047
Jul 20, 2022	PetroChina	Cheniere	China / US	0.24	24.0	2026	2050
Jul 26, 2022	PTT Global	Cheniere	Thailand / US	0.13	20.0	2026	2046
Jul 27, 2022	Exxon Asia Pacific	NextDecade	Singapore / US	0.13	20.0	2026	2046
Sep 2, 2022	Woodside Singapore	Commonwealth	Singapore / US	0.33	20.0	2026	2046
Nov 21, 2022	Sinopec	QatarEnergy	China / Qatar	0.53	27.0	2026	2053
Total Asian LNG Buyers New Long Term Contracts Since Jul/21				**8.16**			
Non-Asian LNG Deals							
Jul 28, 2021	PGNiG	Venture Global LNG	Poland / US	0.26	20.0	2023	2043
Nov 12, 2021	Engie	Cheniere	France / US	0.11	20.0	2021	2041
Mar 7, 2022	Shell	Venture Global LNG	US / US	0.26	20.0	2024	2044
Mar 16, 2022	NFE	Venture Global LNG	US / US	0.13	20.0	2023	2043
Mar 16, 2022	NFE	Venture Global LNG	US / US	0.13	20.0	2023	2043
May 2, 2022	Engie	NextDecade	France / US	0.23	15.0	2026	2041
May 17, 2022	PGNiG	Sempra Infrastructure	Poland / US	0.40	20.0	n.a.	n.a.
May 25, 2022	RWE Supply & Trading	Sempra Infrastructure	Germany / US	0.67	15.0	n.a.	n.a.
Jun 9, 2022	Equinor	Cheniere	Norway / US	0.23	15.0	2026	2041
Jun 21, 2022	EnBW	Venture Global LNG	Germany / US	0.20	20.0	2026	2046
Jun 22, 2022	INEOS Energy	Sempra Infrastructure	UK / US	0.21	20.0	2027	2047
Jun 22, 2022	Chevron	Venture Global LNG	US / US	0.26	20.0	n.a.	n.a.
Jun 22, 2022	Chevron	Cheniere	US / US	0.26	15.0	2027	2042
Jul 12, 2022	Shell	Mexico Pacific Ltd	US / Mexico	0.34	20.0	2026	2046
Jul 13, 2022	Vitol	Delfin Midstream	US / US	0.07	15.0	n.a.	n.a.
Aug 9, 2022	Centrica	Delfin Midstream	UK / US	0.13	15.0	2026	2041
Aug 24, 2022	Shell	Energy Transfer	US / US	0.28	20.0	2026	2046
Oct 6, 2022	EnBW	Venture Global LNG	Germany / US	0.26	20.0	2022	2042
Total Non-Asian LNG Buyers New Long Term Contracts Since Jul/21				**4.43**			
Total New Long Term LNG Contracts since Jul/21				**12.59**			
*Excludes Asian short term/spot deals							
*on Dec 20, CNOOC also agreed to buy an additional 0.13 bcf/d from Venture Global for an undisclosed shorter period							
Source: Bloomberg, Company Reports							
Prepared by SAF Group https://safgroup.ca/news-insights/							

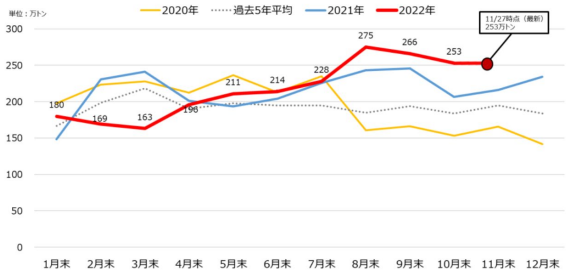
Source: Company reports, SAF Group

Natural Gas – Japan's LNG stocks down -3.1% WoW to 122 bcf

Japan LNG stocks -3.1% WoW

It's been very warm in Japan, way warmer than normal and it has meant no real weather-related demand for electricity and natural gas. And that should continue with the continued warmer than normal temperatures forecast for Dec. But 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. A cold winter or interruption in LNG imports could 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 Nov 27 were ~122 bcf, -3.1% WoW from Nov 20 of 125 bcf and above the 5-yr average of 104 bcf. Below is the LNG stocks graph from the METI weekly report.

Figure 12: Japan's LNG Stocks



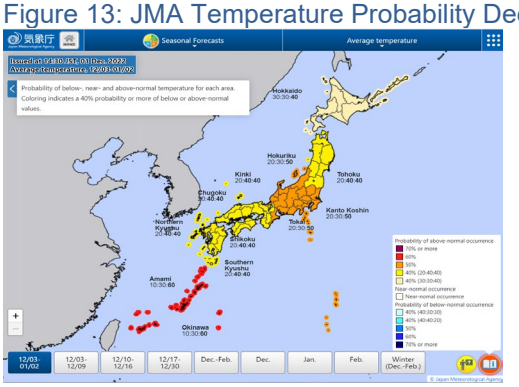
Source: METI

Natural Gas – Japan sees warmer than normal temperatures in Dec

Japan temperature outlook

It's not just that it was warm in Japan in November, but the forecasts for Dec changed over the past month from expectations for a colder than normal Dec to a warmer than normal Dec. Every Thursday, the Japan Meteorological Agency provides an updated 30-day temperature probability outlook. The expectation has been that the warmer than normal weather would continue in November, but then to give way to a cold. The new weekly JMA forecast builds on the view of last week and call warmer than normal temperatures in Dec. Below is the JMA's Dec 1 updated 30-day outlook. [LINK]

Figure 13: JMA Temperature Probability Dec 3 – Jan 2

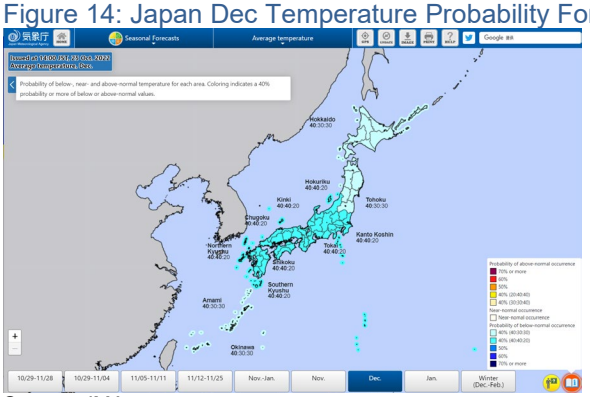


Source: Japan Meteorology Agency

Recall JMA's Oct 25 seasonal forecasts called for colder than normal Dec/Jan

The last two weeks (Nov 24 and Dec 1) JMA 30-day forecasts are a good reminder that forecasting weather is far from a 100% game. These last two 30-day forecasts for Dec were a change from the JMA's Oct 25 seasonal forecast for Nov/Dec/Jan. Here is what we wrote in the Oct 30, 2022 Energy Tidbits memo. *"On Thursday, we tweeted [LINK] "Still early, but Japan Meteorological Agency 10/25 forecast calls for colder than normal Dec and Jan. Nov expected warmer than normal. #NatGas #LNG #OOTT". With winter right around the corner, Japan expects a warmer end to fall with November being warmer than normal, but then switching to below normal temperatures in December and January. On Thursday, the Japan Meteorological Agency posted its seasonal forecast for Nov 2022 – Jan 2023 and overall it is a positive indicator for electricity demand as residents look to heat their homes [LINK]. So far in 2022, Japan has been trying to maximize coal and petroleum products due to the sky-high prices of LNG. But a cold Dec/Jan should lead to increased natural gas/LNG consumption. The JMA forecasts that most of the country should expect colder than average winter temperatures, especially in the southern regions of the island."* Below is the JMA Oct 25 seasonal forecast for Dec 2022.

Figure 14: Japan Dec Temperature Probability Forecast



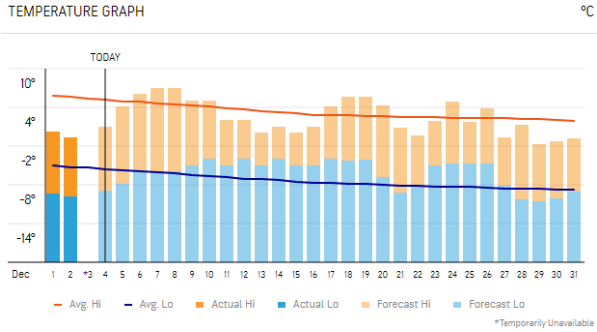
Source: JMA

Natural Gas – China's colder than normal temps turning to normal temps this week

There has been colder than normal temperatures in most of China this week but that is expected to return to more normal temperatures in the next day or so. Yesterday's China Meteorological Administration's Daily Weather tips [LINK] highlighted the warming temperatures "*As of this morning, the temperature in the south has risen by 2~4 °C, and the temperature in Northeast China, North China and other places can reach 8~10 °C, and the local temperature can reach 14 °C. However, affected by the cold air, the temperature in North China, Northeast China and other places will be lower this day and tomorrow, and the public still needs to pay attention to temperature changes and take measures to keep warm and cold*." We always cross check vs AccuWeather's monthly forecasts for key cities Beijing and Shanghai. Their updated monthly forecast as of yesterday's show the return to normal temperatures.

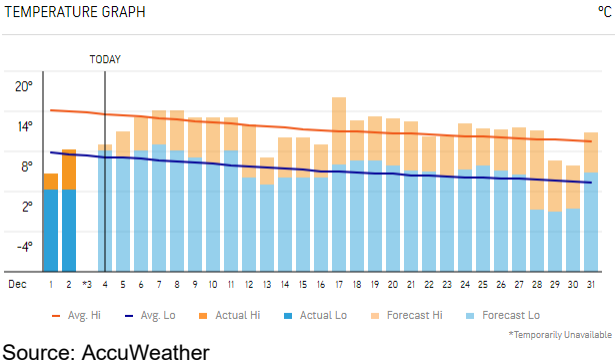
China cold weather is leaving

Figure 15: Beijing Temperature Graph



Source: AccuWeather

Figure 16: Shanghai Temperature Graph



Source: AccuWeather

Natural Gas – Gazprom not cutting off Moldova

Gazprom doesn't cut gas to Moldova

Last week's (Nov 27, 2022) Energy Tidbits noted the Nov 22 Kommersant (Russian media) report [LINK] that Gazprom was reducing natural gas flows to Moldova. Basically, Gazprom is reducing the amount of natural gas to Moldova by the amount that Moldova is reportedly exporting to Ukraine. On Monday, Gazprom changed that position. We tweeted [LINK] "*At least for now, Gazprom not cutting #NatGas to Moldova as long as it gets paid even if there is some leakage of gas back to Ukraine*." Our tweet included the Gazprom tweet announcing that it wasn't reducing natural gas supply to Moldova. Even, if as said by Russia that Moldova was sending the Russian natural gas back to the Ukraine, Moldova paid Gazprom for all the natural gas and Gazprom hasn't yet reduced natural gas to Moldova. Gazprom said "*Moldovagas has belatedly paid to Gazprom for the ongoing supplies of Russian gas in November. Gazprom received the payments for gas intended for delivery to the Moldovan consumers but lost in Ukraine."* Our Supplemental Documents package includes the full Gazprom announcement.

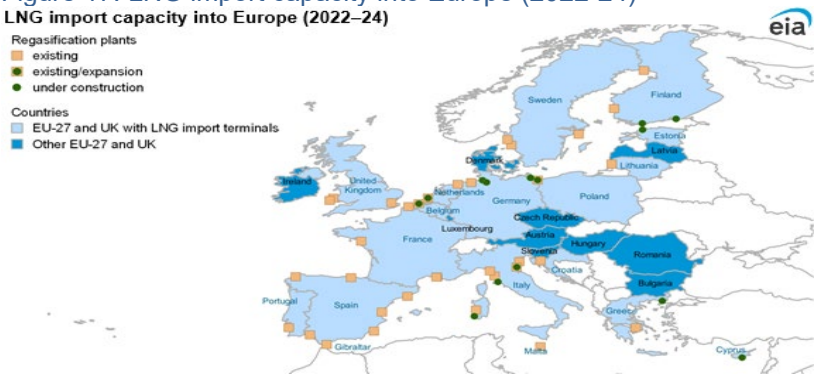
Natural Gas – EIA: Europe LNG import capacity +6.8 bcf/d by end of 2024

Europe's increasing LNG import capacity

On Monday, the EIA posted its blog "*Europe's LNG import capacity set to expand by one-third by end of 2024*" [LINK]. The EIA writes "*Liquefied natural gas (LNG) import capacity in the European Union (EU) and the United Kingdom (UK) will expand by 34%, or 6.8 billion*

cubic feet per day (Bcf/d), by 2024 compared with 2021, according to the International Group of Liquefied Natural Gas Importers (GIIGNL) and trade press data. Expansions of import, or regasification, capacity will total 5.3 Bcf/d by the end of next year and grow further by an additional 1.5 Bcf/d by the end of 2024. LNG regasification capacity in the EU-27 and the UK remained relatively stable and expanded modestly in the last 10 years, by 2.8 Bcf/d (16%), from 17.5 Bcf/d in 2012 to 20.2 Bcf/d at the end of 2021, according to data from GIIGNL." Relative to 2021, the EIA estimates Europe LNG import capacity will increase by 6.8 bcf/d by 2024 vs 2021. To put in perspective, Gazprom's Nord Stream pipeline capacity is 5.3 bcf/d and its Nord Stream 2 is an additional 5.3 bcf/d. Regardless, Europe seems to be moving as fast it can to increase LNG import capacity. Our Supplemental Documents package includes the EIA blog.

Figure 17: LNG import capacity into Europe (2022-24)



Source: EIA

Natural Gas – Conoco/Qatar 15-yr LNG supply deal or tie up regas deal with Germany?

Conoco LNG supply to Europe

There was a lot of backslapping on how Germany stepped up to the table to do a 15-yr LNG deal with Qatar, but, based on the Qatar Energy press release, we wonder how firm the LNG supply is and whether the deal is actually Qatar and Conoco tying up the LNG regasification capacity at Germany's Brunsbuttel regasification terminal? (i) We tweeted [LINK] "*@qatarenergy /@conophillips long-term 15-yr supply of "UP TO" 0.26 bcfd Qatari #LNG to Germany. No DE buyers announced, so feels more like COP/Qatar tieing up DE regas capacity. 0.26 bcf/d equals COP 3.125% of 4.4 bcfd NFE plus its 0.625% of 2.1 bc/d NFS expansions."* (ii) Qatar Energy "*announced the signing of two long-term LNG sale and purchase agreements (SPAs) between QatarEnergy and ConocoPhillips affiliates for the delivery of up to two (2) million tons per annum (MTPA) of LNG from Qatar to Germany. Pursuant to the two SPAs, a ConocoPhillips wholly owned subsidiary will purchase the agreed quantities to be delivered ex-ship to the "German LNG" receiving terminal, which is currently under development in Brunsbüttel in northern Germany, with deliveries expected to start in 2026."* (iii) No where did we see any disclosure of any German buyers in the deal ie. utilities, major industrial users, etc. Everyone got excited with the deliver from Qatar to Germany so no ones seemed to ask the question, were there any German buyers who stepped up to commit to buy 15-year LNG that starts delivery from 2026? (iv) Also, it's not clear from the release what the firm LNG volumes are to be delivered. Rather the release says the deliver of "up to two (2) million tons per annum of LNG". That is equal to "up to"

0.26 bcf/d But the "up to" seemed to have been overlooked. (v) With the "up to" condition, we actually wonder if the strategy for Qatar and Conoco is that this deal was done for them to tie up the regasification capacity at Brunsbuttel? (vi) Hopefully, there will be more disclosure to answer these questions. Our Supplemental Documents package includes the Qatar Energy release. [LINK]

Qatar's NFE and NFS LNG expansions to add 6.5 bcf/d in total

Our tweet on the Germany deal also noted how the "up to" 0.26 bcf/d is equal to the sum of Conoco's 3.125% of the NEF expansion and its 0.625% interest in the NFS expansion. In our June 12, 2022 Energy Tidbits, we noted these two Qatar Energy expansion projects. We then wrote "… Reminder Qatar's #LNG expansion is 2 phases. Phase 1 North Field East, adds 4.4 bcfd BY 2026. Phase 2 North Field South adds 2.1 bcf operational IN 2027. Current 10.1 reaches 16.6 bcfd. Thx @SimoneFoxman @V_Ratcliffe. #NatGas #OOTT". (i) Phase 1: North Field East: increases existing LNG capacity from 77 to 110 million tons by 2026 ie. operational in 2025. This is an increase of 4.4 bcf/d from current 10.1 bcf/d to 14.5 bcf/d. (ii) Phase 2: North Field South: increases then 110 million tons to 126 million tons but won't be finished until 2027 ie. operational in 2027. This is an increase of 2.1 bcf/d from then current 14.5 bcf/d to 16.6 bcf/d. (iii) So total expansion of 6.5 bcf/d from current 10.1 bcf/d to 14.5 bcf/d sometime in 2025, and then to ultimate 16.6 bcf/d sometime in 2027."

Natural Gas – 1st Woodside Australia LNG cargo to Europe (Rotterdam)

Australia LNG to Europe

Most expectations are that the warm start to winter and industrial demand destruction should allow Europe to get thru winter without any major outages. Demand destruction has been big but the other factor has been the big inflow of US LNG cargos. The simple reminder is always that replacing Russia pipeline natural gas with US LNG means natural gas import cost is way more than under the Russia natural gas supply scenario. The increased natural gas import cost will be further increased by LNG supply from longer distances, in this case Australia. Longer distances = higher costs. On Monday, we tweeted [LINK] "*Good news: @WoodsideEnergy delivers 1st #LNG cargo from NW AUS to Rotterdam. But also reminds future EU #NatGas costs are making a step change higher as they replace Russian pipeline gas with LNG, especially if LNG tankers have a 1-month voyage. Thx @VesselFinder. #OOTT".* Our tweet included the Woodside press release [LINK] on the 3.5 bcf LNG load from the North West Shelf (Australia) to Rotterdam. Woodside did not mention the length of the voyage. But our tweet included the below Vessel Finder graphic on the Woodside Rees Withers LNG tanker noted that it was a 28-day voyage from the time it departed Australia to arriving in Rotterdam. Our Supplemental Documents package includes the Woodside release and the full Vessel Finder page.

Figure 18: Woodside Rees Withers LNG tanker

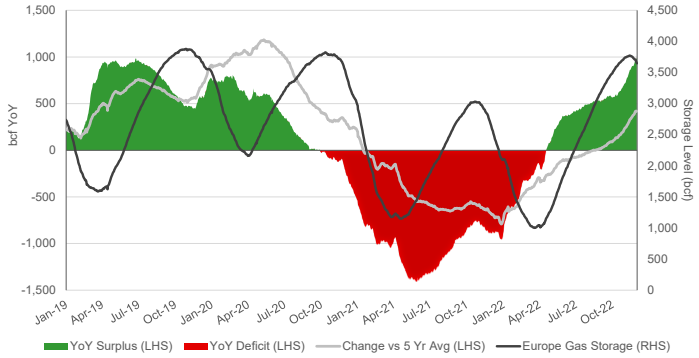
Source: Vessel Finder

Natural Gas – Europe storage is now +25.10% YoY ie. 92.31% full vs 67.21%

Europe storage now 92.31% full

It was a very good Oct/Nov for lower natural gas consumption driven by warmer than normal weather and industrial demand destruction. But at least, this week there were marginal draws in Europe gas storage levels that are still at very high levels. But this week it is supposed to be the first cold week in most of Europe. Europe gas storage began the year in a YoY deficit, but the YoY Europe storage deficit changed to a YoY storage surplus, and it continues to build this week. Europe gas storage started the winter 17.86% YoY and is now a YoY surplus of 25.10%. Europe gas storage started 2020 winter (Nov 1/20) at basically full levels at 94.66% and had dropped by 65.77% to be 28.89% at Apr/21. Europe storage levels bottomed in late Apr/22 at 29%, which was the lowest level since Apr 2018. Last 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. This winter (Nov 1/22) began with gas storage at 94.94% capacity, up 17.86% YoY. Thanks to the warm weather and US LNG, storage as of Dec 1 is at 92.31%, which is +25.10% greater than last year levels of 67.21% and are +10.47% above the 5-year average of 81.84%. Below is our graph of Europe Gas Storage Level.

Figure 19: Europe Gas Storage Level



Source: Bloomberg

Oil – US oil rigs flat at 627 oil rigs on Dec 2

US oil rigs flat WoW

Baker Hughes released its weekly North American drilling activity data on Friday. It doesn't show on the graph but, normally, US rigs are normally fairly flat in Nov/Dec, which would be a positive for building DUCs if frac spreads have their normally seasonal decline. This week US oil rigs fit the trend of being flat at 627 oil rigs. The big change came from the Permian which decreased -2 rigs this week. US oil rigs hit a 15-week low of 591 on September 9. US oil rigs are still +448 oil rigs since the Covid Sept 17, 2020 oil rigs of 179 oil rigs. And US oil rigs are +160 oil rigs YoY. US gas rigs were also flat WoW at 155 gas rigs.

Figure 20: Baker Hughes Total US Oil Rigs

Source: Baker Hughes

Oil – Weekly US frac spreads recap is now behind a pay wall

Frac spreads now behind pay wall

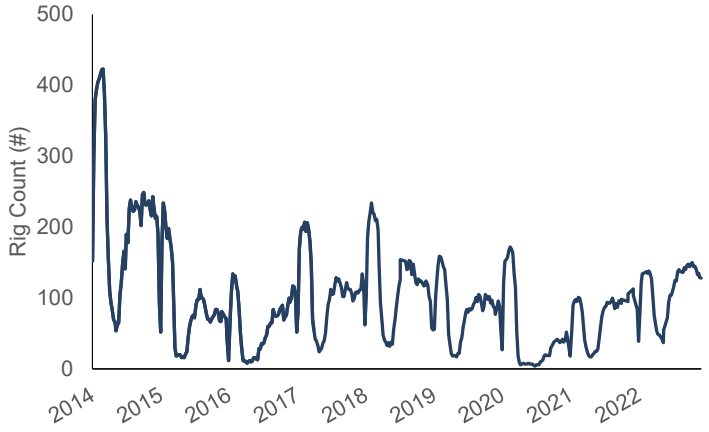
We won't be including any weekly frac spread recap as the weekly frac spread recap moved behind a pay wall a week ago. The weekly recap was provided by C6 Capital Holdings and they advised a month ago that this pay wall move was happening.

Oil – Total Cdn rigs up +1 WoW to 195 total rigs, +15 rigs YoY

Cdn rigs +1 WoW

Total Cdn rigs were +1 to 195 rigs as of Dec 2, 2022. Cdn oil rigs were -1 to 128 oil rigs. Cdn gas rigs were +2 to 67 rigs. Normally rigs are fairly flat in early Dec although there can be up weeks. Total rigs are now +93 vs the comparable Covid period of 102 rigs on Dec 4, 2020. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 113 and Cdn gas rigs were 67 for a total Cdn rigs of 180, meaning total Cdn oil rigs are +150 YoY to 128 oil rigs and Cdn gas rigs are flat at 67 gas rigs.

Figure 21: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production data looks low, showing still flat at 12.1 mmb/d

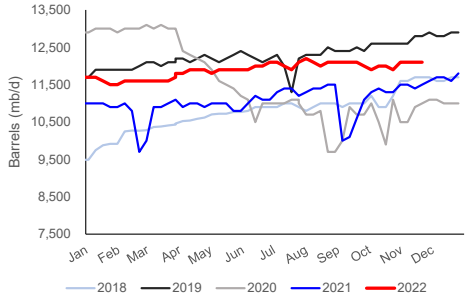
As noted in the following item, it looks like the EIA"s weekly estimates of US oil production are low. The EIA estimates US oil production was flat WoW at 12.1 mmb/d for the week ended Nov 25. US oil production, based on the weekly estimates, has been range bound between 11.9 to 12.1 mmb/d since the 2nd week of May other than when it touched 12.2 mmb/d in the 1st week of August. Lower 48 production was flat WoW at 11.7 mmb/d this week and Alaska was flat WoW at 0.4 mmb/d. US oil production is up +0.500 mmb/d YoY at 12.1 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 22: 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-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		
2022-Sep	09/02	12,100	09/09	12,100	09/16	12,100	09/23	12,000	09/30	12,000
2022-Oct	10/07	11,900	10/14	12,000	10/21	12,000	10/28	11,900		
2022-Nov	11/04	12,100	11/11	12,100	11/18	12,100	11/25	12,100		

Source: EIA

Figure 23: US Weekly Oil Production



Source: EIA, SAF

Oil – EIA Form 914: Sept oil prod +634,000 b/d YTD, +208,000 b/d vs weekly estimates

EIA Form 914 September

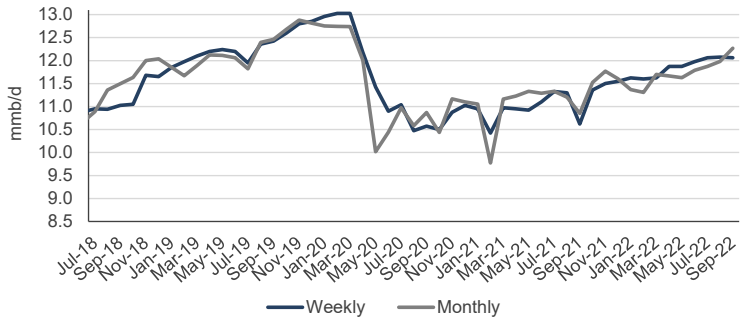
There were two key takeaways from the EIA's weekly US oil production data for Sept – the actuals were 208,000 b/d more than the weekly estimates, and Sept is now +634,000 b/d YTD. There was a big MoM increase in US oil production in Sept, which means that US oil growth has a shot to grow 1 mmb/d in 2022. The EIA released its Form 914 data [LINK] on Wednesday, which is the EIA's "actuals" for September US oil and natural gas production. (i) Form 914 estimates total US oil production is up 0.289 mmb/d MoM to 12.268 mmb/d in September. The actuals for September were 208,000 b/d higher than the EIA's weekly estimates that worked out to just over 12.060 mmb/d. August actuals were immaterially adjusted higher to 11.979 mmb/d from 11.975 mmb/d in last months Form 914. (ii) One of the growing questions has been how much US oil will grow in 2022. September actuals are 12.268 mmb/d or +634,000 b/d more than Dec 2021; this almost doubles last month as August actuals were +341,000 b/d more than the year end Dec 2021 average of 11.634 mmb/d.

Figure 24: EIA Form 914 US Oil Production

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2022	11,369	11,316	11,701	11,668	11,629	11,797	11,844	11,979	12,268			
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 25: EIA Form 914 US Oil Production vs Weekly Estimate



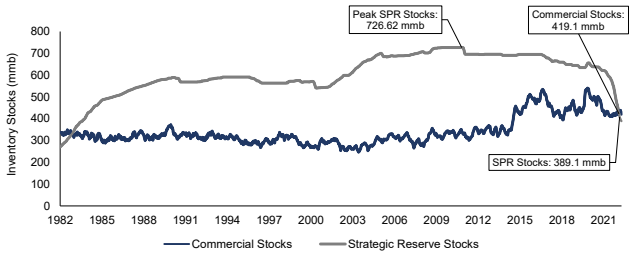
Source: EIA

Oil – US SPR reserves now -29.9 mmb lower than commercial crude oil reserves

SPR reserves remain lower

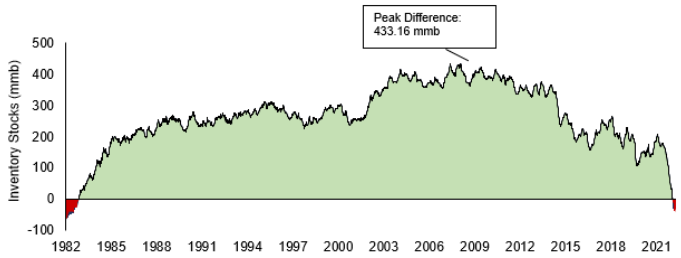
Oil in US Strategic Petroleum Reserves (SPR) moved below total US commercial crude oil reserves in the Sept 16 week for the first time since 1983, with the deficit narrowing this week. The EIA's new weekly oil data for Nov 25 has SPR reserves at 389.1 mmb vs commercial crude oil reserves at 419.1 mmb. The below graph highlights the difference between commercial and SPR stockpiles.

Figure 26: US Oil Inventories: Commercial & SPR



Source: EIA

Figure 27: US Oil Inventories: SPR less commercial



Source: EIA

Oil – Oil sands 2023 maintenance schedule

Oil sands 2023 maintenance

There were a number of comments this week on 2023 oil sand maintenance schedules. Last week's (Nov 27, 2022) Energy Tidbits included the oil sands 2023 maintenance schedule from the union advising its people for their 2023 planning. Here is what we wrote last week.

"*Two weeks ago, Local Union 488 (Piping Professionals) posted the tentative 2023 shutdown schedule for oil sands maintenance/turnarounds [LINK]. It's a tentative schedule, but the oil sands players typically don't provide maintenance schedules until sometime in 2023. But it still gives an indication of the length of turnarounds at each oil sands project*."

Figure 28: Tentative 2023 Shutdown Schedule for Oil Sands Projects

2023 Shutdown Schedule- Updated November 10th, 2022

Tentative Spring Shutdown Schedule ***Subject to change**

Job Site	Approximate Expected Duration	Pre Shutdown Approximate date	Approximate Start Date	Approximate End Date	Approximate Total Manpower All Trades
Syncrude	55 days		01-Apr-23	26-May-23	3500
CNRL Horizon	30 days	16-Apr-23	16-May-23	16-Jun-23	2600
CNRL Jackpine	30 days		28-Mar-23	28-Apr-23	1250
Muskeg River	30 days		06-May-23	08-Jun-23	1000
Suncor Base plant	50 days		May	July	3000
Edmonton Suncor	35 days		May	June	500
Suncor Firebag	40 days		TBD	TBD	600
Fort Hills	60 days		TBD	TBD	1200
Scotford	64 days		01-Apr-23	04-Jun-23	2600
Albian	45 days		April	June	1000
IOL	TBD		April	TBD	500
Nutrien (ft.sask)	TBD		May	TBD	350
Nutrien (Redwater)	13 days		April	April	20-30 (UA)

(Please note: all information is subject to change and will be updated as new information becomes available.) Total Manpower is all trades. Click the link below to view as a PDF

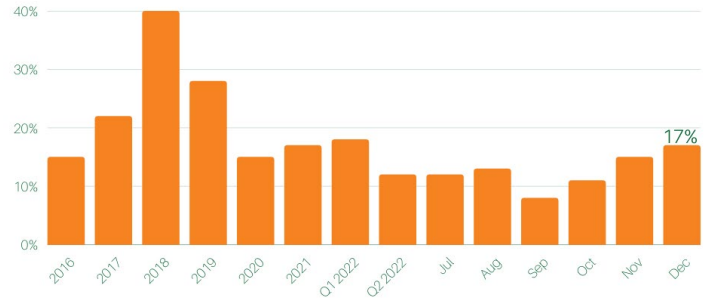
Source: Local Union 488

Oil – Trans Mountain apportioned by 17% for Dec

Trans Mountain apportionment

On Nov 28, Trans Mountain released an update [LINK] on its capacity for the month of December. Total system nominations are apportioned by 17% for Dec (Nov was 15%), meaning 17% 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 29: Trans Mountain Pipeline Apportionment



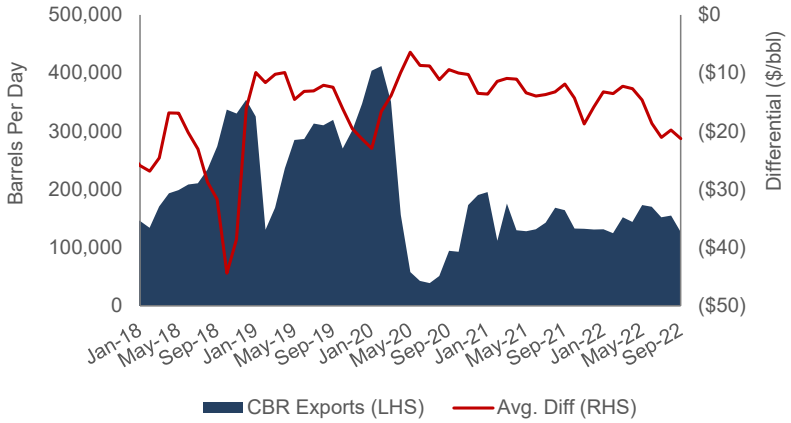
Source: Trans Mountain Pipeline

Oil – Cdn crude by rail imports to Gulf Coast down 52% YoY to 40,000 b/d

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 40,000 b/d in September, which is down 36,000 b/d MoM from August, and down 44,000 b/d YoY vs September 2021. There was a slight upward revision of +5,000 b/d in to August's data. Below is our graph of Cdn CBR exports to the Gulf Coast.

Cdn CBR imports to Gulf Coast down 44,000 b/d YoY

Figure 30: Canada CBR Exports to US Gulf Coast vs WCS Differential



Source: EIA, Bloomberg

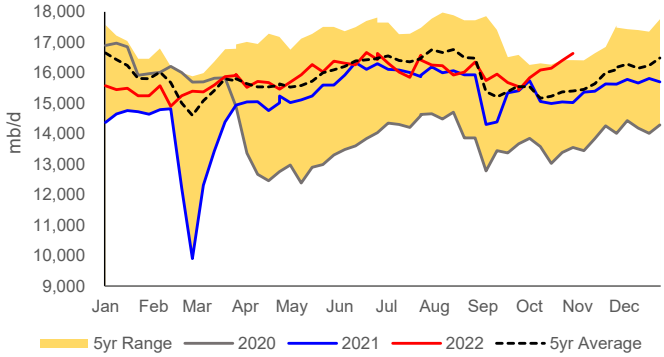
Oil – Refinery inputs +0.228 mmb/d WoW to 16.638 mmb/d

Nov has ended and it is normally the start of the seasonal increase in crude oil inputs to refineries as they have finished their normal Sept/Oct seasonal refinery maintenance period as refineries change from summer to winter fuel blends. Crude oil input into refineries tends to slightly increase in Nov and Dec. On Wednesday, the EIA released its estimated crude oil input to refinery data for the week ended Nov 25. The EIA reported crude oil inputs to refineries up +0.228 mmb/d WoW to 16.638 mm/d, which is +1.007 mmb/d YoY from 15.640 mmb/d for the week ended Nov 26, 2021. Note last year's week ended Nov 26, refineries

Refinery inputs up WoW

saw a slight decline since the steady recovery of Covid, Hurricane Ida, seasonal maintenance impact, and the regular decline after American Thanksgiving weekend. Total products supplied (i.e., demand) decreased WoW, down -0.160 mmb/d to 19.717 mmb/d, and Motor gasoline was down -0.010 mmb/d at 8.317 mmb/d from 8.327 mmb/d last week. The 4-week average for Motor Gasoline was down -0.559 mmb/d YoY to 8.599 mmb/d.

Figure 31: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA

Oil – US "net" oil imports down -1.733 mmb/d WoW to 1.089 mmb/d

US "NET" imports were down -1.733 mmb/d to 1.089 mmb/d for the Nov 25 week. US imports were down -1.027 mmb/d to 6.037 mmb/d. US exports were up +0.706 mmb/d to 4.948 mmb/d. The WoW decrease in US oil imports was driven Top 10 with a decrease of -0.727 mmb/d and "other" posting a smaller decrease of -0.299 mmb/d. Some items to note on the by country data. (i) Canada was down significantly this week by -0.490 mmb/d to 3.354 mmb/d. (ii) Saudi Arabia was down -0.347 mmb/d to 0.338 mmb/d this week. (iii) Colombia was up +0.120 mmb/d WoW to 0.290 mmb/d. (iv) Ecuador was up this week +0.200 mmb/d to 0.242 mmb/d. (v) Iraq was down -0.022 mmb/d to 0.363 mmb/d. (vi) Mexico was down -0.195 mmb/d to 0.300 mmb/d.

US "net" oil imports down WoW

Figure 32: US Weekly Preliminary Oil Imports by Major Countries

(thousand b/d)	Sep 23/22	Sep 30/22	Oct 7/22	Oct 14/22	Oct 21/22	Oct 28/22	Nov 4/22	Nov 11/22	Nov 18/22	Nov 25/22	WoW
Canada	3,775	3,298	3,300	3,372	3,483	3,410	3,235	3,076	3,844	3,354	-490
Saudi Arabia	422	398	370	230	325	533	519	211	685	338	-347
Venezuela	0	0	0	0		0	0	0	0	0	0
Mexico	598	539	759	747	509	748	503	528	495	300	-195
Colombia	72	360	242	214	215	218	341	143	170	290	120
Iraq	202	275	109	130	220	134	503	141	385	363	-22
Ecuador	191	203	136	134	201	0	102	101	42	242	200
Nigeria	0	0	0	29	42	81	119	181	43	50	7
Kuwait	0	0	0	0	0	0	0	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0	0
Top 10	5,260	5,073	4,916	4,856	4,995	5,124	5,322	4,381	5,664	4,937	-727
Others	1,189	874	1,147	1,052	1,185	1,081	1,132	1,178	1,399	1,100	-299
Total US	6,449	5,947	6,063	5,908	6,180	6,205	6,454	5,559	7,063	6,037	-1,026

Source: EIA

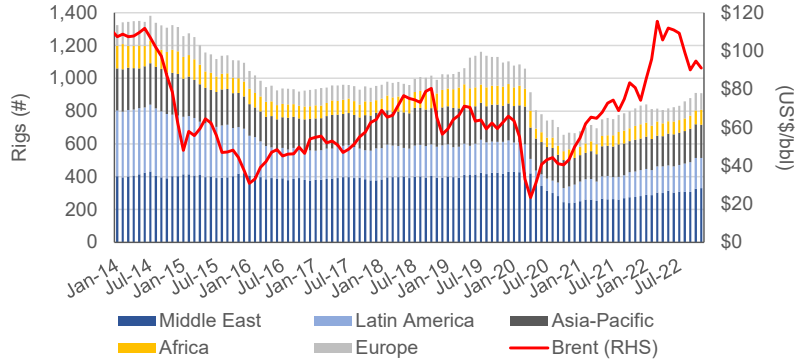
Oil – Baker Hughes International rigs -1 MoM to 910 rigs in November

Baker Hughes posted its monthly update to international rigs on Friday, which showed a slight reversal, but no major MoM changes in rig counts. November stopped six consecutive

International rigs -1 MoM

month of increasing rig counts. (i) Total international rigs were -1 rigs MoM to 910 rigs in November, which is up from the recent bottom of 806 in April. Nov 2022 rigs are +93 rigs YoY from 817 in Nov 2021. (ii) Ukraine is flat MoM at 27 active rigs in November and is almost back to year ago levels. This comes from being at a low of 5 in May with a big pivot in momentum on the Ukraine war. Saudi Arabia increased by +2 rigs MoM to build on the +7-rig increase in October. India was up +1, while Indonesia was also flat MoM at 36 rigs. Libya's rig activity has been hit by internal conflict and uncertainty recently, but added +2 rigs totaling 8 in November, from a low of 2 in August. Australia's rigs were flat at 21 active rigs, and is still below highs seen in September. 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) October of 910 rigs were +11% YoY from 817 in November 2021, but still down 14% vs pre-Covid March 2020 of 1,059 rigs. The YoY rig count is as followed: Asia-Pacific +7, Africa +7, Europe -5, Latin America +30, and the Middle East +54. North Sea rigs were down -4 rigs MoM with the UK and Norway up -1 and -3 rigs respectively. Lain America continues to be strong with Columbia and Argentina both up YoY at +9 and +15 respectively. Middle East is the key YoY increase region led by Saudi Arabia +21 rigs YoY, Iraq +11 rigs YoY, and UAE +7 rigs YoY. Below is our graph of international rigs by region and avg monthly Brent price.

Figure 33: Baker Hughes International Rig Count and Brent Price



Source: Baker Hughes, Bloomberg

Oil – Pemex oil production still stuck around 1.7 mmb/d, and partners flat at 70,000 b/d

On Friday, Pemex released its October production for its interests, it was 1.698 mmb/d of oil, which is basically unchanged for the last several months. Pemex has been unable to grow its own oil production. However, the non-Pemex oil production in Mexico is flat at 70,000 b/d in October and has averaged 69,000 b/d for YTD October 31. As a result, total Mexico oil production (Pemex and non-Pemex) was 1.770 mmb/d for October and 1.695 mmb/d for YTD October 31. Below is our chart tracking Pemex oil production.

Pemex October oil 1.698 mmb/d

Figure 34: Pemex (Excl 3rd Party) Mexico Oil Production

Oil Production (thousand b/d	2015	2016	2017	2018	2019	2020	2021	2022	22/21
Jan	2,251	2,259	2,020	1,909	1,623	1,724	1,651	1,705	3.3%
Feb	2,332	2,214	2,016	1,876	1,701	1,729	1,669	1,684	0.9%
Mar	2,319	2,217	2,018	1,846	1,691	1,745	1,697	1,696	-0.1%
Apr	2,201	2,177	2,012	1,868	1,675	1,703	1,693	1,686	-0.4%
May	2,227	2,174	2,020	1,850	1,663	1,633	1,688	1,690	0.1%
June	2,247	2,178	2,008	1,828	1,671	1,605	1,698	1,702	0.2%
July	2,272	2,157	1,986	1,823	1,671	1,595	1,701	1,707	0.4%
Aug	2,255	2,144	1,930	1,798	1,683	1,632	1,657	1,691	2.1%
Sept	2,271	2,113	1,730	1,808	1,705	1,643	1,709	1,685	-1.4%
Oct	2,279	2,103	1,902	1,747	1,655	1,627	1,692	1,698	0.4%
Nov	2,277	2,072	1,867	1,697	1,696	1,633	1,691		
Dec	2,275	2,035	1,873	1,710	1,706	1,650	1,694		

Source: Pemex

Oil – Mexico exports 0.971 mmb/d of oil in October

Pemex Oct oil exports

On Monday, Pemex posted its oil exports for October, which were 0.971 mmb/d, up 3.9% YoY from 0.935 mmb/d in Oct 2021, but down -4.9% MoM from 1.022 mmb/d in Sept 2022. Oct exports are normally +/- 1.0 mmb/d. Mexico oil exports to US were 0.651 mmb/d, which is right in line with the YTD average of ~0.65 mmb/d. Below is our table of the Pemex oil export data.

Figure 35: Pemex Mexico Oil Exports

Oil Exports (thousand b/d)	2016	2017	2018	2019	2020	2021	21/20	2022	22/21
Jan	1,119	1,085	1,107	1,071	1,260	979	-22.3%	832	-15.0%
Feb	1,241	1,217	1,451	1,475	1,093	1,006	-8.0%	925	-8.1%
Mar	1,062	1,001	1,176	1,150	1,144	925	-19.1%	905	-2.2%
Apr	1,081	1,017	1,266	1,023	1,179	923	-21.7%	1,024	10.9%
May	1,204	958	1,222	1,205	1,062	1,031	-2.9%	965	-6.4%
June	1,098	1,157	1,110	995	1,114	1,106	-0.7%	1,029	-7.0%
July	1,146	1,255	1,156	1,079	1,051	1,173	11.6%	1,062	-9.5%
Aug	1,261	1,114	1,181	1,082	1,190	1,099	-7.6%	915	-16.7%
Sept	1,425	1,159	1,206	995	1,023	983	-3.9%	1,022	4.0%
Oct	1,312	1,342	1,027	963	908	935	3.0%	971	3.9%
Nov	1,273	1,388	1,135	1,114	1,171	1,025	-12.5%		
Dec	1,115	1,401	1,198	1,115	1,243	1,037	-16.6%		

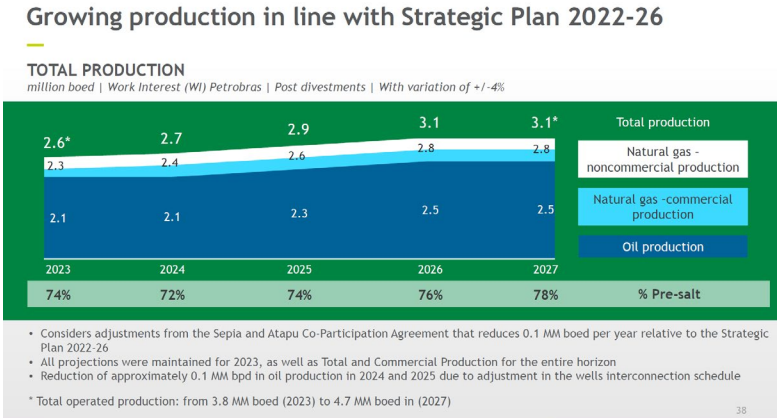
Source: Pemex

Oil – Petrobras lowers its oil production forecast for 2023, 2024, 2025 and 2026

Petrobras Strategic Plan

On Wednesday night, Petrobras press released the highlights of its Strategic Plan 2023-2027 ahead of the Thursday webcast. We did not listen to the webcast but reviewed the release and slide deck. Here is what Petrobras forecasting for crude oil compared to their crude oil forecast from Nov 2021 in their Strategic Plan 2022-2026. Petrobras forecasts crude oil production of 2.1 mmb/d in 2023 (was 2.2 mmb/d), 2.1 mmb/d in 2024 (as 2.4 mmb/d), 2.3 mmb/d in 2025 (was 2.5 mmb/d), 2.5 mmb/d in 2026 (was 2.6 mmb/d), and 2.5 mmb/d in 2027. Below is their new 2023-2027 forecast. Our Supplemental Documents package includes the Petrobras release [LINK] and excerpts from the slide deck.

Figure 36: Petrobras Strategic Plan 2023-2027



Source: Petrobras

Oil – No specifics on how much oil Chevron expects to import from Venezuela

Chevron's restart in Venezuela

Last week's (Nov 27, 2022) Energy Tidbits memo highlighted the Nov 26 breaking news that the Office of Foreign Assets (Treasury Department) issued General License No. 41 that authorizes Chevron to restart its operations with PDVSA in Venezuela. [LINK]. (i) We remind that it is very important to read the license because it allows Chevron to basically do what it needs to do to ramp up its production and import Venezuela oil to Chevron refineries in the Gulf Coast. This includes items like bringing in the necessary goods and services, including needed diluent and condensate, to increase its production and oil to the Gulf Coast. We believe this is critical as it allows Chevron to increase Venezuela oil and exports without any major capex or drilling. (ii) Chevron has not come out and said how many Venezuela barrels it expects to produce and import, and when that will happen. Rather, they have only given general comments that are subject to interpretation. (iii) Chevron CEO Wirth is clearly saying there are a lot of logistics and he wouldn't expect to see any ramp up in capex to increase production until there is some clarity if this last more than the initial six months. That makes sense, Chevron wont' commit to hundreds of millions without knowing it will be there for longer. (iv) Not expecting growth in next 6 months, but not clear growth from what level for their JV with PDVSA? Is it growth from the levels that production level of ~50,000 b/d that the JV had reportedly dropped to without things like diluent, or growth from the reported 160,000 b/d the JV was doing in 2018, or growth from the reported capacity to be at year-end 2022 of 200,000 b/d. Reuters quotes Wirth ""*We're not likely to be coming in with investment in a drilling campaign that grows production in the next six months. There's a lot of work that has to be done...to allow us to move in that direction*.' The question is growth from what level. On Tuesday, Bloomberg reported "*Chevron partners with PDVSA on four oil fields, which have seen production plummet to around 50,000 barrels a day from 160,000 barrels a day in 2018, according to a Bloomberg calculation of company data. The joint ventures have the capacity to increase production to as much as 200,000 barrels a day by the end of the year, according to one of the people*." (v) Feels like Wirth is signaling Chevron can move the 1.79 million bbls that is currently exportable. On Monday, Reuters reported "*As of Nov. 23,*

Chevron's largest joint oil venture in Venezuela had 1.79 million barrels of exportable crude in stock, a document seen by Reuters showed." On Thursday, the same Reuters reporter wrote "*After seeing sanctions did not fully stop Venezuelan exports, the Biden administration has decided "to loosen some of the sanctions imposed by the Trump administration. The primary effect is it allows some of that Venezuelan oil to flow back to the U.S., which will help the U.S. refining system," he said*". (vi) If we had to guess, we think what Wirth is signalling is bringing the 1.79 million bbls in sooner than later, but then also bringing on a regular basis from the JVs at some sort of restored level in the near term like a month or two once they bring in items like diluent, so call it 160,000 b/d and not the 50,000 b/d. So not big ramp up, but perhaps something like 160,000 b/d after bringing in the existing exportable inventory. (vii) Remember this is for exporting to Chevron's refinery in the Gulf Coast. (viii) Attached are the two Reuters reports.

Chevron bringing diluent and diesel should have a quick impact

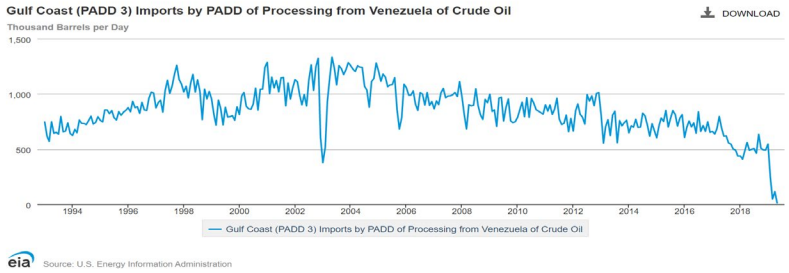
Especially after hearing Chevron CEO Wirth comments this week, it reinforced our view last week that the key to the license is that Chevron can bring in what they need to increase production and exports. And if Chevron isn't going to crank up capex, then it reinforces why diluent and diesel are key items that should have a quick impact on exports and increasing production. Here is what we wrote in last week's (Nov 27, 2022 Energy Tidbitsd). "*We recognize that the vast majority of the quick views on Chevron's return are to not expect any response for a long time. We reiterate its worth reading the details of the license. There are items that should have a quick impact on production and exports, in particular diluent for blending and diesel to provide power. Our view is unchanged from what we wrote in our March 27, 2022 Energy Tidbits – we believe Venezuela could double its production in a matter of a year or two with access to equipment, people, diluent, diesel, etc. As noted above, we expect there will very quick production gains from items such as the ability for Chevron to bring stable flows of diluent, condensate and diesel to Venezuela. We have seen over the past year how Venezuela production increased in great part to getting diluent from Iran. Diluent is needed to blend with the Venezuela extra heavy oil to make it moveable via pipeline. A steady access to diluent would be a key factor to increasing Venezuela oil production. Diesel will also be a quick impact. Plus reliable power, oil and gas operations need power and Venezuela has been hit for several years with power outages and unreliable power. Bringing in diesel and generators to provide power can have a very quick impact Plus recall the reports from a couple years ago on how some PDVSA oil workers were selling their tools so they could put food on the table. We suspect there are hundreds of wells that are shut-in because of a pump jack went down and there are no replacement parts. We suspect there are hundreds of wells that could use workovers, they need equipment parts, tools to service and people. These are a just a few of the likely reasons why it's likely that Venezuela could double its oil production within a reasonably short period. Venezuela was double current production 4 years ago*."

A return of Venezuela is negative for Cdn differentials

Even is Chevron only brings into the Gulf Coast the current inventory of exportable oil plus something like 160,000 b/d of oil on an ongoing basis, it will be a negative the

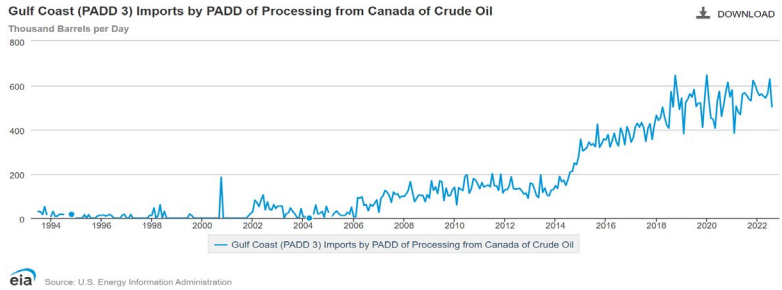
Cdn oil differentials. The more Venezuela oil that is brought into the Gulf Coast (PADD 3), the more competition for Cdn oil in the Gulf Coast. Our original Chevron Venezuela tweets reminded that more Venezuela oil to the Gulf Coast is a negative to Cdn oil differentials. Our tweet included the below EIA crude oil imports in PADD 3 (Gulf Coast) graphs, which remind how Cdn heavy/medium crude was able to penetrate PADD 3 (Gulf Coast) because there was a need with declining Mexico and Venezuela crude oil. Conversely, if Venezuela increases, it will mean more Venezuela crude to the Gulf Coast and less need/increased pressure on Cdn differentials.

Figure 37: Gulf Coast PADD 3 Crude Oil Imports From Venezuela



Source: EIA

Figure 38: Gulf Coast PADD 3 Crude Oil Imports From Canada



Source: EIA

Chevron has 460,000 b/d of refining capacity in Gulf Coast

Our Nov 26 tweets reminded that Chevron has its 350,000 Pascagoula refinery that could take Venezuelan crude oil. The General License 41 says "*Sale to, exportation to, or importation into the United States of petroleum or petroleum products produced by the Chevron JVs, provided that the petroleum and petroleum products produced by the Chevron JVs are first sold to Chevron;"* Chevron has two refineries in the Gulf Coast, one of which would take Venezuelan crude. (i) Pascagoula (Mississippi) refinery. [LINK] "*Chevron's Pascagoula Refinery processes 350,000 barrels (14.742 million gallons) of crude oil a day - an amount equivalent to the size of a football field covered to a depth of 41 feet. Chevron Pascagoula Refinery is primarily a fuels refinery, in that we mainly manufacture motor gasoline, about 130,000 barrels per day (BPD); jet fuel, 50,000 BPD; and diesel fuel, 68,000 BPD. Our other products*

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

Oil –EU/G7 agrees on $60 oil price cap on Russia oil, now the uncertainty starts

$60 Russia oil price cap

Now the uncertainty starts on what happens to Russia oil now that Europe and the G7 have agreed on a $60 price cap on Russia oil. There is no consensus from the oil experts on what exactly will happen in the coming weeks with the Europe oil tanker bank starting tomorrow and the new $60 Russia il price cap. Not sure what pressure was applied to Poland who were insisting on a $30 price cap on Russia oil, but Europe got there yesterday with their announcement of an initial $60 price cap on Russia oil. Yesterday, the European Commission announced [LINK] "*G7 agrees oil price cap: reducing Russia's revenues, while keeping global energy markets stable*" and "*The international Price Cap Coalition has finalised its work on implementing an oil price cap on Russian seaborne crude oil. EU Member States in the Council have also just approved in parallel its implementation within the EU. The cap has been set at a maximum price of 60 USD per barrel for crude oil and is adjustable in the future in order to respond to market developments. This cap will be implemented by all members of the Price Cap Coalition through their respective domestic legal processes. Ursula von der Leyen, President of the European Commission, said, "The G7 and all EU Member States have taken a decision that will hit Russia's revenues even harder and reduce its ability to wage war in Ukraine. It will also help us to stabilise global energy prices, benefitting countries across the world who are currently confronted with high oil prices."* The EC noted "*There is a 45-day wind-down period for seaborne Russian crude oil purchased above the price cap, provided it is loaded onto a vessel at the port of loading prior to 5 December 2022 and unloaded at the final port of destination prior to 19 January 2023."* Our Supplemental Documents package includes the European Commission press release.

The $60 oil price cap is not set in stone? EC says No.

We thought there would be no way for a fix oil price cap that wouldn't be subject to ongoing negotiations/changes. Poland, in particular, led the charge that $60 was way too high and that a more appropriate number was $30. The European Commission also posted a "*Questions and Answers: G7 agrees oil price cap to reduce Russia's revenues, while keeping global energy markets stable*". The Q&A included " *Is the cap set in stone? No. The price cap is fixed for now but adjustable over time. After the initial cap has been set, the price may be amended in the future to reflect market developments and technical changes, as agreed by the Price Cap Coalition. This review should take into account a variety of factors, which can include the effectiveness of the measure, its implementation, international adherence and alignment, the potential impact on coalition members and partners, and market developments*." Our Supplemental Documents package includes the European Commission Q&A.

Novak says Russia will reduce oil production is EU importers apply price cap

We have a 7am MT news cut off so we haven't seen any detailed western reporting on Russia's Novak comments on Russian TV this morning. Earlier this morning, we tweeted [LINK] "*Buckle Up! #Oil market uncertainty from EU Russia oil price cap is only now starting. Kommersant on Novak comments just now that Russia is "ready to reduce oil production in the event that European importers begin to apply the price limit." #OOTT."* The Kommersant (Russian media) report was posted at 6:15am MT [LINK] and we haven't seen any more Novak quotes. But this is position is consistent with Russia's prior public statements that they will cut oil production if needed because they won't sell oil to any countries agreeing to the price cap. And Russia doesn't care what level of price cap is set, just that there is a price cap. Kommersant also reported "*To do this, we are now working on mechanisms to ban the use of the price cap tool, regardless of what level will be set, "said Mr. Novak on the air of the TV channel "Russia 24*". Our Supplemental Documents package includes the Kommersant report.

Oil – No change to OPEC+ quotas from today's virtual meeting

No change to OPEC+ quotas

No surprise, it was a very quick OPEC+ meeting this morning. Earlier this morning, we tweeted [LINK] *"#OPEC+ makes no changes to their OPEC+ production quotas set at Oct 5 meeting. #OOTT*." This was the expected result especially once OPEC+ made a late change to make this a virtual and not the planned in-person meeting in Vienna. It was expected it would be short meeting that would say no change, and that was what happened. Our tweet included the OPEC+ production quotas that were agreed to at the Oct 5 meeting for Nov 2022 thru Dec 2023. Our Supplemental Documents package includes today's OPEC release. [LINK]

Figure 39: OPEC+ Voluntary Production For Nov 2022 thru Dec 2023

November 2022-December 2023

	August 2022 Required Production	Voluntary Adjustment	Voluntary Production
Algeria	1,055	-48	1,007
Angola	1,525	-70	1,455
Congo	325	-15	310
Equatorial Guinea	127	-6	121
Gabon	186	-9	177
Iraq	4,651	-220	4,431
Kuwait	2,811	-135	2,676
Nigeria	1,826	-84	1,742
Saudi Arabia	11,004	-526	10,478
UAE	3,179	-160	3,019
Azerbaijan	717	-33	684
Bahrain	205	-9	196
Brunei	102	-5	97
Kazakhstan	1,706	-78	1,628
Malaysia	594	-27	567
Mexico	1753	0	1,753
Oman	881	-40	841
Russia	11,004	-526	10,478
Sudan	75	-3	72
South Sudan	130	-6	124
OPEC 10	26,689	-1,273	25,416
Non-OPEC	17,167	-727	16,440
OPEC+	43,856	-2,000	41,856

Source: OPEC

Oil – Chevron CEO: "big moving parts" to oil are or about to happen

Chevron CEO on near term oil prices

Chevron CEO Mike Wirth had a good reminder on Friday that some "big moving parts" to the near-term oil price movement are or about to happen. He said price could move either direction, but when we listened to these big moving parts, we thought these are generally items that would be positive to oil prices. Wirth was on CNBC Squawk Box on Friday morning. We tweeted [LINK] "*Hmm! #OPEC+ meeting, SPR releases coming an end, China demand uncertainty, sanctions & price cap on RUS. @CVX CEO "hard to call any one of those, let alone the combination of them". Agree, but aren't most of these likely to be positive to #Oil? thx @SquawkCNBC. #OOTT."* We made a transcript of his comments. At 5:17am MT, CNBC Squawk Box co-anchor Becky Quick "*hundred million barrels a day that the globe uses in oil, it's really the demand picture that's probably more important right now than supply because supply is hard to increase. You're looking at China demand, some issues that happened with things there. How do you just figure out how tenuous things are, how tight that market is, how important a million barrels here or there*?" Chevron CEO Mike Wirth "*Chinese demand is clearly down. It's never come back yet from the pre-Pandemic levels unlike the US and some other places in the world that have seen a strong demand recovery. There are, a hundred million barrels a day is a big number, but supply and demand are the difference between two very large numbers and so, at the margin, swings of a million barrels a day, two million barrels a day as we've seen out of some of these OPEC decisions, can create a real response. The SPR releases are coming to an end, that takes a million barrels a day out of the market. Chinese demand, if the Chinese economy were to recover, would put a million barrels in. The effective sanctions and the price cap is really hard to discern right*

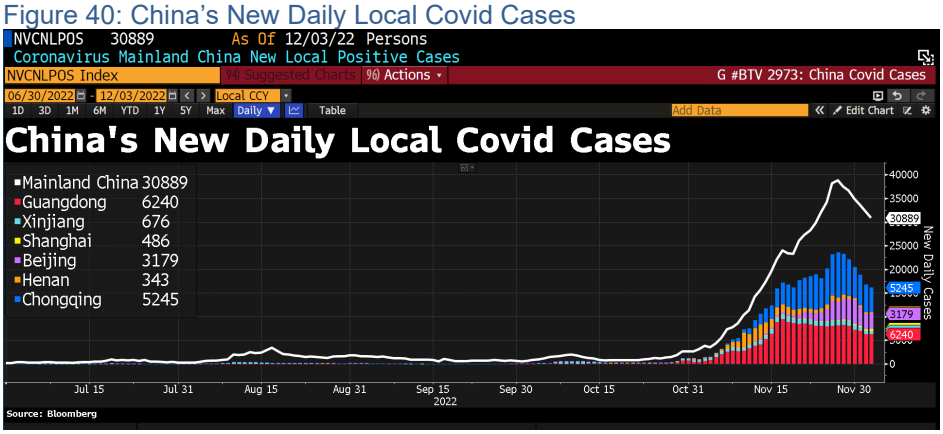
now. So, there are big moving parts, which is why I said earlier the market could break hard in either direction. And it's just really hard to call any one of those, let alone the combination of them."

Oil – China leadership says Covid is in a new phase ie. a formal relaxation is coming

China Covid restrictions

It was a big week for a change in China's Covid fighting with, most importantly, a clear signaling from the leadership that a formal relaxation in Covid is soon to come as they see Covid in a new phase. Of course, that is unless a big outbreak happens that ruins that potential. (i) There was great reporting early Tuesday morning (Calgary time) by CNBC's Eunice Yoon, who nailed it as to what evolved this week. We tweeted [LINK] "*see 👇clip. is china covid change coming? Respected @onlyyoontv "what investors latched onto""unverified discussion that the leadership has been drafting a new narrative to try to get themselves out of zero covid but in a face saving way". #OOTT."* She is not the type to throw out every rumor so we thought it was interesting that her live report stressed this unverified discussion about a new messaging. As everyone saw this week, a new messaging was clearly the name of China Covid game. (ii) On Wed, we saw the start of China leadership with a new messaging clearing pointing to a new phase for China Covid fighting. On Wed, we tweeted on comments from China's Vice Premier that Covid was in a new situation. We tweeted [LINK] "*Per @onlyyoontv 11/29 a new China narrative. "With the weakening of the pathogenicity of Omicron virus, the popularization of vaccination, & the accumulation of prevention & control experience, China's epidemic prevention & control is facing a new situation & new tasks" #OOTT."* (iii) On Thurs, we tweeted once more on the Vice Premier comments as they only got traction a day after our tweet. We tweeted [LINK] "*China Covid story is Vice Premier👇 on weakening pathogenicity of virus, less long Covid fear & facing a new situation & new tasks ie. a new stage. Significant as @onlyyoontv just said she is China's top lockdown enforcer, often referred to as Beijing's Lady of Lockdowns. #OOTT."* (iv) The story this week has been relaxing Covid restrictions, mass testing, in a range of large cities across China. The latest is Shanghai. Earlier today China Daily reported [LINK] "*Shanghai is the newest destination to join other major Chinese cities to embrace the optimization of COVID-19 prevention and control measures to bring life and work back to normal after Beijing, Guangzhou and Chongqing."* (v) And this has been supported by six consecutive days of declining new Covid cases. The qualifier we give is that this is also helped by less mass testing. The peak was 38,808 on Nov 27, which has been followed by 37,477 on Nov 28, 36,683 on Nov 29, 34,942 on Nov 30, 33,683 on Dec 1, 32,206 on Dec 2, and 30,889 on Dec 3. Our Supplemental Documents package includes the People's Daily Dec 1 reporting of the Vice Premier comments.

Figure 40: China's New Daily Local Covid Cases



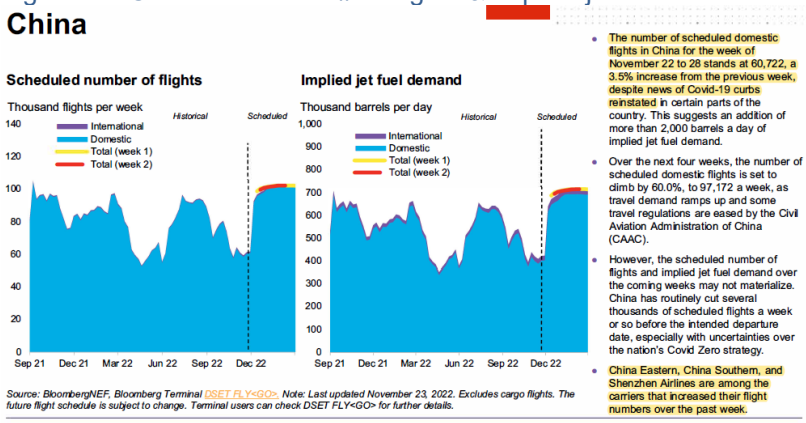
Source: Bloomberg

Oil – Chinese domestic flights; will Decembers flight numbers mirror May?

Scheduled China air flights

It will be interesting to see China's relaxing of a number of Covid restrictions will impact China air travel in the short term and to see if there is a reversal or at least pause in the negative movement in the oil demand factors that was seen in November with the acceleration in Covid restrictions and lockdowns due to highest case numbers since April 2022. Given the small uptick of +3.5% for the Nov 22-28 week, we suspect we could see a bounce around ifor the next couple weeks. The question will be is there is a rebound like seen in May, when the number of scheduled flights increased +53.9% MoM as major cities eased lockdown restrictions following the high case numbers seen in April. Or we could experience what was seen earlier this month as China's scheduled domestic air flights had a modest uptick for the Nov 1-7 week, which proved an anomaly and was followed by two negative weeks. On Monday, we tweeted [LINK] "*China #JetFuel demand to likely bounce around this bottom of current scheduled domestic air flights until clear momentum for reopening. Like seen in April Covid peak. Flights Nov 22-28 +3.5% WoW, Nov 15-21 -2.7% WoW, Nov 8-14 -5.3% WoW. Thx @BloombergNEF Claudio Lubis. #OOTT.*" Scheduled domestic airflights were +3.5% WoW to 60,722 flights for the Nov 22 to 28 week. The prior Nov 15-21 week was a decline of -2.7% WoW, and the prior week was -5.3% WoW. The number of scheduled domestic air flights is supposed to increase by 60.0% to 97,172 per week. Our tweet included the below BloombergNEF graph from its Aviation Indicators Weekly report.

Figure 41: China Scheduled # of flights & Implied jet fuel demand Nov 22-28 week



Source: BloombergNEF

Oil – Vortexa crude oil floating storage 84.56 mmb as of Dec 3, -17.870 mmb WoW

Vortexa crude oil floating storage

There were upward revisions to most of the last several weeks of Vortexa estimates for floating storage. We are referencing the Vortexa global crude oil floating storage data posted on the Bloomberg terminal as of 10am 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 Nov 26 at 10am MT. (i) As of 10am MT yesterday, Bloomberg posted Vortexa crude oil floating storage estimate for Dec 2 at 84.56 mmb, which is -17.87 mmb WoW vs upwardly revised Nov 25 of 102.43 mmb. Note Nov 25 of 102.43 mmb was revised +7.67 mmb vs 94.76 mmb originally posted on Bloomberg at 10am on Nov 26. (ii) The revisions for the past several weeks were all generally up, although not as much as the Nov 26 revisions. The revisions from the estimates posted yesterday at 10am MT vs the estimates posted on Bloomberg at 10am on Nov 26 MT are as follows: Nov 25 revised +7.67 mmb. Nov 18 revised -0.97 mmb. Nov 11 revised +2.42 mmb. Nov 4 revised +3.17 mmb. Oct 28 revised +1.52 mmb. Oct 21 revised +2.71 mmb. Oct 14 revised +3.02 mmb. (iii) There is still a wide range of floating storage for the past several weeks, but a simple average for the past seven weeks is ~94 mmb, so storage is at higher levels. (iv) Also remember Vortexa revises these weekly storage estimates on a regular basis and we do not track the revisions through the week. (v) Dec 2 estimate of 84.56 mmb is -135.89 mmb vs the post-Covid peak on June 26, 2020 of 220.45 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. Dec 2 estimate of 84.56 mmb is +35.84 mmb vs pre-Covid Dec 2, 2019 of 48.72 mmb. Dec 2 estimate of 84.56 mmb is -0.27 mmb YoY vs Dec 3, 2021 of 84.83 mmb. (vi) Below are the last several weeks of estimates posted on Bloomberg as of 10am yesterday, 10am on Nov 26, and 10am on Nov 19.

Figure 42: Vortexa Floating Storage posted on Bloomberg Dec 3 at 10am MT

Source: Bloomberg, Vortexa

Figure 43: Vortexa Estimates Posted Dec 3 10am MT, Nov 26 10am MT, Nov 19 10am MT

Posted Dec 3, 10am MT

Date	Last Px
Fr 12/02/2022	84560
Fr 11/25/2022	102.426k
Fr 11/18/2022	99390
Fr 11/11/2022	81568
Fr 11/04/2022	90847
Fr 10/28/2022	104.752k
Fr 10/21/2022	92757
Fr 10/14/2022	88119
Fr 10/07/2022	82746
Fr 09/30/2022	85376
Fr 09/23/2022	101.147k

Nov 26, 10am MT

Date	Last Px
Fr 11/25/2022	94763
Fr 11/18/2022	100.361k
Fr 11/11/2022	79153
Fr 11/04/2022	87680
Fr 10/28/2022	102.227k
Fr 10/21/2022	90045
Fr 10/14/2022	85100
Fr 10/07/2022	81244
Fr 09/30/2022	85521
Fr 09/23/2022	100.327k
Fr 09/16/2022	87396

Nov 19, 10am MT

Date	Last Px
Fr 11/18/2022	86163
Fr 11/11/2022	83996
Fr 11/04/2022	90384
Fr 10/28/2022	107.216k
Fr 10/21/2022	94673
Fr 10/14/2022	87563
Fr 10/07/2022	83714
Fr 09/30/2022	88639
Fr 09/23/2022	105.268k
Fr 09/16/2022	89773
Fr 09/09/2022	82131

Source: Bloomberg, Vortexa

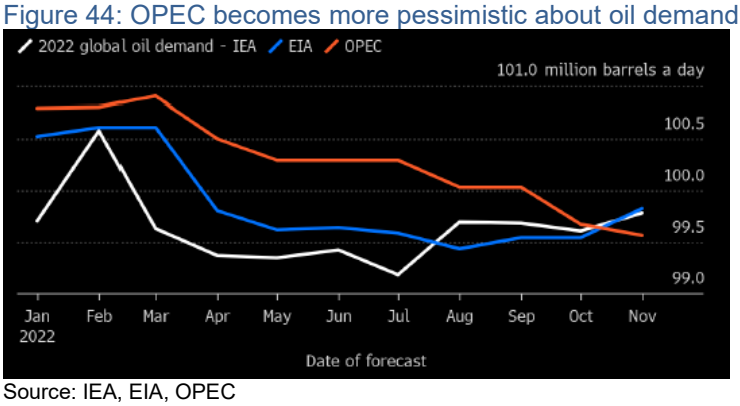
Bloomberg Oil Demand Monitor

Oil – Bloomberg Oil Demand Monitor: Oil demand expected to drop -240,000 b/d in Q4

We recommend reading the Bloomberg Terminal Oil Demand Monitor for a good recap of key oil demand indicators around the world. The Oil Demand Monitor noted road congestion eased in major cities across China and protests should force the Chinese government to step up vaccination efforts. The eye is continuously on China and how its ongoing battle with Covid-19 continuing to curb oil demand. Road congestion in major cities across the country decreased materially MoM for the Nov 21 week, including the capital city Beijing. Chinese air travel is still attempting to reach normal levels. In October, the number of airline passengers sank to a five-month low of 16 million. Which is also well below the five-year average. Travel demand in northeast Asia also sits well below historical numbers at 32% below 2019 figures. This is the largest deficit out of all 17 regions tracked. Global demand estimates for Q4 2022 have dropped by 240,000 according to IEA forecasts, resulting from China's economic struggles, elevated pricing, and Europe's energy crisis. Europe's travel is picking back up with city congestion levels in London and Paris up +25% and +11%, respectively. Airline passengers from the UK are up 94% YoY, but still down -19% from 2019 levels. Below is a figure from the Oil Demand Monitor that highlights the pessimism OPEC forecasts for global

oil demand. Our Supplemental Documents package includes the Bloomberg Oil Demand Monitor.

Figure 44: OPEC becomes more pessimistic about oil demand



Source: IEA, EIA, OPEC

Oil – Caixin PMI for Nov is still below 50 at 49.4, but up from last month at 49.2

Caixin PMI 49.4 in Nov

On Wednesday, IHS Markit released the Caixin China Manufacturing PMI data for November [LINK] and the index showed the fourth consecutive month of below 50 with Nov at 49.4 (vs expectations of 48.6) but up from Oct at 49.2. On Wednesday we tweeted [LINK], *"China Caixin PMI for Nov 49.4 v Est 48.6 & Oct 49.2, Sept 48.1, Aug 49.5. 'Covid-19 containment measures continued to weigh on the performance of China's manufacturing sector' 'notably the degree of positive sentiment reached a three-month high', Thx @IHSMarkitPMI #OOTT"* The tone is negative for manufacturers with one key reason being covid containment continuing to restrict output and demand. This makes sense – a slowing global economy means less orders for Chinese products. The Caixin Insight Group said "*factory output in China fell for the third month running in November, with the rate of reduction quickening from October, but remaining mild overall. Companies frequently linked the decline to the impact of COVID-19 restrictions on operations and customer demand."* Our Supplemental Documents package includes the Caixin China PMI for November

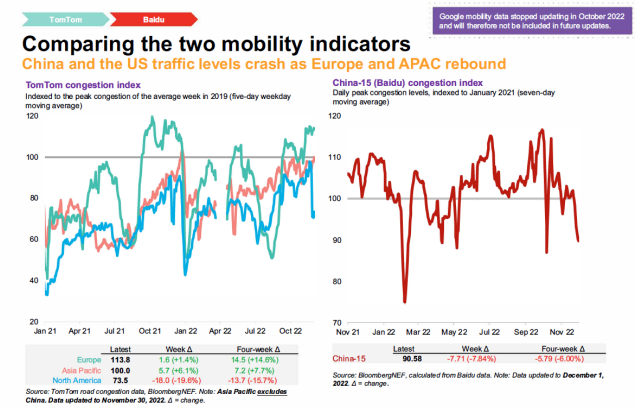
Oil – BNEF, Mobility down WoW in China and North America

Mobility mixed globally

We are big fans of the BloombergNEF weekly indicators reports as they provide updates on WoW changes, but also remind that WoW changes do not necessarily mark a trend. On Friday, BloomergNEF posted its Global Road Traffic Indicators which included a drop in China's mobility, as well as North America, while the Asia Pacific and Europe increased WoW. US Thanksgiving was last week, so we suspect the drop WoW is due to the rolling off of seasonal travel numbers. The softness in the TomTom indicators we highlighted in the last two weeks memo continued this week. Over the last few weeks TomTom trends are moving lower relative to 2019 as one of the three regions dropped WoW. So it's worth keeping an eye on these indicators as they are happening at the same time as places like the US have seen lower gasoline prices. TomTom congestion index showed Europe up 1.4%, Asia Pacific up 6.1%, China down 7.84%, and North America down 19.6% from last week. Europe and North America are bearish and subject to drivers responding to rising cost, including high gasoline prices. China's mobility data should not come as a surprise given the increasing impact of the zero-covid policy and various lockdowns throughout the country. Our

Supplemental Documents package includes excerpts from the BNEF Global Road Traffic Indicators report.

Figure 45: BloombergNEF Mobility Indicators



Source: BloombergNEF

Oil & Natural Gas – TotalEnergies cuts North Sea capex re windfall tax

UK governments windfall tax impacts investment

On Thursday, TotalEnergies UK country chairman said the company would cut £100mm from North sea investment plans in 2023 [LINK]. This equates to ~25% of annual investment. The United Kingdom government released its Autumn budget on November 17, 2022 [LINK] which included a 10% increase in the windfall tax, bringing the total to 35% with expiry in 2028. With oil companies now paying 75% of total profits, even in a falling price environment, a pullback in some future investments was bound to happen and should not come as a surprise. Jean-Luc Guiziou mentions the lack of a floor price is of concern, *"following another change to the fiscal environment for energy investors in the UK, we are now evaluating the impact of this change on our current and planned projects We note that without a price floor to the [windfall tax], the current regime will affect short-cycle investments in particular infill wells."* Our Supplemental Documents package contains the release.

Oil & Natural Gas - Largest ever 5.6 Alberta earthquake believed to be natural cause

Alberta 5.6 earthquake

On Tuesday around dinner time, there was the largest ever earthquake in Alberta – a 5.6 earthquake in northern Alberta. We haven't seen any reports or suggestions that the earthquake was linked to oil and gas fracking or water disposal. Rather, the reports were such as [LINK] " *A geologist says the largest earthquake ever recorded in Alberta on Tuesday evening was probably due to natural causes. Rebecca Salvage of the University of Calgary says the 5.6-magnitude quake that rattled windows and shook homes near Peace River in northwest Alberta was likely too deep to have been caused any other way. Energy extraction processes such as fracking have contributed to earthquakes in other parts of the province. Salvage says the earthquake, which was preceded by two smaller quakes and followed by several aftershocks, occurred about six kilometres underground."* The major oil play by the earthquake is the hot Clearwater oil play, which is different than the other plays in that it is not a play that is fracked, rather it is drilling wells on tight spacing without fracks.

Oil & Natural Gas – A rare-mid season pause during the 2022 hurricane season

hurricane season comes to an end

The 2022 hurricane season officially came to an end on November 30, and it was overall in line with the average. This year's Hurricane season saw 14 named storms with 8 experiencing winds of 74 mph and 2 major storms experiencing winds of greater than 111 mph. From an oil and gas perspective, there wasn't as many hurricanes that came into the GoM. 2022 was an average Atlantic hurricane season, although hurricane Ian was tied for the fifth largest in US history. According to NOAA [LINK], scientists attribute the unique season, with a rare mid-season pause, to increased wind shear and suppressed atmospheric moisture high over the Atlantic Ocean. The official start of the season is June 1 and this season's storms began early with the first storm forming June 5. There was a pause in August with storm activity resuming in September, where seven of the storms and two of the hurricanes formed. A rare late-season storm was experienced on November 10. Of the 14 storms, 3 made landfall with 2 being classified as a category 3 or higher. NOAA noted *"La Nina conditions remained robust throughout the season while the West African Monsoon was only slightly above normal, which both largely aligned with conditions anticipated by the team at NOAA."* Our Supplemental Documents package includes the NOAA recap.

Oil & Natural Gas – Manchin may lose his leverage with Biden on Tues

Georgia senate runoff on Tues

The coal, oil and gas industries will be watching the Georgia Senate run off race on Tuesday. Polls are far from 100% predictive, but the latest CNN poll on Friday [LINK] has Warnock at 52% and Walker at 48%. In the November general election, Warnock got 49.4% of the vote, Walker 48.5% and Libertarian candidate Oliver got 2.1% of the vote. Two other interested watchers will be Democrat senators Manchin and Sinema. As it stands right now, the November elections have resulted in a Senate that is 50 Democrats and 49 Republicans. A Walker win puts it back into the current situation of a 50/50 Senate where VP Harris vote is needed to break a deadlock assuming all Democrat senators, including Manchin and Sinema, vote for any bill. It has given these senators a lot of leverage with Biden. But if Warnock wins, it will be 51/49 for the Dems and Manchin will lose his leverage with Biden. This is a negative for coal and oil and gas that have been big areas of support from Manchin.

Energy Transition – United warns airports weren't built for electrifying at this scale

United Airlines warning on airports electrification

You would never know it from the United Airlines release on their strategic equity investment in battery storage player, Natron. But United warned to Axios that "*these airports weren't built for electrifying at this scale*". That was a pretty clear warning. We expect electrifying airports is much like the aspiration to electrify highways – there is an underestimated need for electricity and it won't be there to support a rapid electrification. Yesterday, we tweeted [LINK] "*Airport electrification realty check. @JoannMuller reports "These airports weren't built for electrifying at this scale," says Mike Leskinen, president of United's investment arm, United Airlines Ventures (UAV)." #NatGas will be needed for longer. #OOTT."* (i) On Wednesday, there was a United Airlines announcement that reminds of another under the radar need for a big increase in electrification capacity at airports including all the ground support. This is even before thinking about charging up electric planes. There will be massive needs for battery storage and renewables. (ii) We look at infrastructure like airports as something that will have some sort of priority for governments to electrify that are needed to keep the economy going. (iii) United's announcement was for a strategic equity investment in a battery company (not lithium) to give it an advantage for providing electricity to its ground handling operations. (iv) There was nothing in the United Airlines release that warned about the industry electrification

issue at airports. But Axios reported on the United deal and that airports aren't built for electrifying at this scale. So the question is how will this be done besides battery storage. Is there room or logistics for wind or solar? How about mini nukes Axios wrote *"• "These airports weren't built for electrifying at this scale," says Mike Leskinen, president of United's investment arm, United Airlines Ventures (UAV). • Airports will eventually build a more robust infrastructure using renewable energy, he predicts. "But when the wind is blowing and when the sun is shining isn't always exactly when you need the peak load." • Natron's battery storage system helps solve that problem."* (v) It also reminds that the energy transition will take longer, cost more and be a bumpy/rocky road. And if the renewable/battery storage alternative isn't there in scale in the desired timeline, it will inevitably loop back to the need for natural gas for power for longer. Our Supplemental Documents package includes the United Airlines release and the Axios report.

Energy Transition – Massive electricity will be needed for highway EV charging

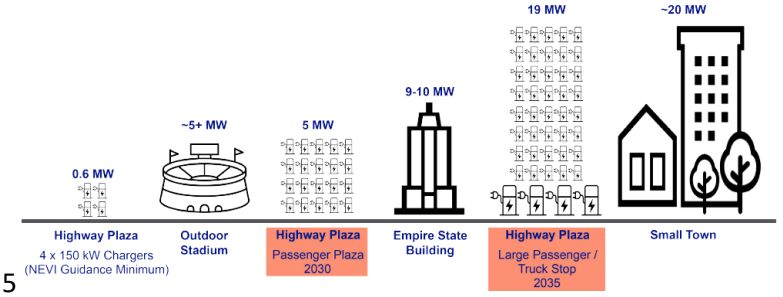
Massive highway EV charging requirements

Seeing the United Airlines comment on airports electrification, it reminded us of another, even bigger electrification shortfall, the massive electricity needed to provide highway EV charging. Here is what we wrote in our Nov 20, 2022 Energy Tidbits memo. "*We know it's not going to happen, but we really wish western leaders would listen to what they need to hear and not just to what they want to hear. Or at least their advisors will tell what they need to hear and not just what they know the leaders want to hear. One area that no one is listening to is the massive electricity requirements to set up highway charging for electric passenger cars and medium/heavy trucks. Because if they were listening, they would be worried about how much it will cost and if it's even possible to provide the level of charging that will be expected. On Monday, we tweeted [LINK] "WOW! Bet most don't appreciate that a SINGLE large passenger/truck highway charging plaza will be ~equivalent to the electric load of a small town. SINGLE 20-fast charger #EV highway play = load of an outdoor stadium. Thx @nationalgrid. #NatGas #OOTT[LINK]". We included the below National Grid graphic. But think of this, a single large passenger/truck highway charging plaza will require the equivalent electricity load of a small town. That is for a single charging plaza. This wasn't an anti-EV report by a fossil fuel or anti-climate change group. Rather it was from the National Grid. There will be $trillions or some massive amount of capital needed over the next 10 to 20 years. We really don't believe politicians appreciate how much electricity is needed for charging. The National Grid analysis shows that every single typical highway charging station will require massive electricity, especially if the highway station charges passenger vehicles and trucks. A single highway passenger only charging electricity needs will be equal the same as an outdoor stadium. A single large highway passenger + truck charging electricity needs will be equal to a small town. And then throw on top of that, there will be a massive need for connection of the large highway charging stops to a high voltage transmission systems, assuming there is a high voltage nearby to hook into. Anything above the 5 MW distribution limit will require access to high voltage transmission. And the scale of the increased energy demand from highway charging sites is off the charts. It's hard to see a scenario that this can be done. Attached are a couple of the key National Grid exhibits. Our Supplemental Documents package includes excerpts from the National Grid report. [LINK]*"

Figure 46: Comparative peak loads for illustrative charging sites vs other major users

For perspective, the Mixed Use Traffic Plaza and Passenger Plaza will each require about 5 MW of charging capacity by 2030—about the amount of power used by an outdoor professional sports stadium. By 2035, the nameplate charging capacity required at the Large Passenger/Truck Stop site will be roughly equivalent to the electric load of a small town (Figure 21). Note that the other large energy users' loads depicted in the figure below are approximate based on a range of loads.

Figure 21. Comparative Peak Loads for Illustrative Sites and Other Major Users[35]



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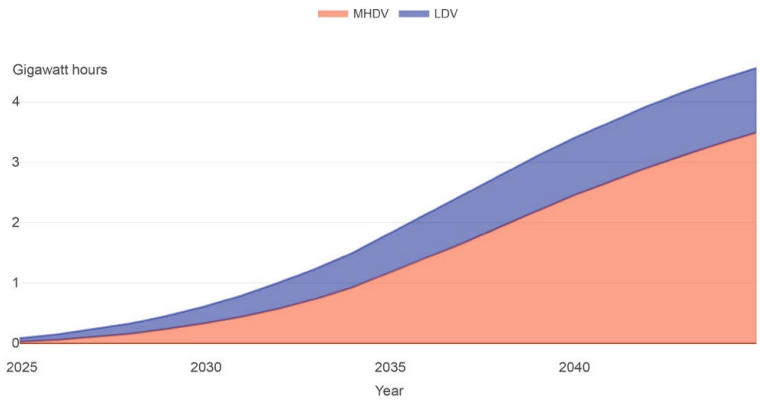
Source: National Grid

Figure 47: Average daily energy demand across all highway charging sites

Figure 22. Average Daily Energy Demand Across All Sites



Source: National Grid

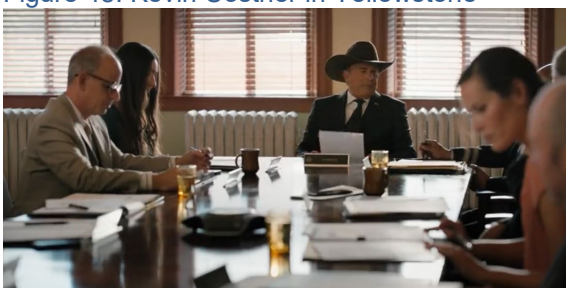
Energy Transition – Yellowstone's Gov Costner on solar project impacting wildlife

Kevin Costner on Yellowstone

We have to believe there are lot of climate change supporters who watch the hit series Yellowstone. But they may not have liked Thursday's new episode. Kevin Costner plays the lead role as Montana Governor John Dutton in the hit series Yellowstone. On Friday, we tweeted [LINK] a 2-min clip "*Makes you wish TV was reality. Have to believe the #EnergyTransition would be as far along, or maybe even further, if our "leaders" asked common sense questions and didn't just spend $ billions because it could be stamped green? Thx @SvenSchnieders for posting. #OOTT.*" The energy transition is happening, but it would be further along if there wasn't $ billions spent on projects stamped as "green" but really are

a waste of money, and if those $ billions were allocated to spending more capital on net zero projects that are making a difference. Costner asks why natural gas leases were being suspend to support the sage grouse restoration project. The policy advisor explains there is empirical evidence that gas impacts the sage grouse. Earlier Costner asked about the approval of 7,000 acres for a solar project in accordance with green initiatives he was asked to approve. Costner asks "*what effect do you think 7,000 acres are going to have on their [sage grouse] environment?.* Policy advisor' "*there is no evidence that solar panels would have any impact on the sage grouse environment".* Costner "*what do they do with the sage brush when they put in the solar panels?"* Policy advisor "*they would clear it before they would put in the solar panels".* Costner "*they remove the sage brush".* Policy Advisor "yes sir". Costner "*sage grouse live in the sage brush".* Policy Advisor "*they do.".* Costner "*you don't think removing the sage brush is going to have an effect on the population".* Policy Advisor "*I just said there is no evidence*". Costner "*you know what scares me about you Stanley, you are serious. You are looking at me and you're not joking. Tops on my agenda today is budget discipline, you're all fired. I am very mindful of our taxpayer's money and you're all wasting it".* Hearing the full clip is way better than reading it.

Figure 48: Kevin Costner in Yellowstone



Source: Sven Schnieders

Capital Markets – Florida pulls $2b BlackRock, don't trust BLK's ability to deliver

Florida calls out BlackRock

It's not a long letter but Florida CFO Jimmy Patronis didn't pull any punches on why Florida is puling its $2 billion capital from BlackRock. On Friday, we tweeted [LINK] "*Ouch! Florida to divest $2b of assets under mgmt by BlackRock. "using our cash, however, to fund BLK's social- engineering project isn't something FL ever signed up for. It's got nothing to do with maximizing returns and is the opposite of what an asset mgr is paid to do." #OOTT."* That's one of the criticisms of BlackRock. Patronis big issue is that his responsibility it get the best returns for taxpayers because the best returns allow Florida to fund their priorities like schools, hospitals and roads. Then Patronis says "*I need partners within the financial services industry who are as committed to the bottom line as we are – and I don't trust BlackRock's ability to deliver. "BlackRock CEO Larry Fink is on a campaign to change the world. In an open letter to CEOs, he's championed 'stakeholder capitalism' and believes that 'capitalism has the power to shape society.' To meet this end, the asset management company has leaned heavily into Environmental, Social, and Governance standards – known as ESG – to help police who should, and who should not gain access to capital. "Whether stakeholder capitalism, or ESG standards, are being pushed by BlackRock for ideological reasons, or to develop social credit ratings, the effect is to avoid dealing with the messiness of democracy. I think it's undemocratic of major asset managers to use their*

power to influence societal outcomes. If Larry, or his friends on Wall Street, want to change the world – run for office. Start a non-profit. Donate to the causes you care about. Our Supplemental Documents package includes the Florida letter.

Louisiana pulled its capital from BlackRock, called out Larry Fink comments

Our Oct 16, 2022 Energy Tidbits memo highlighted the most recent to pull their capital from BlackRock – Louisiana. Louisiana had a similar concern as Florida. We then wrote "*Louisiana State Treasurer John Schroeder posted his Oct 5 letter to BlackRock CEO Larry Fink that "Louisiana Treasury will liquidate all BlackRock investments by the end of 2022. To date we have divested $560 million. We are strategically divesting over a period of time so state money is not lost to the detriment of our citizens. Once complete, this divestment will reflect $794 million no longer entangled in BlackRock money market funds, mutual funds or exchange-traded funds (ETFs) holdings." Schroeder explained that they have a fiduciary duty, "which requires a sole focus on financial returns for the beneficiaries of state funds. Focusing on ESG's political and social goals or placing those goals above the duty to enhance investors' returns is unacceptable under Louisiana law." Schroeder writes "You have admitted that your ESG agenda of forcing behaviors will not increase investor returns. Your 2022 letter to CEOs stated plainly that "We need to be honest about the fact that green products often come at a higher cost." High cost/low return environmental policies will reduce a company's profits...and investors' returns." Our Supplemental Documents package includes the Schroeder letter."*

What did BlackRock say in private to Schroeder that is contrary to public views

One other item from the Louisiana letter to BlackRock was that the BlackRock representatives were saying things that were contrary to Larry Fink's public statements. Not to be a cynic, but this is the type that often happens in politics and big companies. Where the mgmt. or advisors will say that isn't what the CEO or politician actually means. So no one should be surprised. In our Oct 16, 2022 Energy Tidbits, we wrote "*On Thursday, we tweeted [LINK] "Wonder what they said? @LATreasury to #LarryFink on pulling LA $ from $BVI. post meeting #BlackRock reps, "i found that the statements your representative made contradicted most of the public messaging I have read in your annual letters to CEOs or heard you say in media". #OOTT". We know it happens that companies/politicians will make bold public statements but then, when trying to get support, will say in private something different than their public promises. It seems that BlackRock was, in private, trying to convince Louisiana that it's investment practices on oil and gas are not as harsh as believed by Louisiana. It may just be on how they plan to implement a policy in a way that will soften the blow. So no one should have been surprised that Schroeder write "Thank you for the opportunity to visit with members of your team at the National Association of State Treasurers (NAST) conference. While I appreciate the meeting and look forward to further discussion, I found that the statements your representatives made contradicted most of the public messaging I have read in your annual letters to CEOs or heard you say in the media."*

BlackRock's Position for Net Zero

Capital Markets – BlackRock likes carbon-intensive co's with credible transition plans

BlackRock posted its Weekly Commentary November 28, 2022 [LINK], which wraps up with its key three *"Investment Themes*" – "*Bracing for volatility", "Living with inflation", and "Position for net zero".* We tweeted [LINK] #BlackRock "*can get exposure to the transition by investing not only in "already green" companies but also in carbon intensive companies with credible transition plans or that supply materials critical to the transition*" *tactical opportunities in selected energy stocks"* #OOTT." Over the past year, BlackRock CEO Larry Fink changed his view carbon intensive industries like oil and gas, but, for some reason, it always feels like it's a reluctant public support for oil and gas. And being done for the talking point to states that worry about BlackRock's priority for social issues ie. the Florida concern. BlackRock's Position for net zero investment theme is "*3* ***Positioning for net zero****.• Climate risk is investment risk, and the narrowing window for governments to reach net-zero goals means that investors need to start adapting their portfolios today. The net-zero journey is not just a 2050 story; it's a now story. • We see a global drive for more energy security accelerating the transition in the medium term, especially in Europe. • We also don't think the markets have fully priced in the transition yet. Over time, markets are likely to value assets of companies better prepared for the transition more highly relative to others, in our view. • We think investors can get exposure to the transition by investing not only in "already green" companies but also in carbon intensive companies with credible transition plans or that supply materials critical to the transition. • We like sectors with clear transition plans. Over a strategic horizon, we like sectors that stand to benefit more from the transition, such as tech and healthcare, because of their relatively low carbon emissions. •* ***Investment implication****: Time horizon is key. We see tactical opportunities in selected energy stocks."* Our Supplemental Documents package includes the Investment Themes section from the BlackRock Nov 28 weekly commentary.

US rail strike averted

Capital Markets – US approves bill to avoid rail strike

The big market news this week was on Friday, when Biden signed H.J.Res.100 Providing a Resolution to Avert a Nationwide Rail Shutdown force the rail unions to accept the deal. The White House had signaled clearly for the week prior that they would not let a nationwide rail strike occur and that, if needed, they would enact legislation to force the rail deal. The key sound bite used by Biden and the Administration was that as many as 765,000 Americans would be put out of work within the first two weeks of a rail strike and that many of these jobs would be union jobs. Biden's comments on the rail strike are at [LINK].

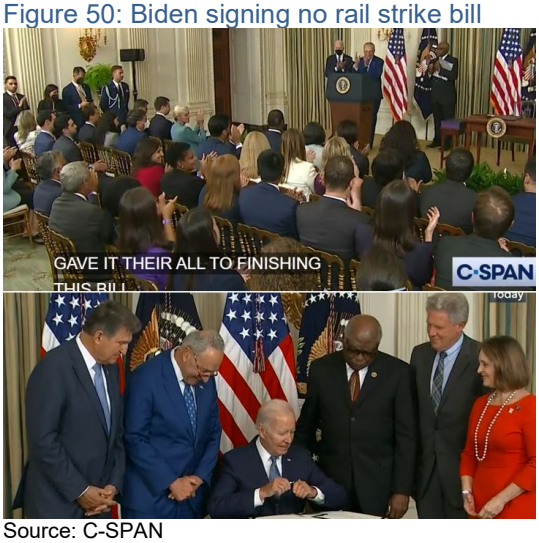
Senior Democrats doing their best to avoid being associated with the bill

The no rail strike bill is the last thing the Democrats wanted to do given they, like Biden, want to be pro Union. It's obvious that they don't want to be associated with a bill to force the unions to take the terms. We couldn't help notice the lack of senior Democrats at the bill signing. And being signed in what is far from a big room. Clearly, no one wanted to be remembered as being an architect for this no rail strike. And, as we have seen every other bill, the senior members of the ruling party always fight to make sure they are front and center any picture signing of a key bill. But, in this case, Biden signed it in what seemed to be no audience and only with administration officials such as Pete Buttigieg, Transportation Secretary. Compare this to the recent Inflation Reduction Act that had the senior Democrats in the signing picture and a full house of Democrats.

Figure 49: Biden signing no rail strike bill

Source: CNBC

Figure 50: Biden signing no rail strike bill



Source: C-SPAN

Capital Markets – AT&T settles lawsuit on selective disclosure to analysts

AT&T settles selective disclosure suit

Surely no one is surprised by this AT&T report. We have to wonder what the company told the analysts, what the analysts said mgmt. told them and who blew the whistle ie. a sellside competitor who didn't get the company heads up, a client who wasn't the first call, a disgruntled employee, or who? Regardless in today's world of being first with chatter and, more significantly, wanting to have a big headline or eye-opener commentary, we aren't surprised to see this scenario. Yesterday, Bloomberg reported "*AT&T to Pay $6 Million to SEC Over Private Calls to Analysts. AT&T Inc. agreed to pay a $6.25 million penalty to settle an unusual lawsuit by federal regulators claiming its executives selectively disclosed nonpublic information about the company's finances to Wall Street analysts. The telecommunications giant won't admit or deny the US Securities and Exchange Commission allegations under a settlement proposal filed Friday by government lawyers with a federal judge in Manhattan. Three AT&T executives who were also named in the agency's March 2021 suit each agreed to pay a $25,000 penalty, also without admitting wrongdoing.*

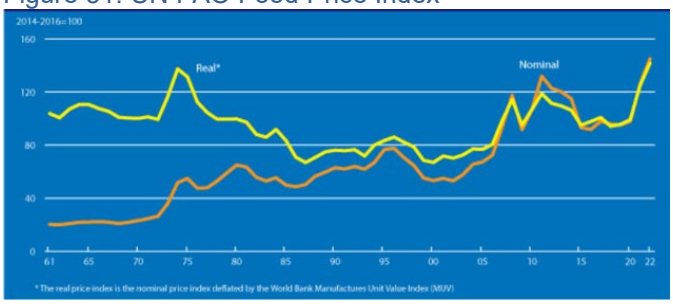
The SEC alleged that the three executives made private calls to analysts at about 20 firms, disclosing information that included its internal sales data and the impact on revenue. The analysts then reduced their revenue forecasts, the agency said. It said the point of the calls was to avoid a revenue miss for the company."

Capital Markets – UN FAO Food Price Index virtually unchanged in November

UN food price index +0.3% YoY

There were essentially no changes in the UN global food price index for November 2022. The UN wrote, *"The FFPI's virtually unchanged from October, with month-on-month decreases in the price indices for cereals, dairy and meat, nearly offsetting increases in those of vegetable oils and sugar."* It was +0.3% YoY, but that is down huge from the all-time record YoY highs of +33.6% YoY seen in March 2022. On Dec 2, the UN posted its monthly update of its FAO Food Price Index [LINK] titled "*FAO Food Price Index in November virtually unchanged for the second month"* Note this is on a Real price basis. The FFPI averaged 135.7 points for November 2022, which was -0.1% MoM and up 0.3% YoY. The FFPI reported a mixed index's MoM in November. The Vegetable oil index was up +2.3% MoM, after seven months of decline. The Sugar Price Index was up +5.2% MoM and the Dairy Price Index was down -1.2% MoM though still +9.2% YoY. The Meat Price Index was down -0.9% MoM, driven by global supply and impacts of currency. Below is the all time FFPI graph. Our Supplemental Documents package includes the UN FAO Food Price Index update.

Figure 51: UN FAO Food Price Index



Source: UN

Capital Markets – Insured losses driven by natural disasters well above 10-yr average

Insured losses from natural disasters up 42% from 10-year average

On Thursday, Swiss Re released an article on natural catastrophe driven insured losses [LINK]. Although, as noted above, the US hurricane season was average, globally exposed insurance companies suffered losses from winter storms in Europe, flooding in South Africa and Australia, and hailstorms in France. 2022 annual insured losses due to natural disasters are US$115b down -5% YoY from US$121b in 2021, but well above the 10-yr average of US$81b. Economic losses saw a similar trend with US$260b in losses during 2022, -11% YoY from US$292b in 2021. Hurricane Ian accounted for a large portion of the losses, estimated between US$50b – US$65b. We should expect to see insurance premiums increase as companies expect more natural disaster related losses. Thierry Léger, Group Chief of Underwriting at Swiss Re commented, *"2022 has been another year of increased natural catastrophe loss activity, and demand for insurance is growing as the protection gap remains vast. To enable the insurance industry to keep up with increasing volatility and demand, it will be key to model evolving frequency and severity trends. Pricing needs to*

reflect the effective risk." Our Supplemental Document package contains the Swiss Re release.

Demographics – China's >65 yr % share of total population is steeply increasing

China's rapidly ageing population

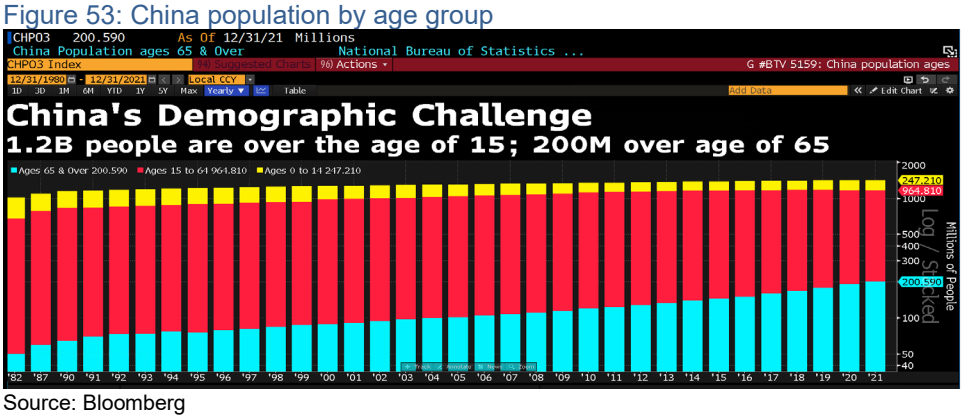
There was a great Bloomberg chart on one of Bloomberg's Asian programs Tuesday night that reminded of China's ageing population. We didn't see the report, but normally look each morning at the Bloomberg TV charts from the prior night. The chart shows the split of China's population into 65 & older, 15 to 64, and 0 to 14 yr. The headline was over 200 million Chinese are over the age of 65. But it also shows how quickly the population is aging and also remember this is irreversible given China's declining birth rates. There is big change in the last 20 years. China's 65 & older age group is now 14.2% of total population and that is a double in the last 20 years from 7.1% in 2001. And the rate of ageing has been accelerating.in the last 8 years ie. it is steeply increasing. 2013 was when there was the maximum number of people, 1.010 billion, in the 15-64 yrs group. In 2013, China's 65 & older was 9.7% of total population and that is now 14.2% in eight years. Our Supplemental Documents package includes the Bloomberg data for the below graphc.

Figure 52: China population by age group

China	millions of people				% share of total population			
Year	≥ 65 yrs	15-64 yrs	0-14 yrs	Total	≥ 65 yrs	15-64 yrs	0-14 yrs	Total
2021	200.59	964.81	247.21	1,412.61	14.2%	68.3%	17.5%	100.0%
2013	132.62	1,010.41	224.23	1,367.26	9.7%	73.9%	16.4%	100.0%
2021	90.62	898.49	286.16	1,275.27	7.1%	70.5%	22.4%	100.0%

Source: Bloomberg

Figure 53: China population by age group



Source: Bloomberg

Demographics – Chinese marriage rate falls to 37-year low

Chinese marriage rate at 37-yr low

The big demographic theme for the next 20 years is an ageing China population and there is no visibility for any change in that trend. One other factor driving the declining birth rate in China is marriages are at low levels. On Friday, Global Times (communist party media) reported "*Chinese first-marrieds fall below 12 million in 2021, a 37-year low: report"* [LINK]. To put that in perspective, 37 years ago, the population of China was about 400 million less people in China. There are less marriages and Chinese are getting married at older ages. Global Times reported "*China has seen the declining marriages during recent years, with the*

number of people in prime marriages falling below 12 million in 2021, a 37-year low, Yicai.com reported on Thursday citing statistics. Experts said that more supportive and targeted policies should be competently implemented to encourage marriages and ease the problems caused by late marriages. The number of Chinese registering their first marriage in 2021 stood at 11.58 million, down 708,000 from 2020, according to Yicai.com, citing data from the China Statistical Yearbook 2022 published by the National Bureau of Statistics. Around 7.64 million couples registered for marriage in 2021, down 6.1 percent from the previous year, according to data released by the Ministry of Civil Affairs in August. The figure dropped below 8 million for the first time since 2003, nearly half aged 30 or above, according to media reports." The peak for first marriages was in 2013 at 23.86 million, which means 2021 was down 51.5% in eight years. Global Times also reported "*Reasons behind the falling number have been attributed to fewer people of marriageable age, late first marriages, economic pressure and changing attitudes toward marriage, experts noted. The official data show that the average age of first marriage in 2020 in China was 28.67 years old, delayed 3.78 years from 24.89 in 2010."*

Demographics – 96.8% of Chinese minors are internet users?

Chinese minors and the internet

We read this report and thought there is no way 96.8% of Chinese minors are internet users. This % seemed crazy high in a country that still has a large rural population. And Xinhua made a point of reminding internet users are being monitored. But On Wed, Xinhua reported "*China sees 191 million underage internet users: report*." [LINK] "*The number of underage internet users in China hit 191 million in 2021, leading to an internet penetration rate of 96.8 percent among Chinese minors, according to a report released on Wednesday. The report, jointly issued by the Chinese Communist Youth League Central Committee and the China Internet Network Information Center, found that the gap in internet penetration rate of the group between urban and rural areas was basically bridged in 2021. China's cyber security has seen continuing improvement, with the proportion of cyber security incidents involving minors decreased compared with 2020, according to the report, which also added that video platforms have become an important source of information for minors. The report covers students from primary, junior high, senior high, and secondary vocational schools in 31 provincial-level regions*."

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.

US introduces the Northrop Grumman B-21 Raider bomber

On Friday, the US Air Force introduced the Northrop Grumman B-21 Raider stealth long-range bomber. Northrop Grumman passed a Frequently Asked Questions [LINK]. They explained "*The B-21 Raider is a new high-tech stealth bomber being developed to replace the Air Force's aging bomber fleet. Designed to be long-range, highly survivable and capable of carrying a mix of conventional and nuclear ordnance, the B-21 will join the nuclear triad as a visible and flexible nuclear deterrent; supporting national security objectives and assuring our nation's allies and partners."* The B-21 will have the range to reach any target anywhere in the world. Plus it's stealth characteristics are huge as only 10% of the current bomber fleet has stealth capabilities. Northrop Grumman explained why it's named Raider – *"At the 2016 Air Force Association's Air, Space and Cyber Conference, then-Secretary of the Air Force Deborah Lee James announced the B-21 would be named "Raider" alongside Lt. Col. Dick Cole, the last surviving airman from the famous Doolittle Raid. According to the Air Force, "the Doolittle Raiders are known for their surprise attack against Japan during World War II on April 18, 1942, which forced the Japanese to recall combat forces for home defense and boosted morale among Americans and U.S. allies abroad. James and Air Force Chief of Staff Gen. David Goldfein selected the name from more than 2,000 naming submissions."*

Figure 54: B-21 Raider

Source: Northrop Grumman