Energy Tidbits

March 19, 2023

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IEA OMR: Building Near-Term Global Oil Stocks Then "*Global Demand is Set to Surge by 3.2 mb/d from 1Q23 to 4Q23*"

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. IEA Oil Market Report had a bearish oil outlook for next few months, but then moves to a bullish outlook for balance of 2023 with demand set to surge by 3.2 mmb/d from Q1/23 to Q4/23 (Click Here).

2. Saudi Aramco Q4 highlights "*risk of underinvestment in our industry is real*" (Click Here).

3. Cathay Pacific CEO highlights about to see long haul travel about to ramp up, including resuming their 4 to 5 times daily Hong Kong/London flights by end of March (Click Here).

4. E.ON CEO reminds it's more than adding wind and EVs, Europe needs to massively invest in energy infrastructure (Click Here).

5. EDP reportedly believes the additional cracks won't cause any need to change to their France nuclear generation forecast for 2023 (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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Natural Gas – 58 bcf draw in US gas storage; now 521 bcf YoY surplus

YoY storage at 521 bcf YoY surplus

No one should have been surprised to see such llow storage draw given the Heating Degrees Data released on Monday afternoon that, on a gas weighted customer basis for the week ended March 11, it was 6% warmer than normal and 4% warmer YoY. So, for the week of Mar 10, the EIA reported a -58 bcf draw (vs expectations of -62 bcf), a -27% decrease from the -79 bcf draw reported for the week of Mar 10 last year. This compares to last week's draw of -84 bcf, and the 5-year average draw of -77 bcf. Total storage is now 1.972 tcf, representing a surplus of +521 bcf YoY compared to a surplus of +493 bcf last week and is +378 bcf above the 5-year average vs +359 bcf above 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)				Year ago (03/10/22)		5-year average (2018-22)	
Region	03/10/23	03/03/23	net change	implied flow	Bcf	% change	Bcf	% change
East	391	416	-25	-25	294	33.0	322	21.4
Midwest	490	515	-25	-25	341	43.7	383	27.9
Mountain	87	92	-5	-5	88	-1.1	91	-4.4
Pacific	72	81	-9	-9	156	-53.8	165	-56.4
South Central	933	925	8	8	573	62.8	632	47.6
Salt	266	261	5	5	158	68.4	181	47.0
Nonsalt	667	664	3	3	415	60.7	451	47.9
Total	1,972	2,030	-58	-58	1,451	35.9	1,594	23.7

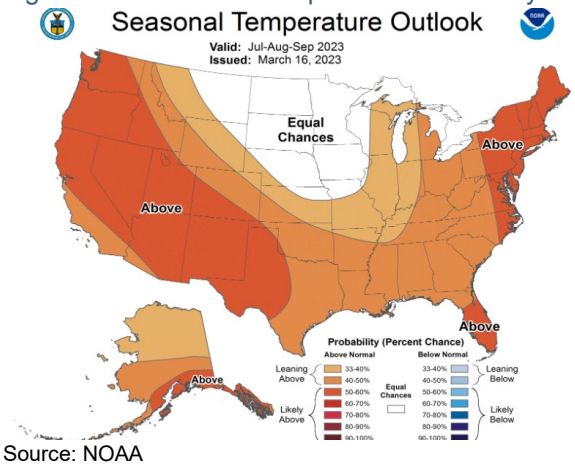
Source: EIA

Natural Gas – NOAA's early look is warmer than normal summer in the US

NOAA forecasts hot summer

We recognize that weather forecasts, even near term, are far from 100%, but, on Thursday, NOAA released its monthly update to its seasonal temperature forecasts. It is still early but the outlook for the summer (Jul/Aug/Sep) [LINK] calls for warmer than normal temperatures across almost all of the US. This would be supportive of natural gas prices. Below is NOAA's Mar 16 temperature probability map for the summer months.

Figure 2: NOAA JAS Temperature Probability Forecast

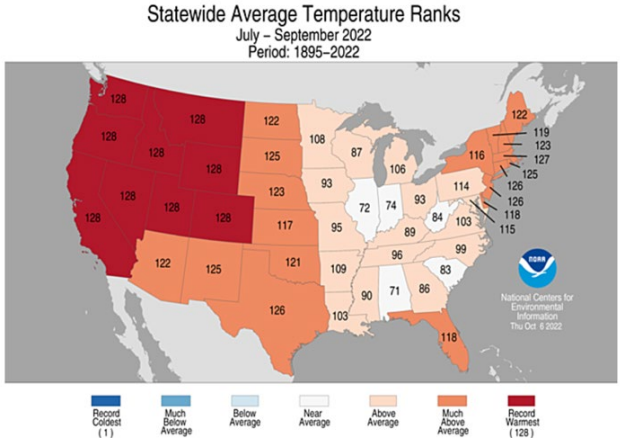


Source: NOAA

But JAS 2023 will be comped vs JAS 2022 hottest summer on record in the US

A warm summer 2023 will provide support for natural gas but the weather driven element of natural gas demand will be less YoY vs summer 2022 because summer 2022 was the hottest summer on record. Here is what we wrote in our Oct 16, 2022 Energy Tidbits memo. "*It was an excellent summer for weather related natural gas demand in the US. It couldn't' be better. On Thursday, NOAA issued its recap of US climate for September. September was the 5th hottest in the 128-years of recording [LINK],. And July-September was the hottest summer on record. [LINK]. Below are graphics depicting the state average temperature ranks for September and for July-September."*

Figure 3: US Statewide Average Temperature Ranks July – September 2022



Source: NOAA

Natural Gas – EIA, US shale/tight natural gas forecast +7.0% or +6.517 bcf/d YoY in Apr

Shale/tight gas production

The warm winter was the biggest negative to natural gas prices so far in 2023, but then there was also the negative that continues to be the very strong growth in US natural gas production driven by the major shale/tight plays. Remember also that the top US shale/tight oil plays are oil wells that produce associated NGLs and natural gas ie so as the Permian, Bakken, Eagle Ford and Niobrara go on oil production, natural gas production in these plays go the same. On Tuesday, the EIA released its monthly Drilling Productivity Report Mar 2023 and the key takeaway is that Apr 2023 would be the 11th consecutive month of growth for US shale/tight natural gas, albeit the last few have been more modest MoM growth but growth, nonetheless. The DPR [LINK] is the EIA's forecast for oil and natural gas production from the major shale/tight oil and gas basins for the current month (in this case Mar) and the next month (in this case Apr). (i) Shale/tight natural gas is forecasted to have 11 months of consecutive growth and has been breaking out since April, as increasing US LNG export capacity out of the Gulf Coast is driving natural gas growth in Louisiana and Texas. US shale/tight natural gas was 96.202 bcf/d in Feb and Mar is forecasted to be 96.202 bcf/d (96.591 bcf/d previously) with Apr production forecasted to be 96.622 bcf/d. (ii) MoM. The largest increases came from Eagle Ford (+0.074 bcf/d MoM), Haynesville (+0.113 bcf/d

MoM), Permian (+0.093 bcf/d MoM) and Appalachia (+0.075 bcf/d MoM). (iii) Total US shale/tight natural gas production is expected +6.517 bcf/d YoY for Apr. All shale/tight plays are up YoY, aside from Appalachia and Niobrara, with the most notable YoY increases being Haynesville +2.276 bcf/d YoY, Permian +2.963 bcf/d YoY, and Eagle Ford +0.824 bcf/d YoY; with Haynesville and Permian acting as key shale/tight plays feeding growth US LNG exports. (iv) Later in the memo, we nole the North Dakota comments on Feb oil production being up MoM and March expected to be down MoM. So we suspect that the EIA DPR's estimate fo the Bakken in Feb and March will likely be revised. (v) Remember US shale/tight gas is ~90% of total US natural gas production. So, whatever the trends are for shale/tight gas are the trends for US natural gas in total. Below is our running table showing the EIA DPR data for the shale/tight gas plays, and the MoM changes in major shale/tight natural gas production. Our Supplemental Documents package includes the EIA DPR.

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

mmcf/d	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Apr YoY	Apr YoY %	Apr less Mar
Anadarko	6,134	6,275	6,554	6,658	6,715	6,708	6,832	6,997	6,981	6,876	6,870	6,892	774	13%	22
Appalachia	35,476	35,155	35,121	35,332	35,486	35,577	35,434	35,417	35,279	35,018	34,879	34,954	-489	-1%	75
Bakken	3,076	3,088	3,086	2,915	3,191	3,156	3,246	3,323	3,308	3,160	3,126	3,164	232	8%	38
Eagle Ford	6,394	6,538	6,671	6,985	7,101	7,220	7,311	7,390	7,365	7,232	7,048	7,122	824	13%	74
Haynesville	14,863	15,023	15,261	15,643	15,835	15,878	16,083	16,257	16,440	16,471	16,690	16,803	2,276	16%	113
Niobrara	5,187	5,195	5,205	5,212	5,223	5,062	5,074	5,124	5,211	5,156	5,186	5,191	-63	-1%	5
Permian	19,870	20,227	20,373	20,417	20,584	20,930	21,143	21,268	21,615	22,112	22,403	22,496	2,963	15%	93
Total	91,000	91,501	92,271	93,162	94,135	94,531	95,123	95,776	96,199	96,025	96,202	96,622	6,517	7%	420

Source: EIA, SAF

Natural Gas – US LNG Exports 10.9 bcf/d in Jan, -4.7% YoY

Jan 2023 US LNG Exports

As a reminder the US Dept of Energy posts monthly US LNG export data two weeks 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 Mar 31). Normally, any differences in data points are due to rounding. The DOE report is better as it provides detailed information on LNG imports and exports including LNG volumes to the top US export countries. The US Department of Energy reported the January LNG export actuals on Tuesday [LINK] and we continue to see the impact of the Freeport LNG shut-in in June (2.2 bcf/d). On Wednesday, we tweeted [LINK] "*US #LNG exports Jan/23 of 10.9 bcfd, -4.7% YoY, -0.8% MoM. Still impact #FreeportLNG 2.0 bcfd 06/08/22 shut. Jan/23 top 5 export markets: UK, Turkey, Dutch, France, Korea. Jan/22 top 5 export markets: UK, France, Spain, Turkey, Korea. @ENERGY. LNG data 2 wks before @EIAgov. #OOTT.*" January saw 336.9 bcf (10.9 bcf/d) of LNG exports, down -0.8% MoM. The top 5 countries with export deliveries from the US were the UK (63.0 bcf), Turkey (39.3 bcf), Netherlands (36.5 bcf), France (34.1 bcf), and South Korea (24.5 bcf), representing 58.6% of total US LNG exports. There has been a shift in the over the last year in top 5 exports with the energy crisis in Europe and the geo-political impacts from the Russian invasion of Ukraine when we look at the top export destinations from a year ago. There was 353.5 bcf of exports in January 2022; the top five export countries were the UK (60.1 bcf), France (50.1 bcf), Spain (49.4 bcf), Turkey (45.1 bcf), and South Korea (21.8 bcf), representing 64.1% of total US LNG exports throughout the month. Below is part of the graphic from our tweet showing the top 5 export countries in Jan 2023 vs Jan 2022. Our Supplemental Documents package includes excerpts from the DOE LNG Monthly.

Figure 5: Top 5 countries of destination for US LNG exports, Jan 2023 vs Jan 2022

Source: DOE

Natural Gas – Venture Global Makes Plaquemines LNG Phase 2 FID, 1st to take in 2023

Plaquemines LNG

No one should be surprised to see the Monday news that Venture Global LNG announced the FID, closing of the $7.8B financing, and full notice to proceed with construction of Phase 2 of the Plaquemines LNG facility, having received all required permits. Phase 1+2 now represent a $21B investment, the largest project financing ever done, with the debt and equity financing fully funding the balance of construction costs for Phase 2 of the 2.63 bcf/d nameplate capacity project. We try to track all long term LNG supply announcements and Venture Global has been announcing enough deals enough deals to expect this FID was coming. The company noted the receipt of all required permits, such as FERC and non-FTA export authorization from the U.S. Department of Energy. According to the company, Phase 2 customers include ExxonMobil, Chevron, EnBW, New Fortress Energy, China Gas, PETRONAS and Excelerate Energy. Mike Sabel, CEO of Venture Global commented, "*Venture Global is proud to announce a positive Final Investment Decision (FID) for phase two of Plaquemines LNG, less than 10 months after sanctioning phase one… Our company's continued ability to commercialize, obtain financing and build our projects in an extremely competitive market is a testament to our team's proven track record of discipline and execution. I would like to thank our customers, lenders, advisors, construction partners and local partners in Louisiana for their continued support. Our team will continue to deliver on our mission to bring more clean, low-cost US LNG to the global market in the coming years to support the world's rapidly growing demand for energy.*" In addition, Venture Global is already actively marketing for its third facility, CP2 LNG, already having secured agreements from several companies.

Natural Gas – Exxon looking at a restart of its 2 bcf/d Mozambique Rozuma LNG

Exxon Mozambique Rozuma LNG

No one should be surprised to see the reports such as Bloomberg's Friday report "*Exxon Mobil Corp. is considering resuming a liquefied natural gas project in Mozambique, but with an even bigger capacity than the one it shelved partly because of an Islamic State-linked insurgency. In a statement published Friday in Mozambican newspaper O Pais, the US energy giant called for expressions of interest to design and build an LNG plant producing as much as about 18 million tons a year. Earlier plans envisaged a 15.2 million-ton project."* We say no surprise given the expectations for TotalEnergies to restart their 1.7 bcf/d Mozambique LNG Phase 1 in July and the expectation/plan has always been for Exxon to follow TotalEnergies Phase 1 with its Mozambique 2 bcf/d Rozuma LNG. The TotalEnergies

and Exxon projects have their onshore LNG facilities basically beside each other to try to provide cost advantages for both projects. It was interesting to see that Exxon is looking for Phase 1 to be more than the original 2 bcf/d by moving to modular development to take Rozuma to 2.4 bcf/d. Our Supplemental Documents package includes the Bloomberg report.

TotalEnergies & Exxon have a continuous construction cycle for MZ LNG

For the past two years, we have highlighted that TotalEnergies force majeure halting its 1.7 bcf/d Mozambique LNG Phase 1 actually put a halt to 5 bcf/d of Mozambique LNG. And that also means that a restart of TotalEnergies Phase 1 sets in motion the restart of 5 bcf/d of Mozambique LNG, not just its 1.7 bcf/d Phase 1. TotalEnergies and Exxon's Mozambique LNG projects have adjoining onshore LNG facilities and worked to have their projects in what we call a continuous construction cycle as a way to maximize efficiencies and minimize costs. It's why, on Friday, we tweeted [LINK] "*#Exxon getting ready to restart its 2 bcfd MZ Rozuma LNG.$TTE #XOM have been planning a continuous construction cycle to get cost advantages so $TTE restart sets in motion 5 bcfd. $TTE MZ Phase 1 .7 bcfd. $XOM Rozuma 2 bcfd. $TTE MZ Phase 2 1.3 bcfd. Thx @mattstephenhill #OOTT."* And it's why with the expectation to restart its Phase 1 in July, no one should be surprised to see Exxon moving to look to restart its Rozuma LNG.

Feb 28, Saipem said TotalEnergies Mozambique LNG to restart in July

Perhaps the best indicator for TotalEnergies restarting its Phase 1 were the Feb 28 comments from Saipem, one of the lead EPC companies for TotalEnergies Mozambique LNG. Here is what we wrote in our March 5, 2023 Energy Tidbits memo. "TotalEnergies has not confirmed any restart date for its Mozambique LNG project, but one of its contractors, Saipem, said, in the Q&A of its Q4 call on Tuesday, that "*we expect to gradually restart the project according to the information received by our clients starting from July this year, progressive restart."* The LNG project's EPC contractor is CCS, a joint venture between Saipem, McDermott and Chiyoda. Saipem should know what TotalEnergies is saying as they will have to gear up and plan for the restart ie. this should be good info. Saipem also explained how this got done – there were some contract renegotations that will see TotalEnergies taking capital risk in the early stages of the restart for some undisclosed period before it the capital risk flips back to the EPC contractors This was the key – TotalEnergies stepping up in the early parts of the restart. In the Q&A, Saipem explained "*Regarding the terms and condition, and what Saipem has mentioned, and what the client has mentioned. What we can state is that the Saipem mentioned this opportunity as the agreement on the principle for the renegotiation of certain sections of the contract has been achieved already with Total Energy. This principle and condition as agreed with Total will contribute to the risk, the initial phase of the project resumption in the best interests of Saipem and Total, prior the return to the fixed contract for project completion. So, we will have -- we are in a situation, where we will have a restart that is currently considering the new situation. We will work together with Total. And then we will continue the project later on following the agreement on a new fixed price for the project. So, this is the situation."*

Renegotiated EPC deal seems to satisfy TotalEnergies rising capex concern

Here is another item from our March 5, 2023 Energy Tidbits memo. "*Our Saipem tweet started of "renegotiated part of EPC contract" because this is the key to why there will be a restart as TotalEnergies raised rising capex their big concern for a restart of the Mozambique LNG project. It seems like the renegotiated deal deals with TotalEnergies rising capex concern. Although, it looks like TotalEnergies has to step in to take some project capex risk in the initial restart stages. Here is what we wrote in our Feb 12, 2023 Energy Tidbits memo. "Natural Gas – Will rising capex hold back TotalEnergies Mozambique LNG restart? After seeing TotalEnergies CEO Pouyanne's comments in the Q&A of the Q4 call on Wed, it doesn't seem like there will be as quick a restart to resuming construction at the Mozambique LNG project as we thought last week. (i) Last week's (Feb 5, 2023) Energy Tidbits memo noted Pouyanne making his first trip to the Mozambique area. TotalEnergies stopped the project due to area violence and Pouyanne had previously there couldn't be a restart decision until he could travel there. He did and TotalEnergies post trip release seemed to indicate that they were now comfortable with the security situation. And this was why they stopped. (ii) TotalEnergies had their Q4 call on Wed and. Pouyanne dealt with Mozambique in the Q&A. We tweeted [LINK] ".@PPouyanne 👇 on MZ #LNG restart. security conditions are okay. will execute recommendation on human rights. BUT "one key condition to restart will be to maintain the costs that we had. If i see the costs going up & up, we'll wait... & the contrators will wait as well". #OOTT." (iii) What won't hold up a restart is security in the region.. He signaled this last week by going there, he signaled to everyone what he weas comfortable the security situation was acceptable so a go ahead could happen. Security, violence and killing was why they called force majeure and stopped the project almost two years ago. But that is not an issue. Pouyanne said "He said "so there the security conditions, I Think are okay". (iv) The second issue they are waiting on is human rights within Mozambique. They hired someone to give them a report and they said they would follow his recommendations. We do not see this as any item to hold up the project. Rather it will be just things they will do for the regions. Pouyanne said 'The two next steps. It varies and because there are some, I would say controversies about human rights about the project around the project, not because of us we inherited that from the Anadarko acquisition. So I want a clear view on these human rights issues, which is a salient issue for me, it's important, I have given a mission to a specialist of human rights, a very well known Dr in France. Mr. Rufin, who has accepted, He is making his job so I'm waiting to see his report to understand exactly what is, I would say what are these issues. if are things to be done, we will execute the recommendation." (v) But Pouyanne raised a third issue that we don't believe was raised before. And we think has the potential to cause a delay to a restart decision. Pouyanne gave a big warning to contractors that they better not have changed their costs. And that he is prepared to wait them out if they have cranked up their costs in the last two years. We have trouble he is saying zero cost change given what has happened in the world in the last two years on inflation and interest rates. And believe he will allow some sort of cost inflation. But even still if he wants no or very little cost increases, we have to believe this causes some sort of delay. Here is what Pouyanne said on costs. "And there is a third step, which I can use this question to deliver is that, of course, we have to reengage with the*

contractors. And one key condition to restart will be to maintain the costs that we had. if I see the costs going up and up. We'll wait . We have wait, we can continue to wait and the contractors will wait as well. So I'm not really in this condition to restart don't." (vi) And his overall assessment in the Q&A, Pouyanne said 'So there are the security conditions I think are okay. Human rights and there is a report. Costs, I will need another report from my teams. We will ask them to reengage but smoothly. No hurry. Again I can wait on Mozambique LNG. If costs increase, we will review it. And we'll take the time. So that's where we are on these projects."

TotalEnergies says first Mozambique LNG not before 2027

It seems like ToralEnergies will soon give the green light to restart construction of its Mozambique LNG Phase 1 in July. So no one should be surprised that TotalEnergies doesn't see first Mozambique LNG until at least 2027. On Tuesday, we tweeted [LINK] "*Is #TotalEnergies restart #MozambiqueLNG in July? IF so, from restart "need another 4 years to build the facility" ie.#LNG exports begin "in 2027 at the best". Seems so, 👇03/04 tweet, #Saipem said renegotiated part of EPC contract for risk sharing. Thx @mattstephenhill. #OOTT."* Bloomberg reported ""*From the time we restart to production, we need another four years to build the facility," Stephane Le Galles, project director at TotalEnergies, said during a visit to the site in northeastern Mozambique last week. That means exports of liquefied natural gas would only begin in "2027 at the best," he said."* Our Supplemental Documents package includes the Bloomberg report.

A TotalEnergies restart will set in motion 5 bcf/d of Mozambique LNG

Here is another item from our March 5, 2023 Energy Tidbits memo. "*Our Saipem also highlighted the significance of the TotalEnergies Mozambique LNG Phase 1 restart, it sets in motion other linked LNG projects. It is important to remember that a restart of TotalEnergies Mozambique Phase 1 is more than a restart of the 1.7 bcf/d for Phase 1 – it's really sets in motion 5.0 bcf/d of Mozambique LNG. This is why we have highlighting TotalEnergies force majeure on its Mozambique LNG Phase 1 for the past 21 months as the game changing event for LNG markets. TotalEnergies Mozambique Phase 1 at 1.7 bcf/d is significant, but our view has been because TotalEnergies delaying Phase 1 of 1.7 bcf/d is actually leading to a delay of 5.0 bcf/d. This was the reason why, on April 28 2021, we posted a 7-pg blog "Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?" [LINK] We thought, and still think, there has been a major change to the outlook for LNG supply in the 2020s and one that is still being overlooked – there is a big new LNG supply gap starting around 2025 that is hitting faster and bigger than anyone expects. We saw Total's April 27, 2021 announcement of force majeure at its Mozambique Phase 1 LNG of 1.7 bcf/d was much more significant that viewed. We just didn't see market focused on the fact that this situation backs up an additional 3.3 bcf/d of LNG supply that is also being counted on in all LNG supply forecasts. Total's Phase 2 of 1.3 bcf/d was to follow, and Exxon's Rozuma Phase 1 of 2.0 bcf/d was originally expected to go FID in 2019 but is now not expected to have a FID decision until 2022 at the earliest. Mozambique is considered a premium LNG supply region for Asia and is in LNG*

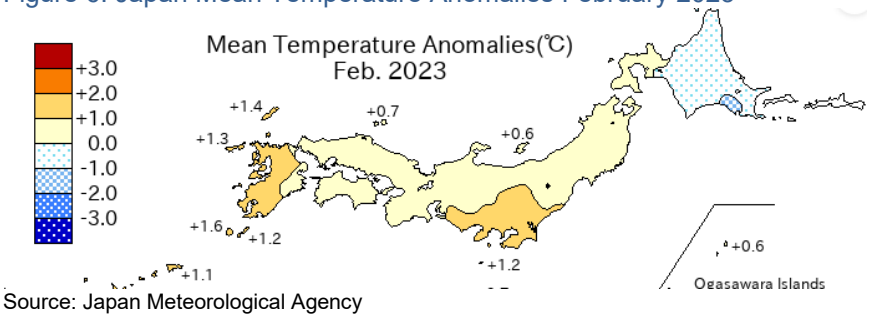
supply forecasts. Total's original in service for Phase 1 is 2024. We had been warning that Mozambique has a major LNG market impact and its why we posted the April 28 blog. Its also why earlier we said that this is starting the clock running for other LNG projects wanting to go FID to make their mind up ie. like LNG Canada Phase 2."

Natural Gas – No significant demand for natural gas in February in Japan

Japan temperature recap for Feb

Mean temperatures were generally above normal throughout most of Japan in February. On Thursday, the Japan Meteorological Agency posted its recap of February weather [LINK].Their recap noted, "*Monthly mean temperatures were above normal in eastern and western Japan and Okinawa/Amami, because these regions were less affected by cold air. Monthly snowfall amounts were significantly below normal on the Sea of Japan side of western Japan.*" And "*Monthly precipitation amounts were below normal and monthly sunshine durations were above normal on the Sea of Japan side of eastern Japan due to less influence of the winter monsoon.*" The Japan Meteorological Agency's mean temperature anomalies map (below) shows the mean temperature breakdown for the month.

Figure 6: Japan Mean Temperature Anomalies February 2023



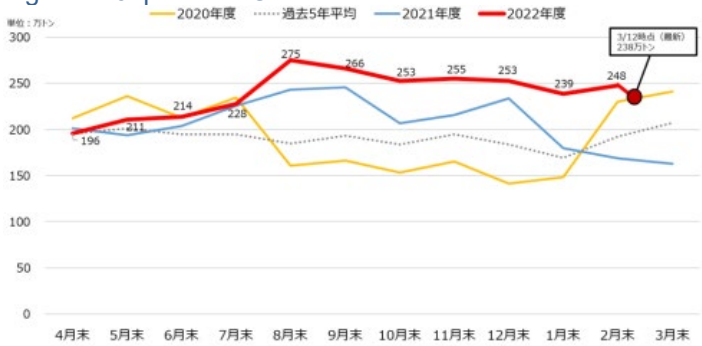
Source: Japan Meteorological Agency

Natural Gas – Japan's LNG stocks up +7.2% WoW to 114 bcf

Japan LNG stocks +7.2% WoW

Japan had a warm end to Feb and winter and was able to escape any LNG shortages in the winter. It's shoulder season so there isn't any strong weather related natural gas demand. LNG stockpiles held by Japanese power producers continue to exceed both last year's level and the seasonal average. Japan's METI weekly LNG stocks data was released on Wednesday [LINK]. LNG stocks on Mar 12 were ~114 bcf +7.2% WoW from Mar 5 of ~107 bcf and well above the 5-year average of 99 bcf. Below is the LNG stocks graph from the METI weekly report.

Figure 7: Japan's LNG Stocks



Source: METI

Natural Gas – Japan LNG Imports in Feb -9.9% YoY to 10.98 bcf/d

Japan Feb LNG imports +9.9% YoY

On Thursday, Japan's Ministry of Finance posted its import data for February [LINK]. As noted above, Feb was slightly warmer than normal in almost all of Japan. The MOF reportred Japan's Feb LNG imports were 10.98 bcf/d, which was -9.9% YoY. Feb 2023 of 10.98 bcf/d ties with 2020 with the lowest LNG imports in Feb for the last decade. There is also the factor of the high LNG prices to end 2022 that would have impacted LNG imports. A good indicator is that Japan thermal coal imports in Feb were +1.4% YoY. Below is our table that tracks Japan LNG import data.

Figure 8: Japan Monthly LNG Imports

bcf/d	2015	2016	2017	2018	2019	2020	2021	2022	22/21	2022	22/21
Jan	13.06	11.22	12.85	12.79	11.69	11.63	12.48	10.51	-15.8%	10.56	0.5%
Feb	13.26	12.30	13.36	14.23	12.61	10.99	13.84	12.19	-11.9%	10.98	-9.9%
Mar	12.60	12.62	12.61	12.28	11.30	11.16	11.04	10.07	-8.7%		
Apr	10.56	10.21	10.52	8.97	9.00	8.31	7.96	8.92	12.0%		
May	8.91	8.55	9.66	9.92	8.62	7.09	7.67	8.92	16.3%		
June	10.61	10.02	9.90	8.88	8.32	8.42	9.13	9.29	1.7%		
July	10.77	10.19	10.19	10.55	10.56	9.35	9.58	9.54	-0.4%		
Aug	10.93	11.96	11.24	11.73	9.45	9.04	9.75	9.71	-0.4%		
Sept	11.06	10.67	9.31	10.04	10.30	10.41	8.66	8.52	-1.6%		
Oct	9.38	9.73	9.50	10.12	9.75	9.20	7.17	7.88	9.9%		
Nov	10.71	12.07	10.26	10.15	10.03	9.63	9.38	8.88	-5.4%		
Dec	12.51	11.69	12.31	11.23	10.54	11.96	10.89	9.39	-13.8%		

Source: Japan Ministry of Finance

Natural Gas – China natural gas production for Jan-Feb up 6.8% YoY to 3.9 bcf/d

China natural gas production +1.9 bcf/d YoY

We have been highlighting a big change in China's natural gas and LNG dynamics over the past two years has been how China has been increasing its domestic natural gas production. We have been highlighting this plus China's increasing natural gas pipeline imports from Russia as these two items reduce the need for LNG imports. China continues to increase its domestic natural gas production in Jan/Feb 2023. China does not provide the separate data for Jan vs Feb. On Wednesday, China's National Bureau of Statistics reported domestic production data for Jan-Feb. YTD domestic production was 3.9 bcf/d, up +6.8% YoY from 3.6 bcf/d in Jan-Feb 2022 and +1.9 bcf/d from 2.0 bcf/d reported for Dec 22.

China's natural gas Jan-Feb imports down -9.4% YoY in 2023

Last week's (March 12, 2023) Energy Tidbits memo highlighted China's LNG imports for Jan/Feb. Here is what we wrote last week "*No one should have been surprised to see China natural gas imports down YoY in Jan/Feb with the mild weather, increasing domestic natural gas production, earlier Lunar New Year, etc. China's natural gas import data reflects the cumulative import volumes for Jan and Feb with YoY comparisons to using YTD total imports for the same 2-month period last year. On Tuesday, Bloomberg reported on China import data for Jan-Feb that was posted on the General Administration of Customs website [LINK]. Bloomberg reported "*China Jan.-Feb. Nat Gas Imports Fall 9.4% y/y to 17.927m MT*". Natural gas imports for Jan-Feb totalled 17.93m MT which is down -9.4% YoY from Jan-Feb 2022 and -12.96% below total imports of 20.60m MT for Nov-Dec 2022. We don't have the split of natural gas imports between pipeline imports vs LNG imports so we can't provide the bcf/d conversions. We typically use bp's conversion factors, which are 1 million tonnes of natural gas = 41.071 bcf, and 1 million tonnes LNG =48.028 bcf."*

Natural Gas – France LNG unloadings resume at 1 terminal, will 3 others follow soon?

France LNG imports shut down by strikes

As of our news cut as of 7am MT, we have not seen any update or indication that the strikes halting LNG unloadings at Elengy's three terminals has ended, the strikes have only ended at Dunkerque LNG terminal. But we have to wonder if the other three terminals follow this week? (i) We have finally started to see Europe natural gas storage back within the 5-yr average after being above the 5-yr average and one of the contributing factors are the strikes in France that have halted LNG imports for a couple weeks. (ii) Earlier in the memo, we noted how France is a big destination for US LNG exports. The strikes against the Macron lowering of the retirement age hit France's four LNG import terminals for the past couple weeks. and is expected to continue at three of them for at least the coming days. France has four LNG terminals with a LNG import capacity of ~3.5 bcf/d. We do not know their sendout capacity into France natural gas pipeline network. (iii) On Wednesday, Platts reported "*Operations at all four of France's four LNG import terminals continue to be impacted by strikes after workers moved to extend their action in protest at French pension reform. The strikes at three terminals operated by France's Elengy -- Montoir-de-Bretagne, Fos Cavaou and Fos Tonkin -- have now been extended by a further week until March 21, a company spokesperson said March 15. The terminals ceased operations on March 6 due to the strike action, which had been due to end on March 14 before unions decided to extend it. "Elengy LNG's three terminals -- Montoir-de-Bretagne, Fos Cavaou and Fos Tonkin -- remain blocked," the Elengy spokesperson said. "The strike has been extended to March 21." There has been no cargo unloading or tank filling, as well as no gas sendout into the French grid, during the strike period. Strike action also continues to impact operations at France's fourth LNG terminal at Dunkerque. The strike, which began early March 7, was initially expected to last only 48 hours but has now been extended to March 17, Dunkerque LNG said in a market transparency notice."* (iv) Strike ended at Dunkerque ended on Friday. On Friday, Bloomberg reported "*Strikes at Dunkerque LNG, which started on March 7, ended this morning, a representative for the facility said my email * Earlier on Friday, ship-tracking data on Bloomberg showed that vessel Fedor Litke, carrying a cargo from Russia's Yamal LNG plant, docked at the terminal ** The ship was previously due for Montoir, before changing*

*scheduled arrival for Zeebrugge on March 22, read story. * Send-outs from Dunkerque LNG also picked up on Friday, grid data show."* (v) We haven't seen indications that the other three LNG terminals will see the strikes ended, but we have to wonder if they follow the Dunkerque terminal. Our Supplemental Documents package includes the Platts report.

Natural Gas – "*EDF plans to maintain nuclear production despite reactor cracks*"

France nuclear issues

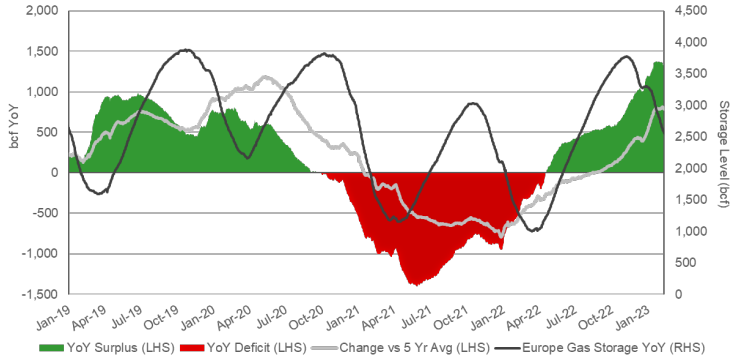
Last week's (March 12, 2023) Energy Tidbits memo noted what we thought was some big France nuclear news on March 8 and then again on March 9 on the discovery of additional cracks, which we thought would inevitably have some impact on nuclear availability in France in 2023. But, if EDF has its way, there won't be any additional impact on France's nuclear generation in 2023. On Tuesday, Reuters reported "*Exclusive: EDF plans to maintain nuclear production despite reactor cracks – sources*" [LINK]. Reuters reported "*French energy utility EDF (EDF.PA) expects to maintain its 2023 nuclear production forecast despite being asked by nuclear safety watchdog ASN to inspect more pipe welds for cracks, two sources with direct knowledge of the matter told Reuters. The plan still needs approval from the watchdog, which EDF hopes to obtain this week, the sources added. EDF's proposed revision would incorporate the weld checks into already-planned reactor stoppages so as to minimise additional disruption, the sources said. That would allow EDF to maintain its 2023 power production goal of between 300 Terawatt-hours (TWh) and 330 TWh this year. This comes after ASN last week ordered EDF to revise its inspection and repair strategy following the discovery of three additional cracks on nuclear reactors. The newly identified cracks had raised questions about the utility group's ability to maintain its production goals a year after corrosion issues forced prolonged reactor shutdowns and sent power production to 30-year lows. "In the event that ASN accepts the plan proposed by EDF, the production target of 300 to 330 TWh would be maintained," one of the sources told Reuters. The updated checks and repairs program is "virtually the same" as the previous one, although it now includes the priority verification of pipe welds that were already repaired when the reactors were built, the second source said."* We recognize that this is what appears to be the nuclear experts saying they can incorporate the additional work into the existing program and not change their nuclear generation forecast. However, we would have thought that they would come out with a view that it would take more time even if only to provide more public confidence in the crack repair process.

Natural Gas – Europe storage is now +19.2% vs 5-yr average, but within 5-yr range

Europe gas storage

The big global natural gas story for Q1/23 has been how the warmer than normal winter in Europe and Asia has been the key reason why Europe made it through winter without a natural gas shortage. There has been negligible weather driven demand for natural gas, which along with the continued industrial demand destruction, means storage levels are at still at high levels. This winter (Nov 1/22) began with gas storage at 94.94% capacity, up 17.86% YoY and is now a YoY surplus of 30.77%. However, temperatures remained a bit cooler this past week resulting in storage falling slightly by -1.40% WoW to 55.77% on Mar 17. Storage is now +30.11% greater than last year levels of 25.66% and is +19.19% above the 5-year average of 36.58%. But, the storage is now withing the 5-year range, albeit at the top end of the range. Below is our graph of Europe Gas Storage Level.

Figure 9: Europe Gas Storage Level



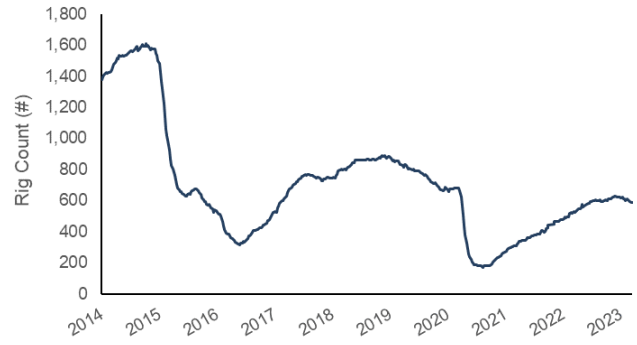
Source: Bloomberg

Oil – US oil rigs down -1 rig to 589 oil rigs on Mar 17

US oil rigs down -1 WoW

Baker Hughes released its weekly North American drilling activity data on Friday. This week total US oil rigs were down -1 rig to 589 rigs as of Mar 17, notably there was a large -6 rig drop in the Eagle Ford and a -2 rig decline at more marginal basins such as "Others", while the Permian saw a +6 rig increase. The total US oil rig count is now at 589 rigs, up +65 YoY, +108 from the 2022 low of 481 rigs in January and +417 since the 2020 low of 172 rigs on Aug 14. US gas rigs were +9 rigs WoW at a total of 162 rigs, an increase of +25 rigs YoY. Although the increase in gas rigs came to some surprise as HH prices continued to show weakness throughout the week, we continue to expect that US gas rigs will continue to decline over the coming weeks. Below is our graph of total US rigs.

Figure 10: Baker Hughes Total US Oil Rigs



Source: Baker Hughes

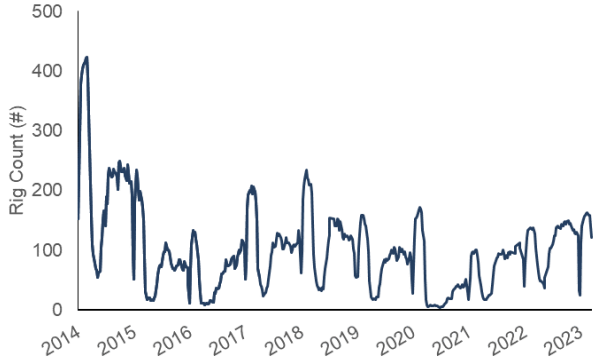
Oil – Total Cdn rigs down -16 WoW to 207 total rigs, +31 rigs YoY

Cdn total rigs -16 WoW

The traditional winter drilling season in Canada is ending and we should continue to see large rig declines in the next 1-2 weeks, however, this week's data came to some surprise as we were expecting to see a larger WoW rig decline. Total Cdn rigs were -16 WoW to 207 rigs as of Mar 17. Notably, the week of Mar 17 saw rig declines of -5 and -10 in AB and SK, respectively, with all other areas remaining flat. There is now a total of 207 rigs, +115 vs the

comparable Covid period of 92 rigs on Mar 19, 2021. Cdn oil drilling rigs decreased by -17 rigs WoW to 122 rigs, up +19 YoY from 103 rigs a year ago and Cdn gas rigs were up +1 rig WoW to 85 rigs. Below is our graph of total Cdn oil rigs.

Figure 11: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production flat at 12.2 mmb/d WoW

US oil production flat WoW

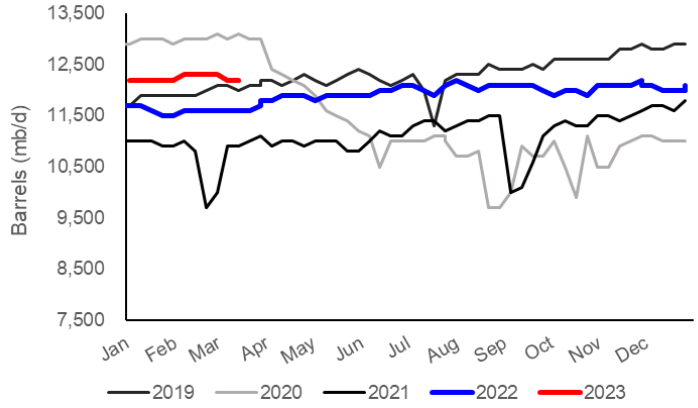
The EIA estimates US oil production was flat WoW at 12.2 mmb/d for the week ended Mar 3 with the Lower 48 also flat at 11.8 mmb/d and Alaska up to 0.444 mmb/d. US oil production, based on the weekly estimates, has been mostly range bound between 11.9 to 12.1 mmb/d since the 2nd week of May. But broke above 12.1 mmb/d to 12.2 mmb/d for the week ended Jan 6 as well as five weeks ago, the first time since it touched 12.2 mmb/d in the 1st week of August. Total US production reached its highest level since March 13, 2020 on Feb 3, 2023 at 12.3 mmb/d. Lower 48 production was flat WoW at 11.8 mmb/d this week and Alaska was up at 0.440 mmb/d WoW. US oil production is up +0.600 mmb/d YoY at 12.2 mmb/d but is still down significantly at -0.900 mmb/d since the 2020 peak of 13.1 mmb/d on March 13.

Figure 12: 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
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		
2022-Dec	12/02	12,200	12/09	12,100	12/16	12,100	12/23	12,000	12/30	12,100
2023-Jan	01/06	12,200	01/13	12,200	01/20	12,200	01/27	12,200		
2023-Feb	02/03	12,300	02/10	12,300	02/17	12,300	02/24	12,300		
2023-Mar	03/03	12,200	03/10	12,200						

Source: EIA

Figure 13: US Weekly Oil Production



Source: EIA, SAF

Oil – North Dakota Jan oil production up +10.7% MoM

North Dakota oil production

As expected, North Dakota oil production in Jan was up MoM as North Dakota oil production was hit hard in Dec by cold winter and snowy weather conditions. Our Dec 18, 2022, Energy Tidbits highlighted the blizzard that hit North Dakota and how that had cut oil output by 200,000 to 250,000 b/d. However, North Dakota production was back above 1.00 mmb/d in Jan. On Wednesday, the North Dakota Industrial Commission posted its Director's Cut, which includes January oil and natural gas production data [LINK]. North Dakota Jan production was up +10.7% MoM to 1.061 mmb/d, which is -2.6% below production of 1.089 mmb/d in Dec 2022. Estimated well completions were 67 in January, a large decrease of -37 from 104

in December. Our Supplemental Documents package includes excerpts from the Director's Cut.

Figure 14: North Dakota Oil Production By Month

(b/d)	2017	2018	2019	2020	2021	2022	2022/2021	2023	2023/2022
Jan	981,380	1,179,564	1,403,808	1,430,511	1,147,377	1,088,613	-5.1%	1,060,708	-2.6%
Feb	1,034,248	1,175,316	1,335,591	1,451,681	1,083,554	1,089,091	0.5%		
Mar	1,025,690	1,162,134	1,391,760	1,430,107	1,108,906	1,122,640	1.2%		
Apr	1,050,476	1,225,391	1,392,485	1,221,019	1,123,166	900,597	-19.8%		
May	1,040,995	1,246,355	1,394,648	859,362	1,128,042	1,059,060	-6.1%		
June	1,032,873	1,227,320	1,425,230	893,591	1,133,498	1,096,783	-3.2%		
July	1,048,099	1,269,290	1,445,934	1,042,081	1,076,594	1,072,632	-0.4%		
Aug	1,089,318	1,292,505	1,480,475	1,165,371	1,107,359	1,075,307	-2.9%		
Sept	1,107,345	1,359,282	1,443,980	1,223,107	1,114,020	1,121,063	0.6%		
Oct	1,183,810	1,392,369	1,517,936	1,231,048	1,111,910	1,121,754	0.9%		
Nov	1,194,920	1,375,803	1,519,037	1,227,138	1,158,622	1,098,389	-5.2%		
Dec	1,182,836	1,402,741	1,476,777	1,191,429	1,144,999	957,864	-16.3%		

Source NDIC, NDPA

Oil – North Dakota expects higher Feb oil production but then lower March production

North Dakota oil production in Feb and March

We used to reference the local reporting on the monthly North Dakota press conference on the monthly Director's Cut for the local reporters insights but those webcasts are now posted so we just listen to the 30 min webcasts. There are always additional insights from the press conference and Q&A webcast [LINK]. At 12:15 min mark Director Lynn Helms said ".. *and the last half of Jan and most of Feb pretty good weather. So like I said, we have about a 6% increase in oil production [in Jan), a little bit higher increase in gas production ….. Looking forward into Feb, the gas number look very strong and so we're expected Feb production to see another major increase. Unfortunately with the weather last week and with what's coming this week, March looks like it could be a bit of a struggle. It looks comparable to last Aug and to Jan, above a million barrels a day. But we are seeing impacts from difficult transportation for crude oil. Still a significant amount of crude oil is trucked from well sites to the pipeline transportation system. And so that causes some problems*." Then in the Q&A, he gave more color when asked about the weather impact right now. At 19:25 min mark, Helms said "*we're already experiencing a downturn from Feb and that's the result of what happened last week. You saw the maps when there was no travel advised on any highway in the state of North Dakota, anywhere. So crude oil transportation really took a hit. We haven't really fully recovered from that and now we're looking at, at least the western and southern parts of the state, another 1 to 3 inches of snow tonight and tomorrow. Of course that's going to slow things again*."

Oil – North Dakota crude by rail up MoM to 99,395 b/d in Jan

North Dakota CBR up MoM in January

The other impact of the Dec blizzard and extreme cold was a hit to Dec crude by rail volumes which was followed by a recovery in Jan. The North Dakota Pipeline Authority posted its monthly update "*March 2023 Production & Transportation"* [LINK]. Please note that we always go to the backup excel sheets from the North Dakota Pipeline Authority for more detailed numbers of crude by rail out of North Dakota. The NDPA Monthly Update (graph below) report only provides rounded numbers, and these rounded numbers are not accurate enough to match the graphs. In the backup excel, the NDPA estimates crude by rail in Jan was a low of 84,395 b/d and a high of 114,395 b/d for an average of 99,395 b/d. This is above the Dec average of 85,216 b/d and Jan 2022 average of 55,826 b/d. Below is a chart

from the NDPA monthly update showing the crude by rail volumes since 2014. Our Supplemental Documents package includes excerpts from the NDPA monthly update.

Figure 15: Estimated North Dakota Rail Export Volumes

Source: North Dakota Pipeline Authority

Oil – EIA shale/tight oil forecast Mar/Apr down vs Dec/Jan/Febr

US shale/tight oil production

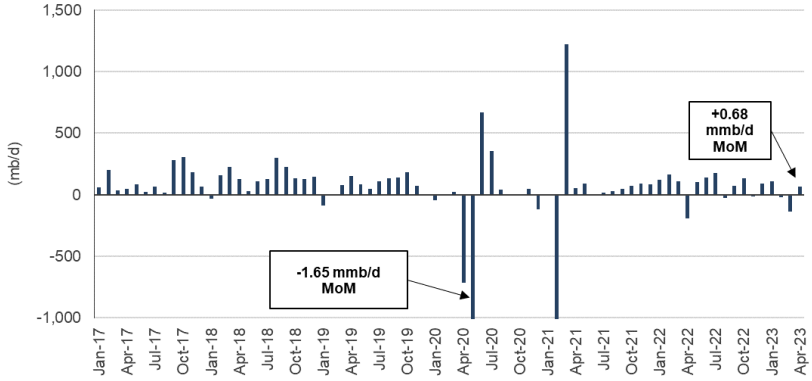
The EIA Drilling Productivity Report March 2023 [LINK] forecast for US shale/tight oil shows a modest MoM decrease in Mar and an increase in Apr after being fairly stuck for July-Oct. The DPR is the EIA's forecast for production for the major shale/tight oil and gas basins for the current month (in this case Mar) and the next month (in this case Apr). (i) Shale/tight oil was flat from July thru Oct, then increased in Nov, Dec, Jan, was flat in Feb and now expected down a bit in Mar and Apr. The EIA does not provide any explanations, but it is a little surprising as we would have expected that Mar/Apr would be higher than Dec/Jan as Dec/Jan are normally impacted by winter weather conditions. It will be a trend to watch. (ii) Noted that we won't be surprised to see the EIA revise its Feb estimates for the Bakken up and its March estimate for the Bakken down given the comments we heard in the North Dakota Director's Cut monthly video noted above. (iii) The EIA now forecasts total US shale/tight oil in Mar at 9.146 mmb/d and Mar at 9.214 mmb/d. (iv) The growth in Apr is somewhat distributed across all basins except Haynesville, Niobrara, and the Permian are basically flat MoM. Anadarko, Appalachia, and the Bakken have the most significant increases of +11,000 b/d, +2,000, and +18,000 b/d, respectively. Permian production for Apr is 5.622 mmb/d, vs 5.596 mmb/d in Mar. Eagle Ford is also forecasted up +9,000 b/d MoM in Apr following two consecutive decreases in Feb and Mar, benefitting from its higher natural gas ratio and the pull for natural gas for US LNG exports. (v) Note that shale/tight oil is approx. ~75% of total US production, so whatever the trends are for shale/tight oil are normally the trends for US oil in total. Below is our table of running DPR estimates of shale/tight oil production and our graph of MoM changes in major shale/tight oil production.

Figure 16: MoM Change – Major Shale/Tight Oil Production

Thousand b/d	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Apr YoY	Apr YoY %	Apr less Mar
Anadarko	391	406	413	425	424	425	423	427	431	433	442	453	55	14%	11
Appalachia	114	124	130	128	120	120	122	126	136	137	138	140	29	26%	2
Bakken	1,172	1,178	1,173	1,136	1,183	1,168	1,182	1,200	1,206	1,178	1,145	1,163	-6	-1%	18
Eagle Ford	1,149	1,152	1,180	1,204	1,224	1,208	1,223	1,231	1,209	1,176	1,123	1,132	-8	-1%	9
Haynesville	35	36	37	37	37	37	37	37	37	37	37	37	3	9%	0
Niobrara	627	630	632	649	648	640	653	662	675	669	665	667	57	9%	2
Permian	5,131	5,232	5,367	5,329	5,347	5,403	5,460	5,542	5,605	5,652	5,596	5,622	567	11%	26
Total	8,619	8,758	8,932	8,908	8,983	9,002	9,100	9,224	9,299	9,282	9,146	9,214	697	8%	68

Source: EIA Drilling Productivity Report

Figure 17: MoM Change – Major Shale/Tight Oil Production



Source: EIA Drilling Productivity Report

Oil – EIA DUC's marginal increases in February

DUCs up slightly in Feb

We have been warning that we see a key risk to how much US oil production can sustainably grow in 2023 and beyond is the need to increase rig counts (not have less frac spreads) to replenish the inventory of Drilled Uncompleted wells at higher levels and the challenge for oilfield services to add capacity to increase frac spreads and completions. In our Dec 18, 2022, Energy Tidbits memo, we noted how DUCs in the Permian are really about the same level as five years ago when Permian production was about half current levels. The biggest problem in the past with the EIA's Drilling Productivity Report [LINK] estimate of Drilled Uncompleted wells was that the data had been constantly revised and sometimes significantly. (i) On the potential plus side over the future years is that DUCs do not account for potential refracs ie. an added source of future fracs. (ii) However, in the coming years, we worry that there are more lesser than expected DUCs that are lower quality. See the following item on this post Chevron's less than expected productivity in its 2022 Permian Delaware Basin wells. The Chevron issue is separate from the issue that there are a portion of the DUCs that will never be completed as there are drilled wells that don't look like they can justify the higher cost of frack/completion. (iii) However, the DUC estimates provide a clear picture of the trend that DUCs haven't really increased since Feb 2022. It's why there is the need for drilling rigs to pick up to replenish the DUC inventory if the US is to have strong oil growth in 2023. We highlight a slight increase in the Feb data. (iv) (ii) Drilled Uncompleted Wells are up +21 MoM (+386 YoY) in February to 4,773 DUCs, which compares to 4,387 DUCs in Feb 2022. Note that Jan's data was revised up +81 to 4,752 from 4,671. (vi) But at 4,773 DUCs, it means that a total 4,101 DUCs were worked down since the Jun/20 peak of

8,874. The largest work downs are coming from the Permian (-336 YoY) and Eagle Ford (-227 YoY). With DUCs being worked down so significantly we will need to see rig counts go up to replenish DUCs in the near future. (vii) Note that shale/tight oil is approx. ~70% of total US production, so whatever the trends are for shale/tight oil are normally the trends for US oil in total. Below is our table of running DPR estimates of shale/tight oil production and our graph of MoM changes in major shale/tight oil production. Our Supplemental Documents package includes the EIA DPR.

Figure 18: EIA - Estimated Drilled Uncompleted Wells

Drilled UnCompleted	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Feb YoY %	Feb YoY
Anadarko	753	740	724	727	723	716	722	723	710	712	722	732	736	-2%	-17
Appalachia	473	471	497	526	524	529	562	576	597	620	631	662	663	40%	190
Bakken	426	426	429	425	427	426	474	494	501	528	552	579	580	36%	154
Eagle Ford	653	642	612	598	611	620	593	582	561	517	482	434	426	-35%	-227
Haynesville	371	395	419	441	466	483	513	535	558	595	624	662	673	81%	302
Niobrara	331	317	320	310	328	345	362	393	443	497	539	641	651	97%	320
Permian	1,380	1,302	1,294	1,244	1,218	1,180	1,117	1,097	1,051	1,068	1,079	1,042	1,044	-24%	-336
Total	4,387	4,293	4,295	4,271	4,297	4,299	4,343	4,400	4,421	4,537	4,629	4,752	4,773	9%	386

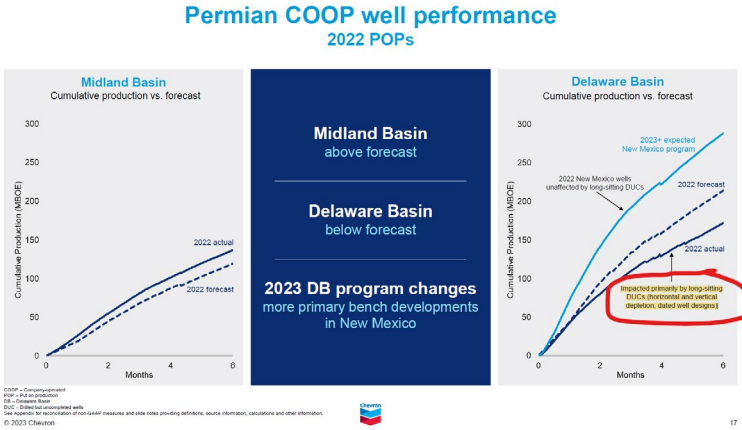
Source: EIA, SAF

What % of DUCs will disappoint like Chevron 2018/19 Permian DUCs did in2022

Here is what we wrote in our *March 5, 2023 Energy Tidbits memo on Chevron's DUCs issue in the Permian. "How can US shale oil growth not be less than expected, or certainly way more costly than expected, if the existing inventory of US DUCs (Drilled UnCompleted wells) not only includes wells that are likely to never be completed and also wells that are completed that will deliver significantly less than expected productivity? Maybe industry can make up for these lesser quality older DUCs, but that means growth will be more expensive as more wells will be needed. (i) On Thurs, we tweeted [LINK] "US shale #Oil growth less than expected? 1. Some DUCs were crappy wells & can't justify $MM for fracking. 2. Some older DUCs will deliver less results. See 👇$CVX Delaware underperformance driven by older 2018/19 DUCs completed in 2022. Surely this isn't unique to CVX. #OOTT." (ii) We have noted many times our view that there will be a percentage of DUCs that will never be completed. These are wells that were drilled that didn't find enough potential to justify the cost to frack and complete the well. (iii) Prior to Chevron's statements, we have not put a separate bucket of DUCs that, if and when completed, would be expected to deliver significantly less than expected productivity. (iv) It's hard to believe Chevron is unique and that other producers won't have some degree of similar impact as Chevron saying that it's older (2018/2019) DUCs delivering less than expected results are the reason why Chevron's overall 2022 Permian wells had lower productivity than planned. Because unless this older 2018/2019 DUCs underperformance was unique to Chevron, it points to US shale growth being less than expected. Chevron included the below graph that showed its less expected Permian well productivity in 2022 was due to a big miss on the Delaware wells, whereas the Midland beat expectations. Chevron graph blamed the significant Delaware underperformance on "Impacted primarily by long-sitting DUCs (horizontal and vertical depletion, dated well designs)". And then in the Q&A, Chevron said "And I want to point to the basis of design, because these -- the vintage of these wells where many of them were drilled in 2018 and 2019. They built a long inventory of DUCs into 2020, and it was only during 2022 that most of that DUC inventory got*

worked off." (v) So unless Chevron's significant underperformance of its 2018/2019 DUCs is unique to Chevron, it has to raise the question on what percentage of industry DUCs are likely to deliver significantly less than expected productivity. (vi) Please note this doesn't necessarily

Figure 19: EIA Form 914 US Oil Production



Source: Chevron

Plus CVX says more single and not multi bench development in the Delaware

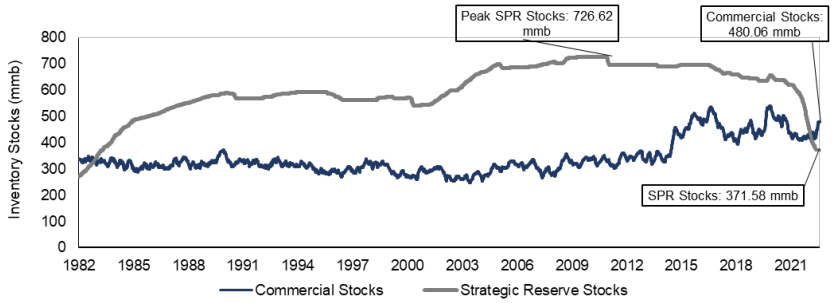
Here is what we wrote in our March 5, 2023 Energy Tidbits memo on Chevron's other change in Permian Delaware oil drilling. "*Please note that having some percentage of less quality DUCs doesn't mean growth can't be achieved as producers can compensate by spending more and drilling more wells. Similarly, producers can compensate for developing less multi-bench areas in the Delaware developing more single bench areas. It will just cost more. One other Chevron investor day disclosure was CEO Wirth responding "We learn every year in the Permian. It's a great big basin. It's multiple basins. You have the Midland and the Delaware, and then you've got sub-basins within each of those. And there is not one game plan that applies everywhere. It's not a homogeneous geologic setting. There's a lot of heterogeneity. And where single bench may work in one area better than multiple bench, there's other areas where the reverse is the case." CEO Wirth didn't say specifically there will be less multi-bench development in the Delaware Basin, but that seemed to be the inference.*

Oil – US SPR reserves now -108.484 mmb lower than commercial crude oil reserves

US SPR reserves

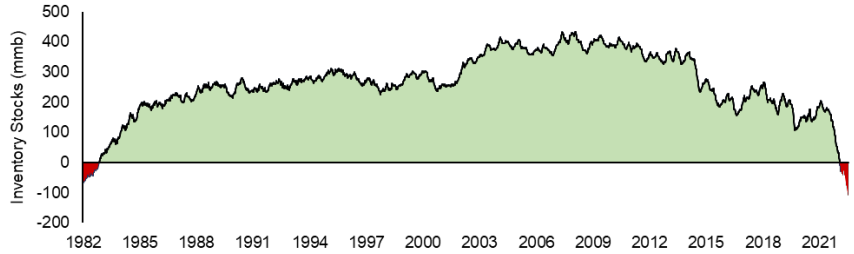
Oil in US Strategic Petroleum Reserves (SPR) moved below total US commercial crude oil reserves in the Sept 16 week for the first time since 1983, with the deficit widening this week due to the build in commercial oil stocks. The EIA's new weekly oil data for Mar 10 has SPR reserves at 371.6 mmb vs commercial crude oil reserves at 480.1 mmb. The last time the SPR was down at this level was in Dec 1983 at 371.3 mmb. The below graphs highlight the difference between commercial and SPR stockpiles.

Figure 20: US Oil Inventories: Commercial & SPR



Source: EIA

Figure 21: US Oil Inventories: SPR less commercial



Source: EIA

Oil – Reminder US SPR going 26 mmb lower over the coming months

SPR going 26 mmb lower

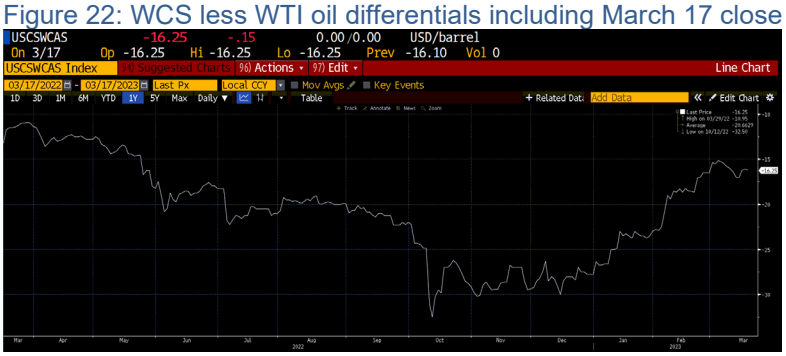
Here is what we wrote in our Feb 19, 2023 Energy Tidbits memo. "*On Monday, Bloomberg reported "The Biden administration plans to sell more crude oil from the Strategic Petroleum Reserve, fulfilling budget directives mandated years ago that it had sought to stop as oil prices have stabilized. The congressionally mandated sale will amount to 26 million barrels of crude, according to people familiar with the matter. The sale is in accordance with a budget mandate enacted in 2015 for the current fiscal year, said a spokesperson for the Department of Energy. The Energy Department has sought to stop some of the sales required by 2015 legislation so that it can refill the emergency reserve, which currently has about 371 million barrels. After this latest release, the reserve will dip to about 345 million." The last time the SPR was 345 mmb was in Aug 1983 at 345.7 mmb.*

Oil – Cdn oil differentials down $0.15 to close at $16.25 on March 17

WCS less WTI differentials

This is normally a normal seasonal narrowing of Cdn oil differentials every spring, and the WCS-WTI differentials have narrowed significantly in the last two months. But this week, the WCS-WTI differentials ended up basically unchanged on the week. The differentials closed 2022 at $27.75, narrowed to $23.00 on Jan 31, and dropped to $18.50 a month ago on Feb 17 and closed at $16.50 on Feb 28. Differentials have bounced up and down in Feb. This week, it narrowed by $0;.15 to close at $16.25 on March 17i. For perspective, a year ago, the WCS-WTI differential was $13.25 on March 17, 2022. Below is Bloomberg's current WCS–WTI differential as of March 17, 2023 close.

Figure 22: WCS less WTI oil differentials including March 17 close



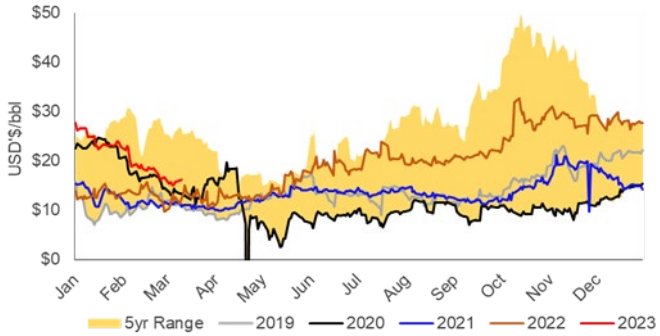
Source: Bloomberg

Oil – This is the normal season narrowing of Cdn heavy oil differentials

Unfortunately, there are often items like Keystone pipeline outage that impact Cdn heavy oil differentials. And the huge item are releases of mostly medium oil out of the SPR. It's not just unplanned events, but there are many items that impact Cdn heavy oil differentials, but we remind that we are in the time of the year that normally sees Cdn heavy oil differentials narrow. This is the time of year, when refineries tend to maximize production of asphalt ahead of the annual summer paving season. As is said in Canada, there are two seasons in Canada – winter and paving season. Below is graph showing WCS-WTI differentials that shows this normal seasonal trend of narrowing WCS-WTI differentials from Feb thru May.

WCS differentials normally narrow in spring

Figure 23: WCS less WTI oil differentials



Source: Bloomberg

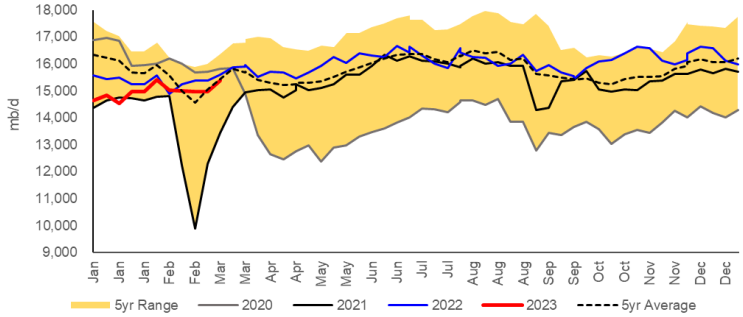
Oil – Refinery inputs up +0.431 mmb/d WoW to 15.398 mmb/d

Following last week's decline, refinery crude oil inputs increased this week. There are always unplanned refinery issues, but we remind Feb/early March is normally when we see refineries move into turnaround/maintenance i.e., crude oil inputs seasonally decline as refineries switch to produce more summer blend fuels. And normally, refineries come out of turnarounds in late March/early April to start their ramp up in refining of summer blend fuels. On Wednesday, the EIA released its estimated crude oil input to refinery data for the week ended Mar 10. The EIA reported crude oil inputs to refineries were up +0.431 mmb/d this

Refiners switching to summer fuel blends

week to 15.398 mmb/d and are down -0.203 mmb/d YoY from 15.601 mmb/d for the week ended Mar 11, 2022. This week's refinery utilization was up to 88.2%, which is +2.2% WoW and -2.2% YoY. Total products supplied (i.e., demand) increased WoW, up +0.064 mmb/d to 19.113 mmb/d, and Motor gasoline was up +0.032 mmb/d to 8.594 mmb/d from 8.562 mmb/d last week. The 4-week average for Motor Gasoline was down -0.033 mmb/d YoY to 8.794 mmb/d. The 4-week average of Total demand was down -1.346 mmb/d YoY to 19.698 mmb/d.

Figure 24: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA

Oil – Exxon adds +250,000 b/d of capacity with $2B Beaumont refinery expansion

Exxon's 250,000 b/d Beaumont refinery expansion

There may have been a historic event in the oil industry with what most believe will be the last major new refinery expansion or new refinery in the US. On Thursday, ExxonMobil announced the completion of its Beaumont refinery expansion, increasing capacity by +250,000 b/d to a total of ~620,000 b/d [LINK]. This was the largest US refinery expansion seen since 2012 and makes Beaumont facility one of the largest refineries in the US, with total capacity falling just short of Saudi Aramco's Port Arthur refinery capacity of 626,000 b/d. The significant increase in capacity will help Exxon meet growing global demand for energy with strategic advantages being underpinned by the Beaumont refinery's connection to a network of crude pipelines from the Permian and Delaware basins. Karen Mckee, Exxon's President of Product Solutions commented, "*ExxonMobil maintained its commitment to the Beaumont expansion even through the lows of the pandemic, knowing consumer demand would return and new capacity would be critical in the post-pandemic economic recovery… The new crude unit enables us to produce even more transportation fuels at a time when demand is surging. This expansion is the equivalent of a medium-sized refinery and is a key part of our plans to provide society with reliable, affordable energy products."* Our Supplemental documents package includes the press release.

Figure 25: US Top 10 Refineries by Operable Capacity

Rank	Corporation	Company	State	Site	Barrels per calendar day
1	Saudi Aramco	Motiva Enterprises LLC	Texas	Port Arthur	626,000
2	Marathon Petroleum Corp	Marathon Petroleum Co LP	Texas	Galveston Bay	593,000
3	Marathon Petroleum Corp	Marathon Petroleum Co LP	Louisiana	Garyville	585,000
4	ExxonMobil Corp	ExxonMobil Refining and Supply Co	Texas	Baytown	560,500
5	ExxonMobil Corp	ExxonMobil Refining and Supply Co	Louisiana	Baton Rouge	520,000
6	BP PLC	BP Products North America Inc	Indiana	Whiting	435,000
7	PDV America Inc	Citgo Petroleum Corp	Louisiana	Lake Charles	418,000
8	ExxonMobil Corp	ExxonMobil Refining and Supply Co	Texas	Beaumont	369,024
9	Marathon Petroleum Corp	Tesoro Refining and Marketing Co	California	Carson	363,000
10	Chevron Corp	Chevron USA Inc	Mississippi	Pascagoula	356,440

Source: EIA

Oil – US "net" oil imports down -1.72 mmb/d WoW to 1.189 mmb/d

US net oil imports

US "NET" imports were down -1.72 mmb/d to 1.189 mmb/d for the Mar 10 week. US imports were down -0.055 mmb/d to 6.216 mmb/d. US exports were up +1.665 mmb/d to 5.027 mmb/d. The WoW decrease in US oil imports was driven mostly by Top 10 with a decrease of -0.352 mmb/d. Some items to note on the by country data. (i) Canada was down this week -0.409 mmb/d to 3.371 mmb/d. (ii) Saudi Arabia was down -0.091 mmb/d to 0.385 mmb/d. (iii) Colombia was up +0.072 mmb/d to 0.294 mmb/d. (iv) Ecuador was down -0.009 mmb/d to 0.046 mmb/d. (v) Iraq was up +0.081 mmb/d to 0.346 mmb/d. (vi) Mexico was up +0.077 mmb/d to 0.633 mmb/d.

Figure 26: US Weekly Preliminary Oil Imports by Major Countries

(thousand b/d)	Dec 23/22	Dec 30/22	Jan 6/23	Jan 13/23	Jan 20/23	Jan 27/23	Feb 3/23	Feb 10/23	Feb 17/23	Feb 24/23	Mar 3/23	Mar 10/23	WoW
Canada	3,504	2,949	3,737	3,707	3,419	3,587	3,856	3,556	3,197	3,605	3,780	3,371	-409
Saudi Arabia	473	479	464	453	433	640	384	262	545	310	476	385	-91
Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	581	428	668	909	511	758	913	690	683	725	556	633	77
Colombia	353	357	246	245	244	216	70	143	284	143	222	294	72
Iraq	289	354	150	201	195	469	230	322	251	290	265	346	81
Ecuador	274	87	137	0	69	243	207	156	145	97	55	46	-9
Nigeria	66	141	143	211	114	317	248	75	256	98	243	170	-73
Kuwait	0	0	0	0	0	0	0	0	0	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0	0	0	0
Top 10	5,540	4,795	5,545	5,726	4,985	6,230	5,908	5,204	5,361	5,268	5,597	5,245	-352
Others	712	917	805	1,135	920	1,053	1,150	1,028	965	940	674	971	297
Total US	6,252	5,712	6,350	6,861	5,905	7,283	7,058	6,232	6,326	6,208	6,271	6,216	-55

Source: EIA

Oil – Eni offshore Mexico oil discovery is part of potential cluster development

Eni offshore Mexico oil discovery

It looks like positive news for Mexico oil production in the back half of the 2020s with Eni's new offshore oil discovery "*contributing to the potential synergistic cluster development of several prospects located nearby*." On Friday, Eni announced [LINK] "*a new discovery on the Yatzil exploration prospect in Block 7, located in the mid-deep water of the Cuenca Salina in the Sureste Basin, offshore Mexico. According to preliminary estimates, the new finding may contain around 200 million barrels of oil (MBoe) in place. Yatzil-1 EXP is the second*

commitment well of Block 7 and the eight successful one drilled by Eni in the Sureste Basin. It is located approximately 65 kilometers off the coast, and 25-30 km away from other discoveries. The well was drilled by the Valaris DPS5 Semisub rig in a water depth of 284 meters and reached a total depth of 2,441 meters. Yatzil-1 EXP found in excess of 40 meters of net pay sands with good quality oil in the Upper Miocene sequences with excellent petrophysical properties confirmed by an extensive subsurface data collection." We wouldn't have noted an individual discovery of this size (200 million barrels of oil "in place") if Eni hadn't indicated that this is part of a potential cluster development. Eni wrote "*The successful result comes after the Saasken and Sayulita discoveries in Block 10 and confirms the value of Eni's Mexican asset portfolio, contributing to the potential synergic cluster development of several prospects located nearby."* One other item to note is that are not deepwater Gulf of Mexico close to the US offshore border, rather they are in the southern part of the Gulf of Mexico, which is the general area of all major Mexico offshore oil development. Our Supplemental Documents package includes the Eni release.

Figure 27: Eni Block 7 offshore Mexico

Source: Eni Fact Book 2021 - Annex

Oil – Colombia says "*but it's not new [Oil exploration] contracts ever*"

Colombia on oil exploration

It looks like the we are seeing the latest step in Colombia President Petro may be having a bit of a reality check on his promise to stop oil and gas exploration. He is realizing his campaign promise isn't going to work now that he is in government. It's like anything else, the politicians know they are better off to break a campaign promise than to fulfill the promise if they realize doing so will cause them to be directly blamed for an economic issue. (i) We could not find any lengthier reporting but, on Thursday, Bloomberg reported "*Deputy Energy Minister*

*Cristian Andres Diaz speaks on a panel at a conference in Cartagena. * There won't be new contracts "for now," Diaz says, "but it's not no new contracts ever" * Government focusing on existing contracts * "It could be that the conclusion of a profound analysis to see if Colombia will meet its goals in 2030, 2050 is that the current contracts are not enough".* (ii) Our Nov 27, 2023 noted this Petro backtracking. We then *wrote "Oil – Colombia signals a go slow or rethink on stopping oil and gas exploration. No one should be surprised to see the reports that Colombia may be on a go-slow path on new President Petro's campaign promise to stop oil and gas exploration. It's a reality check that Petro realizes he needs to have a strong Colombia financial position to be able to try to move on his green aspirations. Like other pro-climate change leaders, we do not expect him to abandon his aspirations to cut out oil and gas, but he will be forced to go slow or some effective indefinite pause. Last Sunday, FT reported [LINK] "Colombia signals rethink on pledge to curb oil and gas exploration". FT wrote "Colombia's leftist government has signalled it could row back on its pledge to halt new oil and gas exploration projects, saying it would first examine existing contracts as part of an overhaul of its fossil fuel industry. Gustavo Petro, a former guerrilla fighter who took office as president in August, made the promise during his election campaign. But finance minister José Antonio Ocampo said in an interview that the government would analyse the 180 contracts before deciding whether to fulfil the pledge. "Then we will see if new contracts are necessary," he said. Any energy transition that reduced exports "would have to be gradual" and prioritise gas self-sufficiency, Ocampo added."*

Oil – OPEC MOMR: Slightly negative, oil stocks continue to go lower

OPEC Monthly Oil Market Report

On Tuesday, OPEC released its Monthly Oil Market Report at ~6:15 am MT. (i) We thought the overall takeaway from the OPEC MOMR for Mar was slightly negative. Oil demand growth doesn't come until Q3 and the near term markets uncertainty will keep oil in a "show me" state. Plus the surplus of crude oil stocks continues to decrease. (ii) 2022 average demand was increased to 99.58 mmb/d (was 99.55) driven by an increase to the 2021 starting point but 2022 YoY growth was revised down to 2.50 mmb/d. At 99.58 mmb/d, 2022 demand was -0.69 mmb/d vs pre-Covid of 100.27 mmb/d (was -0.72). (iii) 2023 average demand was increased to 101.90 mmb/d (was 101.87) due to a higher starting point being carried forward. OPEC's 2023 demand changes by quarter: Q1/23 now 101.28 mmb/d (was 101.26). Q2/23 now 100.77 mmb/d (was 100.70). Q3/23 now 102.14 mmb/d (was 101.99). Q4/23 demand now 103.39 mmb/d (was 103.51). This means 2023 YoY growth remains at +2.32 mmb/d while 2022 was revised down to +2.50 mmb/d from +2.54 mmb/d. (iv) China demand. The MOMR increased expectations for China oil demand as it continues to move away from Covid restrictions with slight upward revisions in OPEC's 2023 forecasts. China's demand forecast now reflects a full year average of 15.56 mmb/d, up from 15.40 mmb/d. Q1/23 now 15.23 mmb/d (was 15.10). Q2/23 now 15.40 mmb/d (was 15,22). Q3/23 now 15.43 mmb/d (was 15.25). Q4/23 now 16.16 mmb/d (was 16.03). (v) non-OPEC supply. Immaterial increases to YoY growth for 2022 due to a higher starting point, now +1.86 mmb/d YoY to 65.76 mmb/d (was +1.89 mmb/d YoY to 65.57 mmb/d). For 2023, YoY growth was unchanged at +1.44 mmb/d YoY to 67.20 mmb/d (was +1.44 mmb/d YoY to 67.01 mmb/d), but 67.20 mmb/d is up due to the higher starting point. Note that 2023 growth is inclusive of NGLs. For 2023 US tight/shale oil supply, OPEC reduced YoY growth to +0.72 mmb/d to 8.49 mmb/d (was +0.75 mmb/d to 8.61 mmb/d). In Mar's MOMR, they wrote *"US liquids production in 2023, excluding processing gains, is forecast to expand y-o-y by 1.1 mb/d to average 20.3 mb/d, revised down by 38 tb/d from the previous assessment, due to lower*

output expectation in 1Q23 and lower-than-expected upstream activities in this period. Greater drilling activity and fewer supply chain/logistical issues in the prolific Permian, Eagle Ford and Bakken shale sites are still assumed for 2023. Given a sound level of oil field drilling and well completions, crude oil output is anticipated to increase by 0.7 mb/d y-o-y to average 12.6 mb/d. Average tight crude output in 2023 is forecast at 8.5 mb/d, up by 0.7 mb/d y-o-y." (vi) OPEC Secondary Sources for Feb was up +117,000 b/d MoM to 28.924 mmb/d. For OPEC10 (the countries in the quota), Feb production was up +80,000 b/d MoM to 24.489 mmb/d vs. 24.409 mmb/d in Jan. (vii) Direct Communications (what the OPEC countries report). There were a few items to note vs what countries reported directly vs Secondary Sources estimates: Libya and Iraq did not provide direct communications estimate for Feb; Venezuela says it produced 704,000 b/d in Feb, in-line with the 700,000 b/d reported by Secondary Sources; Nigeria says it produced 1.306 mmb/d vs Secondary Sources of 1.380 mmb/d. Our Supplemental Documents package includes excerpts from the Mar OPEC MOMR.

Oil – IEA OMR, short term bearish, bullish in H2/23 with record oil demand

IEA Oil Market Report

On Wednesday, the IEA released its monthly Oil Market Report for Feb at 3am MT. They only release very limited public info, but Bloomberg provided detailed tables and added color from the report. So big thanks, as usual, to the Bloomberg team. (i) The OMR is short term bearish with surplus oil stocks in H1/23, but then bullish in H2/23 as oil strongly grows to record levels. The IEA forecasts another new record oil demand in 2023 and with huge YoY oil demand momentum to exit 2023. (ii) The IEA is known as an oil demand bear who seems to reluctantly increase its oil demand forecasts. It did so again this month. We tweeted *[LINK] "Buckle up! @IEA OMR. Yes Oil surplus in Q1 BUT #Oil swings into deficit in H2... demand hits record levels… set to surge by 3.2 mb/d from 1Q23 to 4Q23... matching that increase would be a challenge even if Russia were able to maintain production at pre-war levels. #OOTT."* Oil demand YoY growth for 2023 revised up and is now +2.0 mmb/d YoY to another new record 102.0 mmb/d (101.9 previously but there were rounding items last month). (iii) The IEA sees oil markets moving from a surplus in H1 to a deficit in H2. The IEA wrote, "*Following an 80 kb/d contraction in 4Q22, world oil demand growth is set to accelerate sharply over the course of 2023, from 710 kb/d in 1Q23 to 2.6 mb/d in 4Q23. Average annual growth is forecast to ease from 2.3 mb/d in 2022 to 2 mb/d, and global oil demand to reach a record 102 mb/d. Rebounding air traffic and the release of pent-up Chinese demand dominate the recovery."* This makes sense as the normal seasonal pattern for oil demand is Q1 of every year (peak of winter) is normally down QoQ vs Q4 of the prior year. Then oil demand normally increases a little bit QoQ in Q2, before the bigger increases in Q3 (peak of summer consumption) and another increase in Q4. The IEA forecasts Q4/22 oil demand at 100.8 mmb/d, but then forecasts quarterly 2023 oil demand of: 100.1 mmb/d in Q1/23, 101.1 mmb/d in Q2/23, 102.9 mmb/d in Q3/23 and 103.5 in Q4/23. (iv) No signs of oil demand growth slowing down to leave 2023. IEA's Q4/23 demand forecast of 103.5 mmb/d is +0.6 mmb/d QoQ and +2.7 mmb/d YoY. (v) On Russia, IEA highlights that while oil production is holding up well, exports are not. The IEA writes "*While Russian oil production remained near pre-war levels in February, Russia's exports to world markets fell by more than 500 kb/d to 7.5 mb/d. Over the past year, 4.5 mb/d of Russian oil previously going to the EU, North America and OECD Asia Oceania has had to find alternative outlets. Willing buyers in Asia, namely India and, to a lesser extent, China, have snapped up discounted crude oil cargoes, but increasing volumes on the water suggest the share of Russian oil in their import mix may*

be getting too big for comfort. Russia accounted for around 40% and 20% of Indian and Chinese crude imports, respectively, in February. The two countries took in more than 70% of Russia's crude exports last month." (vi) This month, the IEA did not provide any commentary on how OECD oil and products stocks compared to the 5-yr average. But the message is clear – oil stock shave been building and will continue to build in the first part of 2023 before flipping to a deficit in H2/23. However, last month the IEA estimated the deficit of OECD industry stocks narrowed at Dec 31 vs Nov 30. The Feb OMR estimates Dec 31 OECD stocks at 95.7 mmb below the 5-yr average, vs Jan OMR that had Nov 30 OECD stocks at 125.9 mmb below the 5-yr average. (vii) Mar OMR 2023 non-OPEC YoY growth is increased by +1.2 mmb/d YoY to 66.9 mmb/d (was +0.9 mmb/d to 66.6) but note the big increase MoM was driven by FSU (Russia and other countries that were former Soviet Union) that was increased to 13.3 mmb/d (was 13.0 mmb/d) in 2023. Our Supplemental documents package includes the IEA release and the Bloomberg reports.

Figure 28: IEA Global Demand Forecast by OMR Report Month

mmb/d	2020	2021	21-20	Q1/22	Q2/22	Q3/22	Q4/22	2022	22-21	Q1/23	Q2/23	Q3/23	Q4/23	2023	23-22
Mar 23	91.0	97.7	6.7	99.6	98.8	100.8	100.8	100.0	2.3	100.3	101.3	103.0	103.5	102.0	2.0
Feb 23	91.0	97.7	6.7	99.5	98.7	100.7	100.8	100.0	2.3	100.1	101.1	102.9	103.5	101.9	1.9
Jan 23	91.0	97.7	6.7	99.5	98.7	100.7	100.5	99.9	2.2	99.6	100.8	102.9	103.5	101.7	1.8
Dec 22	91.0	97.7	6.7	99.5	98.7	100.7	100.8	99.9	2.2	99.7	100.6	102.7	103.4	101.6	1.7
Nov 22	91.0	97.7	6.7	99.4	98.7	100.3	100.7	99.8	2.1	99.6	100.5	102.3	103.0	101.4	1.6
Oct 22	91.0	97.7	6.7	99.4	98.5	100.0	100.6	99.6	1.9	99.5	100.4	102.1	102.9	101.3	1.7
Sep 22	91.0	97.7	6.7	99.5	98.4	99.9	100.9	99.7	2.0	100.2	101.0	102.6	103.3	101.8	2.1
Aug-22	91.0	97.6	6.6	99.4	98.5	100.0	100.8	99.7	2.1	100.3	101.1	102.5	103.3	101.8	2.1
July 22	91.0	97.5	6.5	99.3	97.8	99.4	100.2	99.2	1.7	99.8	100.8	102.0	102.7	101.3	2.1
June 22	91.0	97.5	6.5	99.3	98.2	99.8	100.4	99.4	1.9	100.5	101.1	101.9	102.7	101.6	2.2
May 22	91.0	97.5	6.5	98.8	98.2	100.0	100.4	99.4	1.9						
Apr 22	91.0	97.5	6.5	98.5	98.3	100.1	100.5	99.4	1.9						
Mar 22	91.0	97.5	6.5	99.0	98.8	100.2	100.6	99.6	2.1						
Feb 22	91.0	97.4	6.4	98.9	100.1	101.7	101.6	100.6	3.2						
Jan 22	91.0	96.4	5.4	97.8	99.3	100.9	100.8	99.7	3.3						
Dec 21	91.0	96.2	5.2	97.9	99.1	100.8	100.3	99.5	3.3						

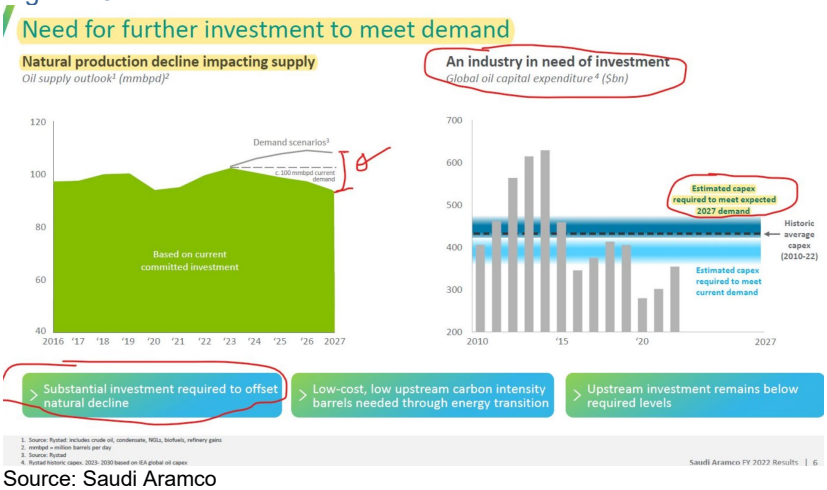
Source: IEA, SAF

Oil – Aramco CEO "*risks of underinvestment in our industry are real*"

Aramco bullish for energy

Last week's (March 12, 2023) Energy Tidbits memo was titled "*Saudi Aramco CEO "Risks of Underinvestment in our Industry are Real – Including Contributing to Higher Energy Prices*" based on quotes from the breaking news that morning of the Saud Aramco Q4 results. At that time, Saud Aramco had not held its Q4 call or posted the slides for the call, which were released on Monday. But CEO Nasser had a stark warning that the "*Given that we anticipate oil and gas will remain essential for the foreseeable future, the risks of underinvestment in our industry are real — including contributing to higher energy prices".* There weren't more significant comments on underinvestment on the Q4 call. On Monday, we tweeted [LINK] "*Risks of underinvestment in our industry are real", #Aramco reminds mid/long-term #Oil supply fundamentals - need capex to offset existing fields declines to meet today's demand & then any future demand growth. #Oil looks good for 2020s unless demand peaked in 2019. #OOTT."* Aramco reminds of another key oil fundamental – the existing global oil production base declines and that new production has to be added each year just stay flat. Below is the slide from the Aramco Q4 call slide deck.

Figure 29: "Need for further investment to meet demand"

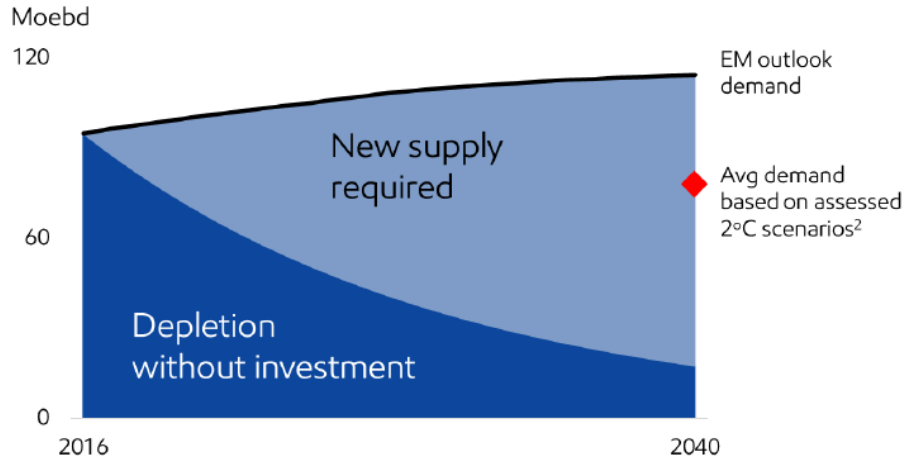


Source: Saudi Aramco

Exxon was warning on global oil declines well before Covid

The Saudi Aramco reminder of the need to replace global oil declines reminded of something we highlighted four years ago – it was Exxon warning on global oil declines in June 2019, which was the reason for our SAF Group June 19, 2019 blog "*Exxon's Math Calls For Overall Global Oil Decline Rate Of ~7%, A Very Bullish Argument For Post 2020 Oil Prices*" [LINK]. Exxon presented at a sellside conference that week and then thought Exxon presented a very bullish argument for oil prices beyond 2020 which was overlooked because most readers only flip thru a slide deck and don't listen to or read transcripts of management's spoken words. Exxon's spoken words highlighted one of the forgotten (and perhaps most important) oil supply/demand concerns for post 2020 – the mid term challenge to replace increasing rate of overall global oil declines. And what was eye opening was Exxon's estimated overall global oil decline rate, which is way higher than any we could then ever remember seeing. Our blog said *"Its impossible to tell from the small oil supply/demand graph in the slide deck, but Exxon's spoken words says long term oil demand is 0.7% per year and then "When you factor in depletion rates, the need for new oil grows at close to 8% per year and new gas at close to 6% per year." Exxon may not specifically say what the global decline rate is, but their math is that the world needs new oil supply to grow annually at close to 8% to meet the 0.7% annual increase in oil demand and offset declines ie. an overall global decline rate of approx. 7%. This is an overall global oil decline rate for OPEC and non-OPEC".* At that time in 2019, BP's estimate of overall global oil decline rate is 4.5% and we expect most are probably assuming something around 5%, certainly not above 6%. No one should be surprised by the increased decline rate given that high decline US shale and tight oil have increased by ~2.5 mmb/d in the last ~2 years. But an implied ~7% overall global oil decline rate is way higher than expectations. There is a big difference between needing to offset oil declines of ~7 mmb/d vs declines of ~4.5 mmb/d ie. an additional 2.5 mmb/d of new oil supply every year. Even if the implied difference was to 6%, it would still be an additional 1.5 mmb/d of new oil supply and that would also be very bullish for post 2020 oil. At that time, we said we recognized that the 2019/2020 oil supply demand story is the need for OPEC+ to keep cuts thru 2020, but Exxon's math implying ~7% overall global oil decline rate sets up a very bullish view for oil post 2020. We believe the reality to replace oil declines post 2020 is overlooked. Our Supplemental Documents package includes June 19, 2019 blog.

Figure 30: Exxon Estimated Oil Supply/Demand, June 2019 slide deck



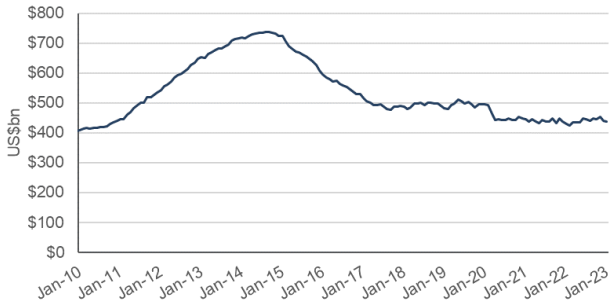
Source: ExxonMobil June 2019

Oil – Saudi nest egg, small decrease in net foreign assets in January

Saudi net foreign assets

We continue to believe the #1 financial theme for Saudi Arabia in the 2020s will be their continued, and likely increasing, use of Other People's Money as they try to transition their country to MBS's Vision 2030. We believe this has been obvious with how Saudi Arabia's net foreign assets dropped by about $300 billion over seven years. We are surprised that markets and oil watchers didn't seem to pay attention to the Saudi net foreign assets data i.e., what we call their nest egg to help them thru the Energy Transition. Above $100 oil last year helped arrest the decline in the Saudi nest egg. But Saudi net foreign assets have dropped by $299.4b in the last 8 years, from is peak of $737.0b on Aug 31, 2014, to $437.6b on Jan 31, 2023. That is an average of $3.1b per month for the last 8 years. Oil prices increased slightly throughout January with Brent crude averaging ~$84 for the month, compared to ~$81 in December. Saudi Arabia's net foreign assets on January 31 were down -$1.91b MoM to $437.6b vs $439.5b in December and $451.8b in November. Saudi Arabia is far from going broke but there has been a huge decline in the last 8 years, but it is still a very big nest egg. This net foreign asset depletion is why we have been highlighting that the primary financial theme for Saudi Arabia in the 2020s is getting Other People's Money (OPM) to fund as much of their Vision 2030 as possible. And no question, accessing OPM has helped to slow down and temporarily pause the decline in net foreign assets. Saudi Arabia's central bank (SAMA) doesn't provide explanations for the monthly swings. Over $100 oil last year helped Saudi net foreign assets on January 31 of $437.6 being up +$9.4b YoY from $429.4b on January 31, 2022. Below is our graph of Saudi Arabia net foreign assets updated for the January 31 data.

Figure 31: Saudi Arabia Net Foreign Assets



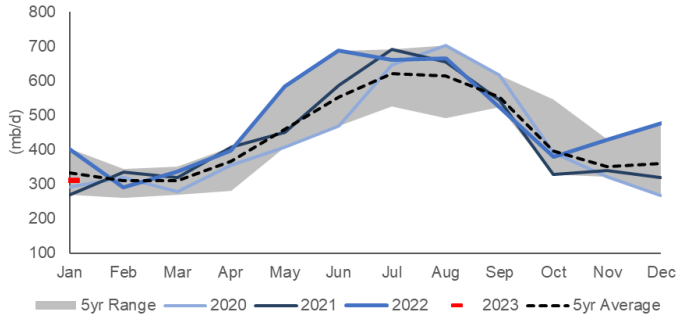
Source: Bloomberg

Oil – Saudi use of oil for electricity declined during cold Jan i.e., more oil for export

Saudi to have more oil for export

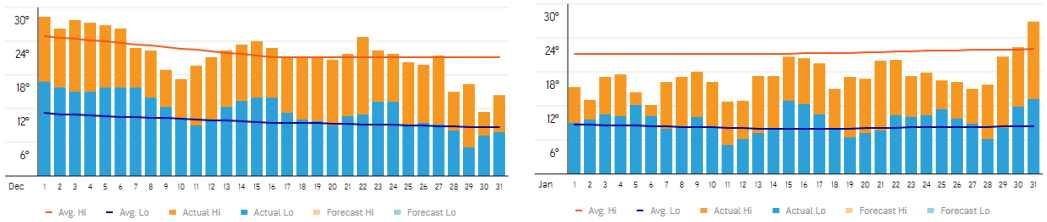
The key theme for the winter months is that Saudi will be able to export more oil as it uses less oil for electricity vs the summer months. A reminder a normal peak to trough decline is ~400,000 b/d. If there is less oil used for electricity, then there is more oil for export. There is one additional wildcard that isn't in the JODI data but could lead to more Saudi oil for export - the JODI data doesn't include how much fuel oil Saudi imports. The JODI data for Saudi Arabia oil supply and demand for January was updated on Monday. Saudi used less oil for electricity in January vs December. This is attributed to the slightly lower than average temperatures experienced throughout January. January saw varying temperatures that were close to the lower average range for most of the month. It is important to note that January experienced colder temperatures than December and colder means less air conditioning/electricity demand. January was 312,000 b/d (vs January 2022 of 402,000 b/d) and December was 477,000 b/d (vs December 2021 of 318,000 b/d). Below are the AccuWeather Temp maps for Riyadh for December and January. Careful they are different scales but look for oil used toward electricity to increase as we move closer to peak cooling season.

Figure 32: Saudi Arabia Direct Use of Crude Oil for Electric Generation



Source: JODI

Figure 33: Riyadh Temperature Recaps for December and January



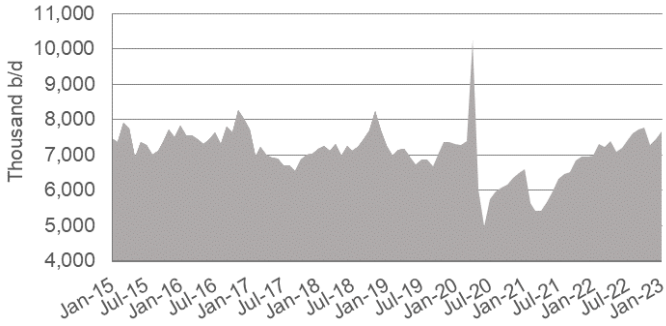
Source: AccuWeather

Oil – Saudi oil exports up +221,000 b/d to 7.658 mmb/d in January

Saudi oil export data for Jan

This month's JODI data is a good illustration on how Saudi Arabia can export more oil without increasing its production by using less for electricity and refining less, which is in part driven by Saudi importing Russian fuel oil and diesel. So no surprise that Saudi oil exports in January were +221,000 b/d MoM. This is despite production being only up +18,000 b/d MoM to 10.453 mmb/d in Jan. But Saudi use of oil for electricity was down -165,000 b/d MoM, Saudi refinery intake of oil was down -43,000 b/d MoM.

Figure 34: Saudi Arabia oil exports (mb/d)



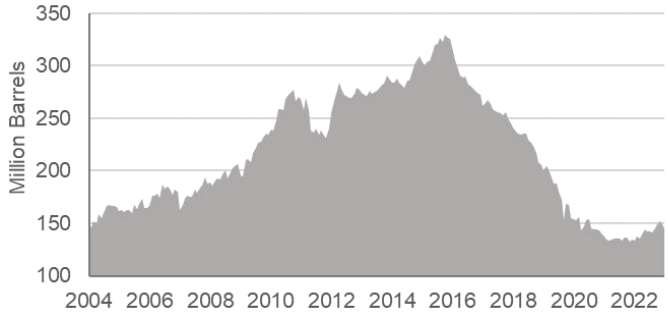
Source: JODI

Oil – Saudi oil inventories decreased MoM, down -2.924 mmb to 145.654 mmb

Saudi oil inventory data

JODI doesn't provide data for Saudi fuel oil imports, which is a wildcard to the math. The JODI data also reported Saudi oil inventory decreased -2.924 mmb MoM to 145.654 mmb at Jan 31. If we do the math on the MoM changes in Saudi production, exports, oil used for electricity and oil into refineries, it would come out to a net inventory build of 5,000 b/d. But the JODI data reported an inventory draw of -2.924 mmb, or -94,000 b/d MoM. This is a difference in the math of draw of 5,000 b/or -3.079 mmb for Jan. But the JODI data reported an inventory draw of -94,000 b/d MoM, which means there is an unexplained draw of 99,000 b/d. If the only wildcard was Russia imports, then there wouldn't be an unexplained draw, there would be an unexplained inventory build. We will have to check next month to see if any revisions to the new data.

Figure 35: Saudi Arabia Crude Oil Inventories (mmb)



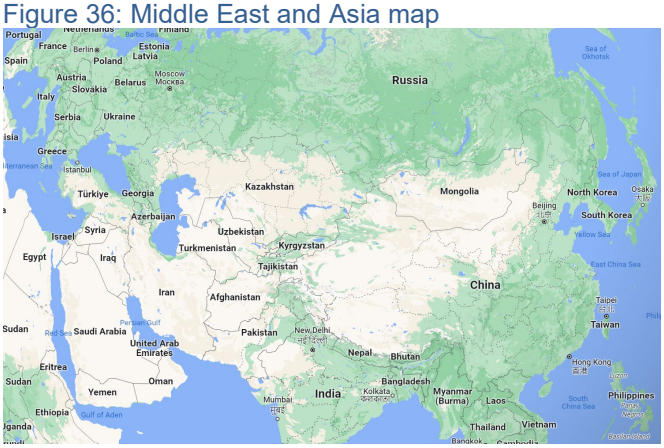
Source: JODI

Oil – Will Saudi/Iran deal also lead to some open-air skies for the new Riyadh Air?

Riyadh Air

We can't help wonder if last week's big news of the trilateral statement by Saudi Arabia, Iran and China end up leading to some sort open air skies for Saudi Arabia over the next few years. It would certainly help if the newly announced Riyadh Air could fly directly oved for its future Riyadh to China and Japan routes. Last week, Saudi Arabia announced "*HRH Crown Prince Announces "Riyadh Air" – New National Carrier to Further Expand Saudi Aviation Ecosystem Locally and Globally. •Riyadh will be the company's operational hub, and will connect the Saudi capital to over 100 destinations globally. •The new carrier will acquire modern aircraft equipped with the latest technology, and will adopt world class sustainability and safety practices. •Riyadh Air will usher in a new era for the travel and aviation industry globally and will provide tourists from around the world the opportunity to visit Saudi Arabia's cultural and natural attractions. •The establishment of the airline is aligned with PIF's mandate to further enable the aviation ecosystem in Saudi Arabia".*

Figure 36: Middle East and Asia map



Source: Google Maps

Battle for Marib, Yemen

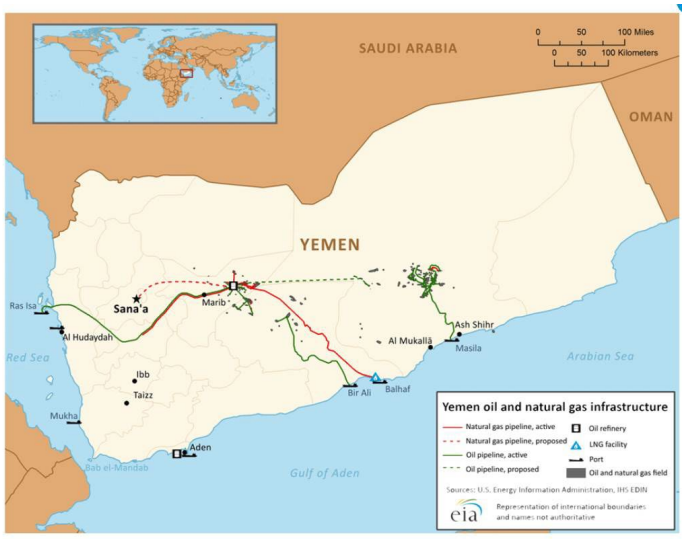
Oil –Does Houthis push on Marib signal the end is near for the Saudi/Houthi war?

Earlier this morning, we tweeted [LINK] "*Possession is 9/10th of the law. Do #Houthis think KSA/Iran deal will lead to a quasi return to North & South Yemen? #Xinhua 03/17 "Yemen's government forces clash with Houthi fighters in Marib" Makes sense, Marib key Yemen #Oil #NatGas region was part of North Yemen. #OOTT."* We thought there is significance to the Xinhua report that the Houthis have carried out attacks on Marib because of last week's Saudi/Iran deal. If the Houthis think some sort of forced peace deal will be happening soon, it makes sense that they would want to capture Marib. Marib is the capital of the oil producing region, and this oil producing region was part of the old North Yemen before they and South Yemen joined together to form Yemen. It makes sense the Houthis want to be the ones in control before any peace talks/deal. The qualifier is that we haven't seen other reports apart from the Xinhua Friday report [LINK] "*Yemen's government force on Friday engaged in intense clashes with fighters of the Houthi militia in the country's northeastern oil-rich province of Marib, a military official told Xinhua. "The Houthis carried out attacks on government-controlled sites in Harib district of Marib, sparking hours of intense clashes in the area," the local military official said on condition of anonymity. The clashes resulted in the killing of four soldiers and injury of six others, he said, adding that the Houthi group also suffered casualties but didn't provide details."*

Figure 37: Yemen 1967-1990 Pre Unification

Source: Wikipedia

Figure 38: Yemen Oil and Natural Gas Infrastructure



Source: EIA

Oil – Libya NOC says oil production continues to be stable at ~1.2 mmb/d

We have to give the Libya National Oil Corporation credit that it's been able to keep oil production pretty stable right around 1.2 mmb/d for the past four or five months. On Wednesday, the Libya National Corporation posted on its Facebook [LINK] a short update on oil production. The Google Translate was "*Crude oil production reached 1.211 million barrels per day, and condensate production reached 53 thousand barrels per day during the past 24 hours.*"

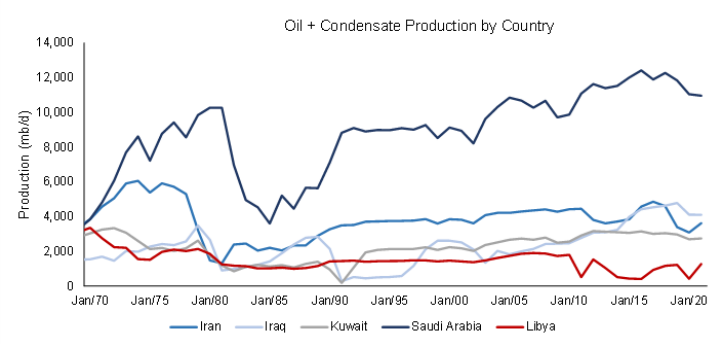
Libya oil production stable at ~1.2 mmb/d

Libya NOC targets oil production to hit 2 mmb/d in 3 to 5 years

We remind that a sustained peace in Libya would lead to a big increase in ILbyha oil production in a relatively short time. (i) Yesterday, the Libya Herald reported [LINK] "*The United Nations Support Mission in Libya (UNSMIL) hosted a meeting in the presence of the Special Representative of the United Nations Secretary-General Abdoulaye Bathily bringing together the 5+5 Joint Military Committee (JMC) and an number of commanders of the military and security units in the West and East. The meeting aimed to establish a safe and conducive environment for the political process and for holding free and fair elections this year, 2023. The meeting stressed that the interests of Libya and its people come first and transcend all personal interests of all parties. They agreed to come together and move forward towards organizing free and fair elections in Libya this year, 2023.*" There is a long way to go to elections and then the issue will be will the election results be accepted by both sides, but sustained peace would lead increasing Libya oil production. (ii) Our Nov 6, 2022 Energy Tidbits memo highlighted two excerpts posted on Nov 1 on the Libya National Oil Corporation Facebook [LINK] of NOC Chair Farhat bin Qadara comments at ADIPEC 2022. Qadara said "*We annually need up to 4 billion dollars in investments to modernize the infrastructure of the oil sector in addition to developing*

services at the oil sites. We aim to raise production to 2 million barrels per day over a period of 3 to 5 years. We expect oil revenues for this year to reach between 35 and 37 billion dollars." We also highlighted that Libya has big oil production growth if there is lasting domestic peace. Libya's oil growth all comes is there a stable lasting domestic peace. Because if Libya returns to east vs west fighting, Libya oil production could drop to almost zero again. But, and a big but, if there is a stable lasting peace, we believe Libya's oil production growth potential is much more than the Libya NOC Chair's target of 2 mmb/d. One we saw the Libya NOC Chair oil target, we tweeted [LINK] "*Imagine if #Libya ever gets lasting peace? Could blow away @NOC_Libya Chair target to get to 2 mmbd in 3 to 5 yrs. Current 1.2 mmbd. Gaddafi took over 09/01/69 & #Oil went down from there. #OPEC 1970: Saudi 3.85 mmbd, Iran 3.85 mmbd, Libya 3.34 mmbd, Kuwait 3.04 mmb. #OOTT."* Those numbers remind of how Saudi Arabia benefited by being the US ally whereas Iran and Libya got creamed for decades.

Figure 39: Iran, Iraq, Kuwait, Libya & Saudi Arabia oil + condensate production



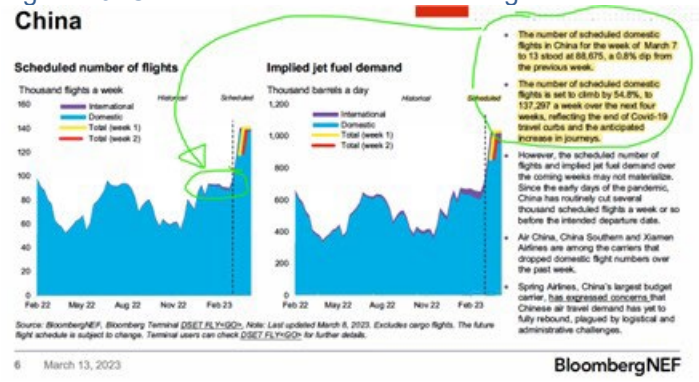
Source: BP

Oil – China domestic air flights, 5th week of flat or small WoW declines

China domestic flights

There have now been five consecutive weeks of slight WoW declines or basically flat WoW changes in China's scheduled domestic flights. It seems like a pause before a seasonal uptick in Q2 and Q3. On Monday, we tweeted [LINK] *"Pause continues. 5th week of slight WoW decline or flat China domestic flights. Mar 7-13: -0.8%. Feb 28-Mar 3: -2.6%. Feb 21-27: +0.01%. Feb 14-20: -0.5%. Feb 7-13: -0.7%. Jan 31-Feb 6: +10.9%. Jan 24-30: -9%. Jan 17-23: +7%. Jan 10-16: +20%. Thx @BloombergNEF Claudio Lubis. #OOTT."* BloombergNEF wrote "*The number of scheduled domestic flights in China for the week of March 7 to 13 stood at 88,675, a 0.8% dip from the previous week. • The number of scheduled domestic flights is set to climb by 54.8%, to 137,297 a week over the next four weeks, reflecting the end of Covid-19 travel curbs and the anticipated increase in journeys."* Not sure if significant but, just like last week, BNEF didn't highlight the bums in the seat, whereas the prior weeks, BNEF included the increasing passenger load factors ie. BNEF "*passenger load factors have increased to at least 68%* …..". That wasn't in the last two weeks Aviation Indicators Weekly reports. Below is the NEF China scheduled domestic flights.

Figure 40: China scheduled domestic air flights



Source: BloombergNEF

Oil – China resumes issuing visas, reopening for international travel to/from China

China resumes issuing visas

There was big news on Tuesday that now sets up the expected big ramp up in international travel to/from China in Q2. On Tuesday, Global Times (state media) reported [LINK] China further relaxes entry requirements, resumes visa issuance for foreign visitors starting Mar 15 after a 3-year suspension. When China reopened in January, many overlooked that China wasn't issuing visas for travel. We have to believe others have heard the same thing about people are now planning to go back and see relatives for the first time in at least three years. On Tuesday, we tweeted [LINK] " *China reopening for international travel to/from China. China resumes visa issuance for foreign visitors! See 👇03/05 tweet. @vitolnews @michaelwmuller stressed not issuing tourist visas , also not allowing Chinese to go on tourist trips abroad. That's now changed! #OOTT."*

March 5, Vitol reminded China was only in the beginning of air travel uptick

Our March 5, 2023 Energy Tidbits memo was titled "*Vitol's Mike Muller on Oil: "Market is Justified in Feeling Upbeat and Positive About Chinese Demand Growth*" who highlighted that without international travelers, China was only at the beginning of the air travel uptick. Here is what we wrote in the March 5 memo. "*Earlier this morning, Mike Muller, Head Vitol Asia led out the factor why the market is justified about strong Chinese oil demand growth over the balance of 2023. (i) We tweeted [LINK] "Market is justified in feeling upbeat & positive about Chinese demand growth" #Vitol @michaelwmuller. beginning of air travel uptick, economy w/ support of cash-rich central govt, reduced products exports. See 👇SAF Group transcript. @CrystolEnergy @DyalaSabbagh_GI. #OOTT #Oil." Our tweet included the transcript we made of Muller's comments on this bullish oil demand outlook for the balance of 2023. (ii) "Seen the beginning of a reasonable uptick in air travel". He reminded that international travel is only business so far as it is still not possible to travel as a tourist. China is not issuing tourist visas yet or allowing Chinese to go on tourist trips leaving China. This fits to the ramp up in western airlines not happening until Q2. (iii) "There do seem to be some very real policy incentives from provincial governments to start building roads, construction of municipal buildings, etc, etc." (iv) He was in Shanghai in Feb and "The congestion was very much normal and everyone is saying that things are busier. For example, if you go into Shanghai*

before Covid, they had such a congestion problem that they had to rule out certain number plates on certain days. So when my colleagues connected me from cities outside Shanghai, they had to come into the city the day before because they couldn't have driven into Shanghai to pick me up in their car. So back to normal in that sense." (iv) "But, I think this has led to a sense of optimism, as you said Dyala, in terms of [???] see a surge in Chinese demand. Not just for jet fuel as the Chinese tourists come back and vice versa, but in terms of Chinese economy, with full support of their pretty cash rich central government, consuming more." (v) Also "we are seeing it in terms of reduced exports of petroleum products in stark contrast to Q4 where we had a policy directive for Chinese refiners to crank up their runs and maximize exports in what some people believe was an attempt to improve trade balance at the tail end of the year." (vi) "And now the question is What from Here? It's awfully difficult to read, of course, but that just serves to illustrate that the market is justified in feeling upbeat and positive about Chinese demand growth." (vii) "Most analysts seem to be revising their estimates for Chinese oil and gas consumption up for the balance of this year. Substantially so, which will make 2023 one of the biggest year-on-year demand growth stories that we've seen. With the big ones being I think 2009 and 2001 or 2 if I remember correctly. In one of those years, just after the turn of the millennium, China grew by 2 million barrels a day of oil demand, year-on-year." (viii) "So the fear of that happening again has the bulls talking their book and suggesting that we could enter a world where spare capacity is in the hands of Russia and Saudi Arabia only. And effectively, that is base case for many people going forward into the second half of the year." Our Supplemental Documents package includes the transcript we made of Muller's response.

Oil – Cathay Pacific CEO reminds about to resume key international air flights

Cathay Pacific resuming HK to London flights.

On Tuesday night (North American time), the day after the China announcement on resuming issuing visas, Bloomberg TV interviewed Cathay Pacific CEO Ronald Lam. We are fortunate that Bloomberg's China Open and Asia Open shows run in the evenings MT. On Tuesday night, we tweeted [LINK] "*China air travel. #CathayPacific CEO "seeing a lot of long haul travel resuming" ".. London route, which we are planning to resume, very soon, back to 4 to 5 daily, flight between Hong Kong & London...by summer season, starting the end of this month (March)" Thx @RishaadTV* #OOTT. Note his reference to summer season restarting the 4 to 5 daily flights between Hong Kong and London is starting the end of this month. Our tweet included a 42-second clip of Lam's bullish viewon how they are seeing a lot of long haul travel resuming. Lam also highlighted the pickup in travel around Asia outside of China.

Foreign airlines about to rapidly escalate flights to/from China

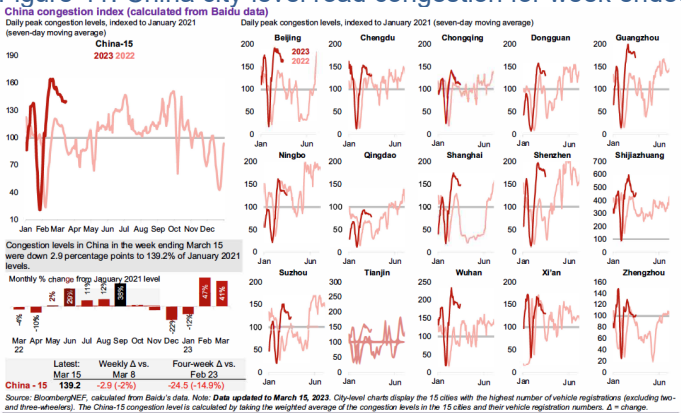
Our Energy Tidbits memos and tweets have also included the BloombergNEF graph of scheduled international flights from China and how they are about to rapidly escalate in H1/23. Of Feb 20, we tweeted [LINK] "*China reopening! Major airlines to ramp up flights to China. KLM: 03/26, AMS/HKG, 6/wk. Air France: CDG/PKX, HKG, PVG to daily in July. Lufthansa. Mar, double from 5 to 9/wk. Qatar Airlines. DOH/PKX, CAN, resume daily 03/26. British Airways. LHR/PVG, 7/wk 04/23. And more. #OOTT."* Our tweet referenced the Global Times (China) report [LINK] "*Foreign airlines ramp up international flights to China amid rising demand*" that recapped the planned schedules return of international flights from KLM Royal Dutch

Airlines, Air France, Lufthansa, British Airways and Qatar Airways. Below is the BloombergNEF china international air flights graph per our tweet. Our Supplemental Documents package includes the Global Times report.

Oil – 4th consecutive WoW decline in China traffic. But traffic is "exceptionally high"

No one can deny that China's traffic surged in 2023 following the removal of Covid restriction, but with four consecutive WoW declines in traffic congestion, we have to wonder if China has found a general post-Covid traffic level ie, its post-Covid gap up is done. China traffic congestion surged with the reopening in Jan, but we now have four consecutive WoW declines in traffic congestion, although the traffic has "been exceptionally high". On Thursday, we tweeted [LINK] "*#EU traffic >2019 levels. NA, Asia excl China, up YoY but <2019 levels. China "traffic in Feb & Mar has been exceptionally high". But 4th consecutive WoW down in CN traffic -2.9% for Mar 15 to 139% of Jan 2021. Thx @BloombergNEF. Global Road Traffic Indicators Weekly. #OOTT.*" BloombergNEF's Global Road Traffic Indicators Mar 16, 2023 described China's city-level road congestion as "*exceptionally high*" based on the Baidu data "*Traffic in China stabilizes, shedding increasingly small margins every week*". Our tweet also included the below BloombergNEF graphic on China road congestion.

Figure 41: China city-level road congestion for week ended Mar 15



Source: BloombergNEF

Oil – Vortexa crude oil floating storage at Mar 17 was 79.31 mmb, -1.84 mmb WoW

Vortexa 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 on the new estimates are compared to the prior week's Vortexa estimates posted on Bloomberg on March 11 at 10am MT. (i) As of 10am MT yesterday, Bloomberg posted Vortexa crude oil floating storage estimate for March 17 at 79.31 mmb, which is -1.84 mmb vs the upwardly revised March 10 of 81.15 mmb. Note March 10 of 81.15 mmb was revised +11.58 mmb vs 69.57 mmb posted on Bloomberg as of 10am MT on March 11. (ii) All of the prior seven weeks were revised up with large revisions for Mar 10 and 3. The revisions from the estimates posted yesterday at 10am MT vs the estimates posted on Bloomberg at 10am MT on March 11 are as follows: March 10 revised +11.58 mmb. March 3 revised +7.15 mmb. Feb 24 revised +0.81 mmb. Feb 17 revised +0.58 mmb. Feb

10 revised +0.87 mmb. Feb 3 revised +3.69 mmb. Jan 27 revised +2.96 mmb. (iii) Floating storage has been reasonably steady for the past two months. A simple average for the past seven weeks is 81.53 mmb, which is up vs last week's average of 77.23 mmb. (iv) Also remember Vortexa revises these weekly storage estimates on a regular basis and we do not track the revisions through the week. (v) March 17 estimate of 79.31 mmb is -140.98 mmb vs the post-Covid peak on June 26, 2020 of 220.29 mmb. (vi)The below graph goes back 3 years and not just 2 years as floating oil storage was in the big ramp up period started at the first week of April 2020 as Covid started to have a huge impact. (vii) March 17 estimate of 79.31 mmb is +3.98 mmb vs pre-Covid of 75.33 mmb as of March 20, 2020. But note floating storage quickly ramped up in April 2020 given Covid had hit China at the beginning of 2020. (viii) March 17 estimate of 79.31 mmb is -12.81 mmb YIY vs 92.12 mmb as of March 18, 2022. (ix) Below are the last several weeks of estimates posted on Bloomberg as of 10am MT March 18, 10am MT March 11, and 10am MT March 4.

Figure 42: Vortexa Floating Storage posted on Bloomberg Mar 18 at 10am MT

Source: Bloomberg, Vortexa

Figure 43: Vortexa Estimates Posted Mar 18 10am MT, Mar 11 10am MT, Mar 4 10am MT

Posted Mar 18, 10am MT

Date	Last Px
Fr 03/17/2023	79305
Fr 03/10/2023	81152
Fr 03/03/2023	88034
Fr 02/24/2023	84569
Fr 02/17/2023	76366
Fr 02/10/2023	76873
Fr 02/03/2023	84377
Fr 01/27/2023	76881
Fr 01/20/2023	92745
Fr 01/13/2023	88877
Fr 01/06/2023	101.041k

Mar 11, 10am MT

Date	Last Px
Fr 03/10/2023	69574
Fr 03/03/2023	80876
Fr 02/24/2023	83764
Fr 02/17/2023	75787
Fr 02/10/2023	75999
Fr 02/03/2023	80687
Fr 01/27/2023	73921
Fr 01/20/2023	88707
Fr 01/13/2023	84955
Fr 01/06/2023	96742
Fr 12/30/2022	94617

Mar 4, 10am MT

Date	Last Px
Fr 03/03/2023	80364
Fr 02/24/2023	86212
Fr 02/17/2023	77948
Fr 02/10/2023	78563
Fr 02/03/2023	82986
Fr 01/27/2023	75517
Fr 01/20/2023	89737
Fr 01/13/2023	83830
Fr 01/06/2023	95522
Fr 12/30/2022	93295
Fr 12/23/2022	84626

Source: Bloomberg, Vortexa

Oil – Vortexa's team specializes in tracking the "*so-called dark fleet*"

Vortexa tracking the "dark fleet"

There was a great commentary on Friday from Vortexa's Senior Market Analyst Pamela Munger on how Vortexa has focused on tracking the growing dark fleet of tankers who turn

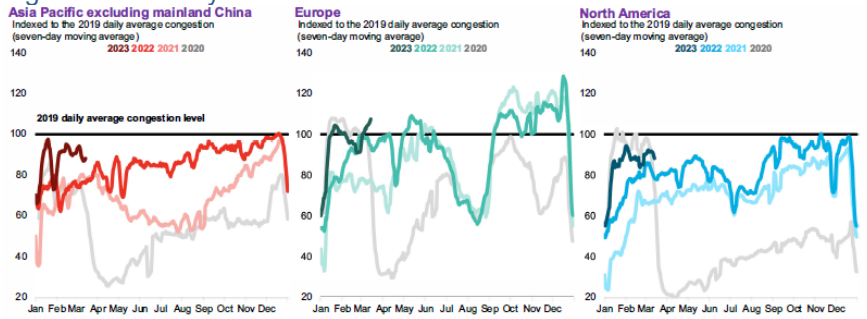
off transponders. The dark fleet has had a huge growth with Russian sanctions adding to Iran dark fleet and others. And Vortexa has focused on tracking this dark fleet. We tweeted [LINK] "*Why we like & follow @Vortexa weekly crude oil floating storage! "we do a lot of tracking for the so-called dark fleet" "we have a great team that specializes in analyzing signals & gaps in the signals & where vessels appear" @Vortexa Pamela Munger on @gulf_intel podcast. #OOTT."* Our tweet included the transcript we made of Munger's comments on the Gulf Intelligence PODCAST: Daily Energy Markets – March 10th. [LINK]. At 24:30 min mark, Munger *"… we do a lot of tracking for the so-called dark fleet, if you want to call it. There is a certain set of vessels that we have noticed patterns where they turn off their transponders. And we do have special sets of technology on the back end where we analyze. We have a great team that specializes in analyzing signals and gaps in the signals and where vessels reappear*."

Oil – US TomTom mobility indicator shows traffic in all key regions remains elevated

US oil indicators weekly

In the BloombergNEF US Oil Indicators Weekly report we continue to see the same signals from the indicators for US gasoline consumption from BloombergNEF US Oil Indicators Weekly. On Thursday, we tweeted [LINK] "*#EU traffic >2019 levels. NA, Asia excl China, up YoY but <2019 levels. China "traffic in Feb & Mar has been exceptionally high". But 4th consecutive WoW down in CN traffic -2.9% for Mar 15 to 139% of Jan 2021. Thx @BloombergNEF. Global Road Traffic Indicators Weekly. #OOTT*." Mobility indicators like TomTom data point to stable levels in North American driving YoY, although cumulative road congestion has yet to recover to 2019 levels. Following the WoW increase for the week of Mar 7, European road congestion was up +4.7% WoW for the week of Mar 14, while Asia Pacific (ex-China) and North America road congestion declined -4.0% and -3.4% WoW, respectively. Traffic levels in Europe are now +7.4% above the 2019 average +10.7% YoY with North American traffic is -11.8% below the 2019 average but is +3.4% YoY. The TomTom mobility data seems logical as MoM North American road traffic was up slightly resulting in a lowered differential to 2022's levels, but overall congestion remains below the 2019 average. Traffic in the Asia-Pacific region has been exceptionally high since Feb and is up WoW. It its worth noting that TomTom data on congestion levels now reflects daily average congestion compared to peak congestion previously. The change in methodology took effect from January 19.

Figure 44: Mobility Indicators



Week-on-week (2019 average = 100)	Latest week: Mar 14	Δ vs. Mar 7	4-week MA	Δ vs. Mar 7
Asia Pacific ex-China	88.2	-3.6 (-4.0%)	90.2	-1.7 (-1.9%)
Europe	107.4	+4.8 (4.7%)	99.1	+2.7 (2.8%)
North America	88.2	-3.1 (-3.4%)	88.4	-0.2 (-0.2%)

Year-on-year (same week last year = 100)	Latest week: Mar 14	Δ vs. Mar 7	4-week MA	Δ vs. Mar 7
Asia Pacific ex-China	115.5	-4.9 (-4.1%)	119.3	-3.6 (-2.9%)
Europe	115.5	+11.1 (10.7%)	103.4	+2.8 (+2.8%)
North America	112.8	+3.7 (3.4%)	108.4	-0.3 (-0.3%)

Source: BloombergNEF

Energy Transition – E.ON CEO reality check on the Energy Transition

E.ON CEO on energy transition

E.ON reported Q4 on Wednesday and its CEO Leonard Birnbaum made a number of comments on Bloomberg Markets Europe that had a a clear message – Europe is far behind on the energy transition and how Germany's energy policies have led to lost competitiveness and Germany facing the danger of deindustrialization. Here are a few of his key points. (i) Windmills & EVs aren't enough. We continue to believe that many just focus on wind/solar installations and EV penetration and not focus enough on being able to transmit wind/solar power and strengthening the grid to take more intermittent power. As Birnbaum reminded, every windmill added to the grid drives the need for more grid strengthening. On Wed, we tweeted [LINK] "*#NatGas & its existing power infra will be needed for longer. #EnergyTransition is much more than windmills & EVs. #E.ON CEO every windmill needs a great a grid connection, every grid connection drives for more backbone reinforcement ... Thx @annaedwardsnews M. Cudmore. #OOTT."* Our tweet included a 25-second clip of his comments on windmills. (ii) need to massively invest in energy infrastructure. This was his key warning. On Wednesday, we tweeted [LINK] "*over/under? #E,ON CEO "do not have the infra in place for the #EnergyTransition" "need to massively invest into infra" if can "achieve at sufficient speed" can make it happen. "If not, we are going to run into trouble"#NatGas will be needed for longer. Thx @annaedwardsnews #OOTT."* Our tweet included a 1:10 min clip of these comments. (iii) High energy prices have led to Germany loss of competitiveness. Birnbaum was blunt on how Germany has been hard hit by high energy prices. We tweeted [LINK] "*E.ON CEO on #EnergyTransition ""we [Germany] have clearly lost competitiveness with the high energy costs" "unless we actually save energy & get prices down..... we will not see investments that we need and then, Yes, the danger of deindustrialization can not be neglected" #OOTT."* Our tweet included the transcript we made of Birnbaum's comments to Bloomberg's Anna Edwards. "Edwards ".. *do you see Germany as deindustrializing right now …… how different is the German economy going to look when we get to the other side of all this Energy Transition*?" Birnbaum "*I see investment, let me put it this way, I see investment decisions more and more taking place to the detriment of Europe and actually also Germany. Because we have clearly lost competitiveness with the high energy prices and we have not delivered any compensation for that. And so for me, unless we actually save*

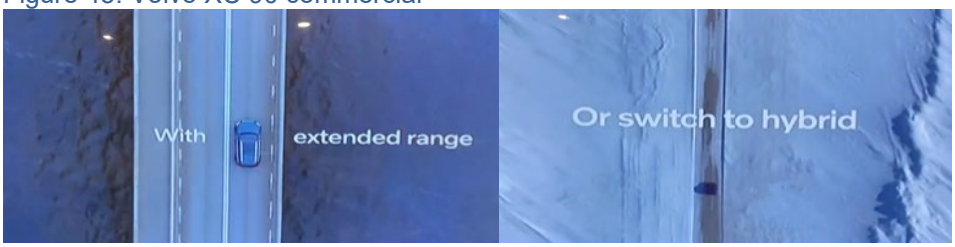
more energy and get prices down. Unless we work much harder to compensate for the loss of competitiveness in energy somewhere else, we will not see investments that we need and then, Yes, the danger of deindustrialization can not be neglected. So that is challenge". (iv) our reminder is that any delays on having the energy infrastructure to support the energy transition should be a positive for natural gas.

Volvo's latest ad

Energy Transition – Inadvertent subliminal seduction in Volvo's XC90 hybrid ad?

Got to give Volvo's advertising agency credit for their new XC 90 plug-in hybrid commercial for talking about the benefit of having the petrol/gasoline option but making sure they don't use the words petrol or gasoline. But, maybe there aren't any baby boomers in the advertising agency because it looks like they had an inadvertent subliminal seduction to give credit to the petrol/gasoline aspect of the hybrid. Don't know what MBA marketing courses include now but in the late 70s, they included Wilson Brian Key's "*Subliminal Seduction*". On Tuesday, we tweeted [LINK] *"#Volvo "Drive, explore, commute, relax, shop every day in pure electric mode with extended range. OR switch to hybrid [code for Gasoline] for longer adventures" Is winter scene for switch to hybrid an inadvertent subliminal seduction reminder need ICE mode for winter? #OOTT*." As the ad moves to the "*Or switch to hybrid for longer adventures*", the background changes from driving on bridge with blue waters to driving on the bridge with the water all frozen with snow.

Figure 45: Volvo XC 90 commercial



Source: Volvo

What's missing from Larry Fink's letter

Capital Markets – What's missing from Larry Finks's letter to all stakeholders

BlackRock CEO Larry Fink posted his annual letter. And we are writing up his oil and gas and energy transition views in next week's Energy Tidbits memo. It was a lengthy letter with a lot more in it than on oil and gas and the energy transition. But what struck us about the lengthy letter was two items that were noticeable by their absences ie. What's missing? (a) Return to clients. On Friday, we tweeted [LINK] "*What's missing in #BlackRock Fink's letter to "all stakeholders" incl clients. what are returns delivered for their clients? wouldn't have noticed its absence if he hadn't highlighted "delivered outsized returns for our shareholders". #OOTT."* Fink says multiple times on their success in getting more money under management. And when he refers to *"industry-leading results",* it's in reference to getting more AUM and not on where they rank in generating returns to clients. Rather, we didn't see any items that the returns they generated for their clients were the best or top quartile. In fact, we didn't see any comments on they get for clients. They do say on providing them with outcomes but not the returns. In fact. the only mention of actual returns BlackRock has delivered is not to clients but its shareholders. He includes a graph of Blackrock's returns to shareholders and closes his letter saying "*and by doing so, we have delivered outsized returns for our shareholder*s." And earlier he highlighted "*our scaled, fiduciary model – which*

is centered on empowering our clients with comprehensive choices across the whole portfolio - that we have been able to deliver performance for our shareholders. We are proud to be the highest-performing financial services stock in the S&P 500 since our IPO in 1999, delivering a total return of 7,700%." (ii) Didn't say his people are the best or very good. We believe that if you ask 100 CEOS of financial markets businesses what is your most important asset or what drives your success? We would assume almost every CEO would say it's the people! If you read Fink's letter, he never really comes out and says they have great people who deliver great returns to their clients. He will talk about their perspective and experience but doesn't say we have the best people at investing our client's money. He says things like "*our global perspective and insights', "advisory expertise", "Clients increasingly want to work with BlackRock as a global, multi-product, and solutions-oriented asset manager, with a strong investment culture and the ability to solve for technology needs", "I have never been more excited about the talent, expertise, and leadership at the firm and their potential to keep innovating ahead of our client needs, delivering value for shareholders, and driving BlackRock into the future", "But clients do not come to BlackRock because we can deliver on one or two or three verticals – they come to us because we can deliver our full platform in a One BlackRock experience – what we call horizontal leadership. BlackRock's most successful leaders work horizontally. They work across teams and groups to innovate, drive forward our goals, and deliver for our clients. We have a diverse leadership team, but they are all united by their commitment to working together to serve our clients."* We think Fink missed an opportunity to publicly tell his people that he thinks they are the best or a top team, instead of him just being never more excited about the talent. Our Supplemental Documents package includes the Fink letter.

Capital Markets – Higher interest rates/cost of capital a key factor for Meta layoffs

Higher interest rates hit Meta

Early Tuesday morning, Meta's Mark Zuckerberg posted his "*Update on Meta's Year of Efficiency"* [LINK], which is a good read and includes the headlines "*Overall, we expect to reduce our team size by around 10,000 people and to close around 5,000 additional open roles that we haven't yet hired*." But it was clear from his update that higher interest rates (ie. higher cost of capital) is a key reason for the layoffs. It's a reality check for Meta and others that the end of free money (ie. very low interest rates) has a big impact on their cost of capital and available cash flow. On Tuesday morning, we tweeted [LINK] *"#Zuckerberg highlights higher interest rates/cost of capital in 10,000 layoff memo. "I think we should prepare ourselves for the possibility that this new economic reality will continue for many years. Higher interest rates lead to the economy running leaner ...." #OOTT."* Zuckerberg's full quote was "*For most of our history, we saw rapid revenue growth year-after-year and had the resources to invest in many new products. But last year was a humbling wake-up call. The world economy changed, competitive pressures grew, and our growth slowed considerably. We scaled back budgets, shrunk our real estate footprint, and made the difficult decision to lay off 13% of our workforce. At this point, I think we should prepare ourselves for the possibility that this new economic reality will continue for many years. Higher interest rates lead to the economy running leaner, more geopolitical instability leads to more volatility, and increased regulation leads to slower growth and increased costs of innovation."* Our Supplemental Documents package includes the Zuckerberg update.

Capital Markets – Why investors should follow insider selling fillings

Insider selling filings

One of the many market commentaries on the regional bank stock drops has been the following of some recent insider filings on stock sales. On Tuesday, we tweeted [LINK] "*Suspect some holders of regional bank stocks wish they had seen this 02/27 @andrewrsorkin reminder why its worth following insider filings on stock sales. JoeSquawk @BeckyQuick. #OOTT."* Our tweet included the Feb 27 video of andrew Ross Sorkin's reminder on CNBC Squawk Box on Feb 27 on why investors follow, or should follow, insider selling filings. On Feb 27, we tweeted [LINK] "*Why investors follow insider selling filings.."when you look at selling, the accuracy on the selling on the whole is way better than the average investor" @andrewrsorkin with @JoeSquawk & @BeckyQuick on @SquawkCNBC. #OOTT."* They referenced studies they had previously seen. Our tweet included the more fulsome conversation that we made from our PVR.

Demographics – Zuckerberg says people work more effectively in person

Zuckerberg on remote working

Mark Zuckerberg didn't come out and say Meta is implementing a back to work in the office mandate like Elon Musk has done, but he certainly points to some sort of direction coming in the near future at Meta. In his "*Update on Meta's Year of Efficiency*" [LINK], Zuckerberg was clear that people work more effectively in person, especially younger people. Zuckerberg wrote " *Our early analysis of performance data suggests that engineers who either joined Meta in-person and then transferred to remote or remained in-person performed better on average than people who joined remotely. This analysis also shows that engineers earlier in their career perform better on average when they work in-person with teammates at least three days a week. This requires further study, but our hypothesis is that it is still easier to build trust in person and that those relationships help us work more effectively*."

Demographics – No more "body language" training in business w/o in-person meets?

Body language

Earlier, we noted the an item from the last 70s that was part of marketing classes – subliminal seduction. On Monday, we were reminded of another item from the late 70s/early 80s – how big companies used to also train on body language. It wasn't that it was a big long training but a short couple hour type course. Of course, in those days, business was all about face-to-face meetings, as well as management meetings. And some never bought into it. Don't forget that big companies in those days were manufacturing, consumer products, etc.The only reason we thought about body language was watching one of the many guests on CNBC Squawk Box early in the week who were ensuring markets that they aren't being dragged down in the regional banking fall-out. We recognize that many don't believe body language is a tell. Regardless, we thought the guest probably never believed in it because the body language side believe looking up and to the right indicates not telling the truth and he did this multiple times in the short interview.

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

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].

Look for energy items on LinkedIn

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 and Calgary items.

Wanda Sykes on when she will retire

Heard a good line last week when comedian/actress Wanda Sykes was on a talk show on when she would retire. Sykes said her wif has been wanting her to retire and Sykes hasn't been wanting to retire. Sykes said she will be retiring when the phone stops ringing. We have to agree but would say that it's not just retirement. It reminds of the investment dealer investment when an institutional salesman or trader tries to reach the buyside client and doesn't get thru. Or for that matter, it applies to any profession when the phone stops ringing or when the client won't take a phone call.

Grocery stores in San Jose del Cabo remove masks requirement after 3 yrs

The Los Cabos areas is the towns of Cabo San Lucas at the southern tip of the Baja Peninsula to the town of San Jose del Cabo 32 km to the north, and the corridor of development of condos and hotels between the two towns. Life has been back to normal for some time without masks for the most part although staff in many restaurants and shops have wear masks. But the one place that has been masks is the big grocery stores. The big grocery story in San Jose del Cabo is La Comer, which up until a few years ago was known as MEGA. It was the first big grocery store in the Los Cabos area , but sometime earlier in March, they stopped the requirement to wear masks for the first time since Covid three years ago.