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Energy Tidbits

April 16, 2023

Produced by: Dan Tsubouchi

Warren Buffett: World will Still Need 100 mmb/d of Oil in 5 Years Even If Trillions are Spent Every Year on Energy Transition

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. Warren Buffet: World will still need 100 mmb/d in 5 years even if trillions are spent every year as "*you can't change the world that fast*" (Click Here).
2. IEA said "*Our oil market balances were already set to tighten in the second half of 2023, with the potential for a substantial supply deficit to emerge. The latest cuts risk exacerbating those strains.*" (Click Here).
3. G7 warns on critical mineral supply: "*We are fully committed to maintain products containing critical minerals and raw materials in the economy as long as possible*" (Click Here).
4. G7 uses political speak and just can't simply say LNG demand is growing and more investment is needed in LNG and natural gas supply (Click Here).
5. Still no visibility as to when Turkey will allow the resumption of ~450,000 b/d of Kurdistan/Iraq oil exports via Ceyhan (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].

Dan Tsubouchi	**Ryan Dunfield**	**Aaron Bunting**	**Ryan Haughn**
Chief Market Strategist	CEO	COO, CFO	Managing Director
dtsubouchi@safgroup.ca	rdunfield@safgroup.ca	abunting@safgroup.ca	rhaughn@safgroup.ca

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Natural Gas – 25 bcf build in US gas storage; now 460 bcf YoY surplus

US gas storage 460 bcf YoY surplus

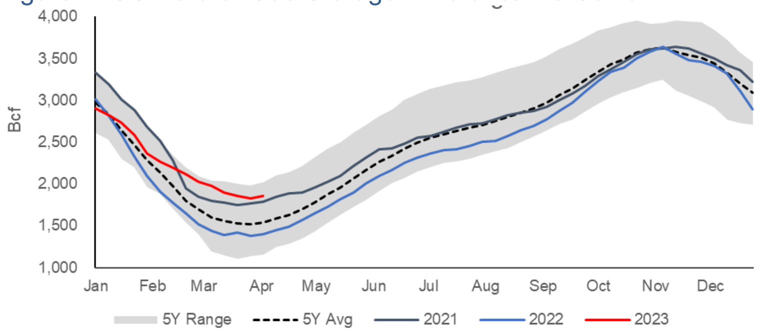
It's April so it's the normal natural gas injection season absent some unusual event. For the week of Apr 7, the EIA reported a +25 bcf build (vs expectations of a 27 bcf build), compared to the +15 bcf build reported for the week of Apr 8 last year. This compares to last week's draw of -23 bcf, and the 5-year average build of +28 bcf. Total storage is now 1.855 tcf, representing a surplus of +460 bcf YoY compared to a surplus of +443 bcf last week and is +295 bcf above the 5-year average vs +298 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 (04/07/22)		5-year average (2018-22)	
Region	04/07/23	03/31/23	net change	implied flow	Bcf	% change	Bcf	% change
East	345	335	10	10	231	49.4	272	26.8
Midwest	427	421	6	6	293	45.7	334	27.8
Mountain	80	80	0	0	90	-11.1	90	-11.1
Pacific	74	73	1	1	168	-56.0	174	-57.5
South Central	929	921	8	8	613	51.5	690	34.6
Salt	261	263	-2	-2	184	41.8	215	21.4
Nonsalt	667	658	9	9	429	55.5	475	40.4
Total	**1,855**	**1,830**	**25**	**25**	**1,395**	**33.0**	**1,560**	**18.9**

Source: EIA

Figure 2: US Natural Gas Storage - Historical vs Current



Source: EIA, SAF

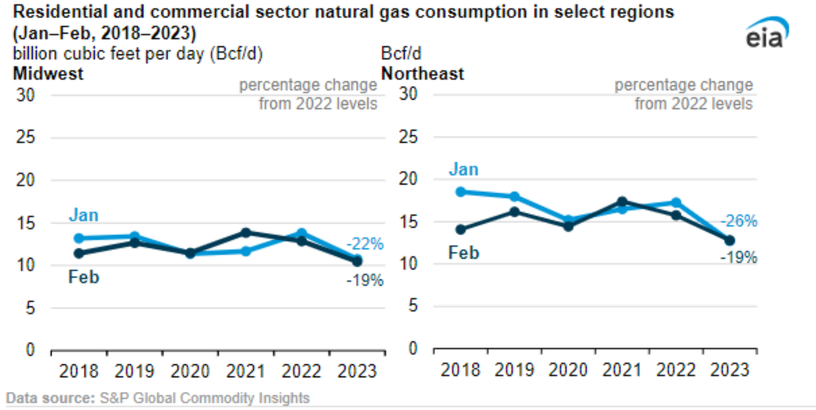
Natural Gas – US natural gas consumption reached multiyear lows in Jan/Feb

YoY storage at 443 bcf YoY surplus

The EIA hasn't posted its actuals for Feb natural gas consumption but, on Wednesday, posted a blog "*U.S. natural gas consumption reached multiyear lows this past January and February*". [LINK] It was driven by the mild winter. The EIA wrote "*Mild winter temperatures and reduced natural gas consumption in the residential and commercial sectors drove down overall U.S. natural gas consumption this past January and February, according to our Short-Term Energy Outlook (STEO). In January 2023, U.S. natural gas consumption averaged 106.8 billion cubic feet per day (Bcf/d), its lowest January volume since 2017. February 2023 natural gas consumption averaged 104.5 Bcf/d, its lowest February volume since 2018.*" "*Natural gas consumption in the residential and commercial sectors, which was down 16% in*

January and 12% in February from the same months in 2022, was low because above-average winter temperatures reduced seasonal heating demand." Our Supplemental Documents package includes the EIA blog.

Figure 3: US Natural Gas Storage



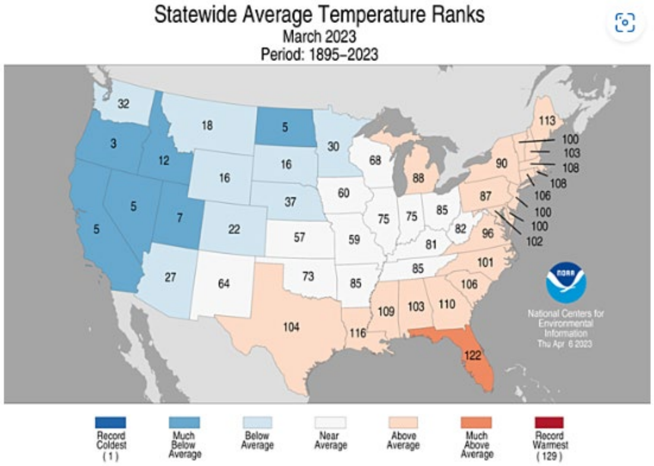
Source: EIA

Natural Gas – NOAA March was hot in the populous east and cold in the west

March was hot in the east

On Monday, NOAA posted its National Climate Recap for March. We reported regularly on the March weather and how it was cold in the west, but hot in the more populous east. And that showed up in the NOAA data. NOAA reported March 2023 on a natinal basis was colder than normal as the 45th coldest in the last 129 years. However, its by state temperatures rankings show it was extremely hot all along the east coast and Gulf Coast. This is why HH gas prices were weak.

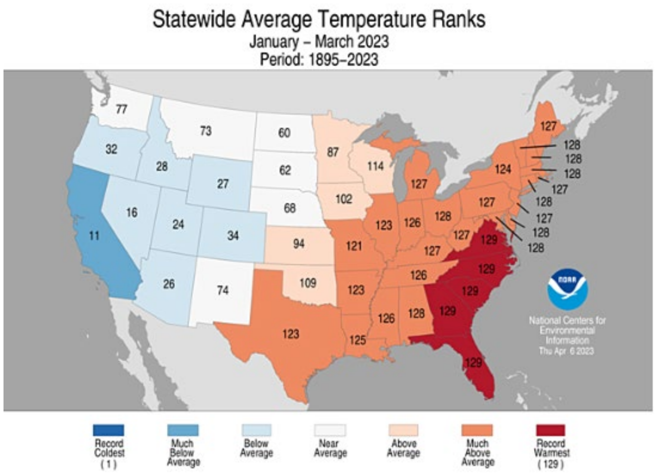
Figure 4: NOAA Statewide Average Temperature Ranks



Source: NOAA

As a result, Jan/Feb/Mar was the 20th hottest in the last 129 years
The fact that it was cold in the west brought Jan/Feb/Mar down to the 20th hottest in the last 129 years. Whereas the Dec/Jan/Feb was the 17th hottest in the last 129 years. But as seen in the NOAA by state temperature rankings, almost every state in the populous eastern half of the US was within the top 3 hottest Jan/Feb/Mar in the last 129 years. No wonder HH gas prices crashed to $2 after being over $7 just before Xmas. Below is a graphic depicting the state average temperature ranks for Jan/Feb/Mar.

Figure 5: US Statewide Average Temperature Ranks (Jan/Feb/Mar)



Source: NOAA

Natural Gas – March residential/commercial gas demand is much less than Jan/Feb

March residential commercial gas demand

The problem with the March weather was that it was a little warmer than normal for the first half of March, but then colder than normal in the last half of March. If it had been switched with a colder than normal first half, then it would have been better for HH prices. So it ended up colder than normal on an overall March basis. Over the prior 10 winters, residential/commercial natural gas consumption averaged 31.8 bcf/d and is normally 16% of winter demand, with a low of 24.4 bcf/d vs a high of 36.2 bcf/d. The averages were 46.7 bcf/d for Jan and 43.4 bcf/d for Feb. Below is our table of HDDs vs residential/commercial demand vs total US natural gas demand for the last 10 winters.

Figure 6: US Winter Natural Gas Consumption vs Heating Degree Days

US Winter Natural Gas Consumption vs Heating Degree Days

Heating Degree Days By Month

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	10 Year Average	
	HDDs	HDDs	HDDs	HDDs	HDDs	HDDs	HDDs	HDDs	HDDs	HDDs	HDDs	HDDs	%
Oct	308	303	265	257	200	218	306	307	308	205	332	280	7%
Nov	572	623	658	484	459	542	650	636	469	539	597	569	14%
Dec	763	920	763	649	856	873	789	778	804	696	876	807	20%
Jan	918	1,019	967	935	843	963	941	808	899	1005		921	23%
Feb	795	903	955	718	597	699	810	760	896	790		793	20%
Mar	827	831	738	511	618	660	804	555	572	638		680	17%
Oct 1 - Mar 31	4,183	4,599	4,346	3,554	3,573	3,955	4,300	3,844	3,948	3,873	1,805	4,050	100%

Note: Oct includes Sept if applicable. March includes Apr if applicable.
Source: AGA, SAF

Total US Consumption

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	10 Year Average	
	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	%
Oct	61.3	60.2	61.7	64.3	62.1	65.5	73.7	75.1	74.9	73.0	76.4	67.2	13%
Nov	72.3	77.2	78.6	75.2	72.1	78.6	90.5	92.6	81.3	89.8		80.8	15%
Dec	80.8	94.0	86.4	83.6	92.5	99.5	96.8	101.6	101.9	97.0		93.4	18%
Jan	92.8	103.4	100.5	100.0	93.3	107.8	110.0	106.3	106.0	115.9		103.6	20%
Feb	91.6	97.9	104.5	91.8	82.9	96.8	107.5	108.3	108.5	109.3		99.9	19%
Mar	81.3	82.5	83.6	76.3	81.1	90.2	93.8	87.4	84.1	89.8		85.0	16%
Average	**80.0**	**85.9**	**85.9**	**81.9**	**80.7**	**89.7**	**95.4**	**95.2**	**92.8**	**95.8**	**76.4**	**88.3**	100%

Source: EIA, SAF

US Residential & Commercial Demand

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	10 Year Average	
	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	bcf/d	%
Oct	14.6	13.9	13.4	12.8	12.2	13.1	15.9	14.4	14.4	12.6	15.1	13.7	7%
Nov	26.3	28.8	30.2	23.0	22.0	26.3	32.8	32.6	24.4	27.3		27.4	14%
Dec	34.2	43.0	36.9	30.4	40.5	42.2	39.5	39.0	40.1	34.5		38.0	19%
Jan	47.0	51.9	47.4	45.0	42.4	49.5	48.6	42.2	44.1	48.8		46.7	23%
Feb	42.3	48.0	50.9	38.4	33.7	39.8	45.7	42.0	48.2	45.1		43.4	22%
Mar	34.3	36.2	33.1	24.4	30.8	34.8	35.9	27.8	29.7	31.5		31.8	16%
Average	**33.1**	**37.0**	**35.3**	**29.0**	**30.3**	**34.3**	**36.4**	**33.0**	**33.5**	**33.3**	**15.1**	**33.5**	100%

Source: EIA, SAF
Data source EIA Natural Gas Monthly

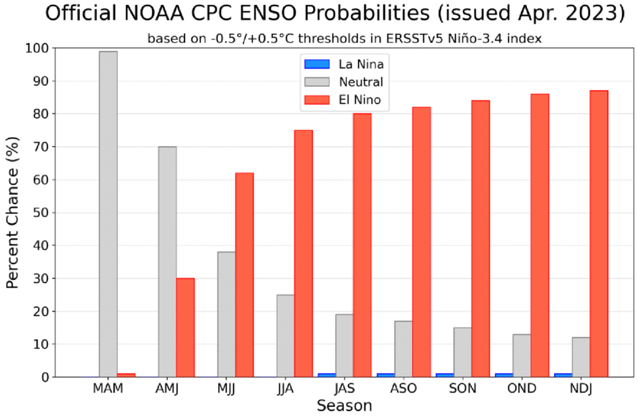
Source: EIA, AGA, SAF

Natural Gas – NOAA sees 62% probability for El Nino conditions during May/June/July

La Nina/El Nino focus to turn to summer

On Thursday, NOAA posted the updated monthly El Nino/La Nina outlook, which is issued on the 2nd Thurs of every month [LINK]. Now that it is spring, the El Nino/La Nina focus shifts to the summer and to hurricane season. Last month, the probability forecast was just above a 60% chance for El Nino conditions in the peak hurricane months of Aug/Sept/Oct. In contrast, Thursdays outlook alluded to a 62% chance of El Nino conditions beginning to form as early as May but range from May to June. However, the qualifier is said by NOAA that forecasting El Nino/La Nina conditions for the summer is difficult in the early weeks of spring. NOAA writes, *"While the lower accuracy of forecasts during the spring can result in surprises, the recent oceanic Kelvin wave plus recurring westerly wind anomalies are anticipated to further warm the tropical Pacific Ocean. The coastal warming in the eastern Pacific may foreshadow changes across the Pacific basin. Therefore, an El Niño Watch has been issued, and the range of possibilities toward the end of the year includes a strong El Niño (40% chance) to no El Niño (10% chance). In summary, ENSO-neutral conditions are expected to continue through the Northern Hemisphere spring, followed by a 62% chance of El Niño developing during May-July 2023."* Again, weather is never 100% the same, but El Nino summers are normally associated with low Atlantic hurricane seasons, whereas neutral/La Nina conditions are more likely normal hurricane seasons. Below is the NOAA CPC ENSO Mar update.

Figure 7: Early Mar NOAA CPC ENSO El Nino/La Nina Outlook

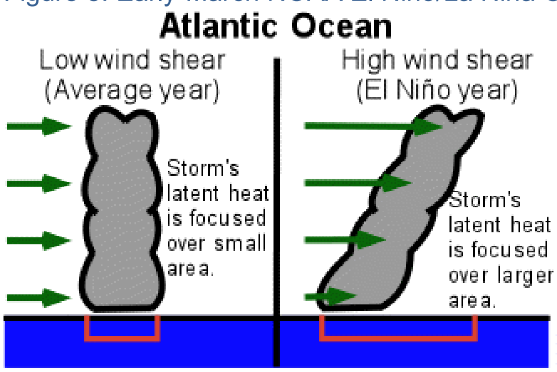


Source: CPC/IRI

El Nino years tend to be low Atlantic hurricane years

Our prior Energy Tidbits over the years/decades noted that "*The hurricane forecasters note that warm El Nino years tend to have less hurricane activity in the Atlantic and Gulf of Mexico, but typically more hurricane activity in the Pacific. The primary explanation for the decline in hurricane frequency during El Niño years is due to the increased wind shear in the environment. It is commonly explained that "In El Niño years, the wind patterns are aligned in such a way that the vertical wind shear is increased over the Caribbean and Atlantic. The increased wind shear helps to prevent tropical disturbances from developing into hurricanes. In the eastern Pacific, the wind patterns are altered in such a way to reduce the wind shear in the atmosphere, contributing to more storms*". This is the common explanation, and we referenced the University of Illinois's description because they also had a good simple graphic (see below). We double checked the link this week, and it is still active after more than a decade, the University of Illinois explanation is found at: [LINK]

Figure 8: Early-March NOAA El Nino/La Nina Outlook



Source: University of Illinois

Natural Gas – EIA forecast US gas production +2.78 bcf/d YoY in 2023, +0.70 in 2024

One of the big US natural gas stories last year was that US dry natural gas production was up approx. 3.5 bcf/d YoY in 2022. This growth was more than expected going into 2022. US dry natural gas production is expected to continue to have strong, but lesser, YoY growth in 2023 and in 2024. The EIA released its monthly Short Term Energy Outlook for Apr 2023 [LINK]. (i) The EIA lowered its HH natural gas price expectations to $2.94 in 2023 and $3.71 in 2024 due the growth in stockpiles to above the 5-year average, following a warmer-than-normal winter and subsequent lower-than-normal consumption of natural gas. The EIA continues to expect US gas supply to increase in Q1/23 and is forecasting production of 101.6 bcf/d which is up from last month's estimate of ~101.0 bcf/d. The EIA April STEO left the 2022 US gas production forecast unchanged at 98.08 bcf/d which is up 3.59 bcf/d YoY from the 2021 exit of 94.6 bcf/d. (ii) US dry natural gas production is forecasted to average 100.88 bcf/d in 2023 (100.67 bcf/d previously), a +2.78 bcf/d increase YoY. (iii) The EIA lowered its 2024 forecast by -0.12 bcf/d to 101.58 bcf/d vs 101.69 bcf/d for the March STEO. But 2024 is still +0.70 bcf/d YoY. Our Supplemental Documents package includes excerpts from the STEO.

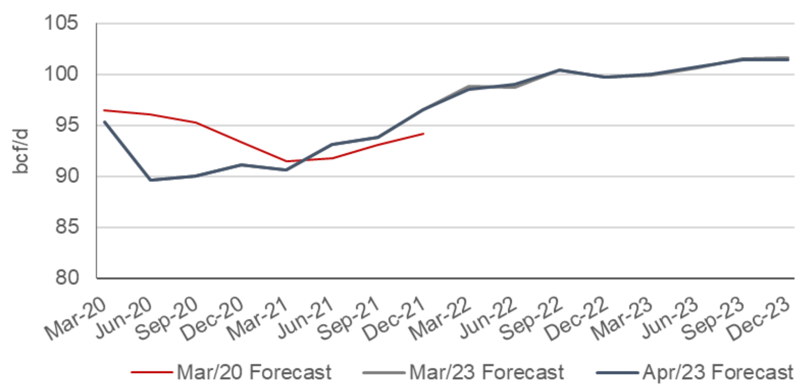
EIA US natural gas production forecast

Figure 9: EIA STEO US Natural Gas Supply Forecasts by Forecast Month

bcf/d	2021	Q1/22	Q2/22	Q3/22	Q4/22	2022	Q1/23	Q2/23	Q3/23	Q4/23	2023	Q1/24	Q2/24	Q3/24	Q4/24	2024
Apr-2023	94.51	95.10	97.60	99.50	100.20	98.10	101.60	100.50	100.50	100.90	100.88	101.20	101.50	101.80	101.80	101.58
Mar-2023	94.51	95.10	97.60	99.50	100.20	98.08	100.96	100.21	100.56	100.96	100.67	101.37	101.40	101.96	102.04	101.69
Feb-2023	94.57	95.10	97.60	99.50	100.10	98.10	99.90	100.00	100.30	100.90	100.30	101.20	101.60	102.00	101.90	101.70
Jan-2023	94.57	95.10	97.59	99.44	99.87	98.02	100.82	99.87	100.08	100.62	100.34	101.12	101.75	102.72	103.57	102.29
Dec-2022	93.55	95.08	97.58	99.22	100.54	98.11	99.87	99.52	100.50	101.60	100.37					
Nov-2022	93.55	95.08	97.58	99.43	100.11	98.05	99.00	99.42	99.99	100.33	99.68					
Oct-2022	93.55	95.08	97.55	98.48	99.06	97.54	99.19	99.57	99.73	100.00	99.62					
Sep-2022	93.55	94.60	96.87	97.85	98.99	97.08	99.65	100.51	100.59	100.67	100.36					
Aug-2022	93.55	94.60	96.61	97.02	98.09	96.59	98.90	100.13	100.52	100.51	100.02					
Jul-2022	93.55	94.61	95.51	96.88	97.89	96.23	98.40	99.62	100.60	101.25	99.98					
Jun-2022	93.55	94.61	95.48	96.90	98.94	96.50	99.94	101.30	102.33	102.66	101.57					
May-2022	93.55	94.66	95.82	97.17	99.14	96.71	100.25	101.55	102.42	102.42	101.71					
Apr-2022	93.57	95.41	97.01	97.94	99.23	97.41	99.72	100.56	101.41	101.72	100.86					
Mar-2022	93.54	95.69	96.09	96.97	98.00	96.69	96.11	98.75	99.60	100.10	98.64					
Feb-2022	93.57	95.43	95.54	96.26	97.12	96.09	97.11	97.57	98.34	98.84	97.97					

Source: EIA STEO

Figure 10: EIA STEO US Natural Gas Supply Forecasts by Forecast Month



Source: EIA STEO

Natural Gas – EIA STEO forecasts Nov 1, 2023 storage at 3.84 tcf, +0.27 tcf YoY

EIA STEO storage forecast

The EIA STEO also forecasts US gas storage and to no surprise, the warmer than expected winter has led to a big increase in forecast US gas storage levels, but this month the EIA slightly lowered its storage estimate for Nov 1 to 3.84 tcf. In the March STEO, the EIA forecasted storage to end the winter at 1.93 tcf on April 1, which was greater than the 1.86 tcf actual storage level reported this month. Working gas storage was 1.86 tcf as of April 1, 2023, which is +32% higher than storage levels on April 1, 2022. For winter 2023, the EIA now forecasts Nov 1 storage at 3.84 tcf, which is +0.27 tcf YoY and -0.04 tcf from 3.88 tcf in the Mar STEO forecast. In addition, Nov 1, 2024, storage is forecasted to be 4.0 tcf, up +0.16 tcf YoY and down -0.03 tcf from the Mar STEO. The EIA commented, "*Mild winter weather in the first quarter of 2023 (1Q23) resulted in natural gas inventories ending the withdrawal season (November–March) 19% higher than the five-year (2018–2022) average. We forecast natural gas inventories will end the injection season (April–October) at 3.8 trillion cubic feet, 6% above the five-year average."*

Figure 11: EIA STEO forecast US working gas storage

	(billion cubic feet)					
	Storage	2016-2024				
	Level	Low	High	Range	Average	Deviation
Mar 2016	2,486.3	1,184.9	2,486.3	1,301.4	1,835.6	35.4%
Oct 2016	4,012.7	3,236.3	4,012.7	776.4	3,624.5	10.7%
Mar 2017	2,062.5	1,184.9	2,486.3	1,301.4	1,835.6	12.4%
Oct 2017	3,816.5	3,236.3	4,012.7	776.4	3,624.5	5.3%
Mar 2018	1,390.3	1,184.9	2,486.3	1,301.4	1,835.6	-24.3%
Oct 2018	3,236.3	3,236.3	4,012.7	776.4	3,624.5	-10.7%
Mar 2019	1,184.9	1,184.9	2,486.3	1,301.4	1,835.6	-35.4%
Oct 2019	3,762.0	3,236.3	4,012.7	776.4	3,624.5	3.8%
Mar 2020	2,029.4	1,184.9	2,486.3	1,301.4	1,835.6	10.6%
Oct 2020	3,928.5	3,236.3	4,012.7	776.4	3,624.5	8.4%
Mar 2021	1,801.2	1,184.9	2,486.3	1,301.4	1,835.6	-1.9%
Oct 2021	3,665.4	3,236.3	4,012.7	776.4	3,624.5	1.1%
Mar 2022	1,401.5	1,184.9	2,486.3	1,301.4	1,835.6	-23.7%
Oct 2022	3,569.4	3,236.3	4,012.7	776.4	3,624.5	-1.5%
Mar 2023	1,856.5	1,184.9	2,486.3	1,301.4	1,835.6	1.1%
Oct 2023	3,841.8	3,236.3	4,012.7	776.4	3,624.5	6.0%
Mar 2024	1,625.0	1,184.9	2,486.3	1,301.4	1,835.6	-11.5%
Oct 2024	4,000.2	3,236.3	4,012.7	776.4	3,624.5	10.4%

Source: EIA

Natural Gas – No major LNG impact from Cyclone Ilsa offshore NW Australia

Cyclone Ilsa

LNG and iron ore followers were watching Cyclone Ilsa that was tracking offshore NW Australia before turning inland just north of Port Hedland. On Tuesday, we tweeted [LINK] "*#CycloneIsla gaining strength to Cat 4 as it hits landfall. cyclone paths always shift and big factor tends to be flooding. Currently east of Port Hedland, world's largest #IronOre export port. But could temporarily halt NW Aus offshore & onshore #LNG operations. #OOTT.* Ilsa was tracking nearby offshore LNG facilities and Port Hedland is the world's largest iron ore export port. We have not seen any reports of any major impact on any LNG facilities. And Port Hedland reopened.

Natural Gas – Sinopec latest to join Qatar's NFE LNG expansion project

QatarEnergy & Sinopec sign NFE partnership agreement

On Wednesday, QatarEnergy and China Petrochemical Corporation (Sinopec) announced a definitive partnership agreement for the North Field East (NFE) expansion project [LINK]. .

Upon signing the deal, Sinopec will acquire a 1.25% interest in the North Field East expansion project, which includes a 5% stake in one NFE train. Each train in the NFE has a capacity 8 MTPA (~1.05 bcf/d). Sinopec joins ExxonMobil, TotalEnergies, ConocoPhillips, ENI and Shell in the Qatar LNG expansions. QatarEnergy Presedent and CEO, Saad Sherida Al-Kaabi commented, *"The People's Republic of China is a major driver of the global energy markets as well as being one of the most important gas markets in the world and is a key market for Qatari energy products. Today's event underscores QatarEnergy's commitment to deepening its relationships with key LNG consumers, while prioritizing long-term strategic partnerships and alignment with world class partners from China, represented by Sinopec here today."* While Chairman of Sinopec, Dr. Ma Yongsheng added, *"China-Qatar energy cooperation features a natural complementarity. QatarEnergy is a leading LNG producer in the world and one of the most important partners of Sinopec. The cooperation with QatarEnergy will help Sinopec further optimize China's energy consumption structure and enhance the security, stability, and reliability of clean energy supply. I hope that the two companies will continue to explore new LNG cooperation opportunities based on the solid foundation we have laid together and will further expand cooperation areas to achieve mutual benefit and win-win results."*. Our Supplemental Documents package includes excerpts from the press release.

Nov 21, 2022, Sinopec/QatarEnergy signed a 27-year LNG supply agreement
Here is what we wrote in our Nov 27, 2022 Energy Tidbits memo. "*There haven't been many long-term LNG deals over the past few months because most supply capacity pre 2025 seems to be getting contracted. On Monday, Sinopec and QatarEnergy announced their new agreement which will span 27 years and ship 0.53 bcf/d [LINK]. The two parties first signed a 10-year Sales and Purchase Agreement in March 2021 where both parties agreed to a 0.27 bcf/d supply to China. This new agreement adds 0.53 bcf/d to take the total of two existing deals up to 0.80 bcf/d. Chairman of Sinopec, Dr. MA Yongsheng explains "the signing of the long-term LNG SPA with QatarEnergy is a milestone and an important part of the integrated cooperation between the two sides on the NFE project. Qatar is the world's largest LNG supplier, and China is the world's largest LNG importer. The two countries share inherent complementarities and a good foundation for energy cooperation." Saad Sherida Al-Kaabi, CEO of QatarEnergy also commented on the deal stating "we are pleased to enter into this agreement, which will further solidify the excellent bilateral relations between the People's Republic of China and the State of Qatar and help meet China's growing energy needs. In addition, it opens a new and exciting chapter in our relationship with Sinopec, one that is very special and spans a number of different areas, and which we are excited about further growing and expanding into the 2050s." Both QatarEnergy and Sinopec are state owned energy companies on the forefront of the majority of long-term LNG agreements. This included nine of 38 deals we have tracked since July 1, 2021. Our Supplemental Documents package includes the QatarEnergy release."*

Qatar's NFE and NFS LNG expansions to add 6.5 bcf/d in total
In our June 12, 2022 Energy Tidbits, we noted these two Qatar Energy expansion projects. We then wrote "… Reminder Qatar's #LNG expansion is 2 phases. Phase 1 North Field East, adds 4.4 bcfd BY 2026. Phase 2 North Field South adds 2.1 bcf

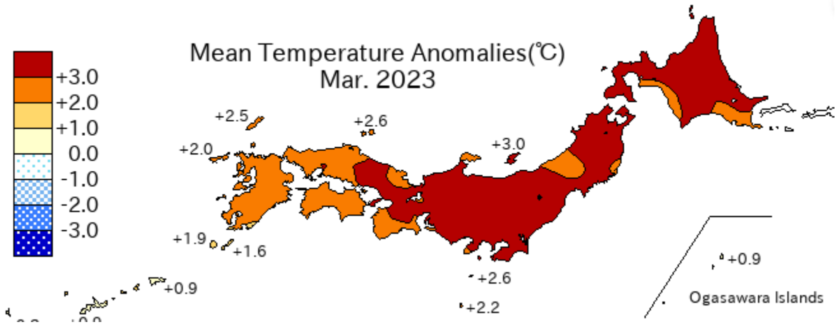
operational IN 2027. Current 10.1 reaches 16.6 bcfd. Thx @SimoneFoxman @V_Ratcliffe. #NatGas #OOTT". (i) Phase 1: North Field East: increases existing LNG capacity from 77 to 110 million tons by 2026 ie. operational in 2025. This is an increase of 4.4 bcf/d from current 10.1 bcf/d to 14.5 bcf/d. (ii) Phase 2: North Field South: increases then 110 million tons to 126 million tons but won't be finished until 2027 ie. operational in 2027. This is an increase of 2.1 bcf/d from then current 14.5 bcf/d to 16.6 bcf/d. (iii) So total expansion of 6.5 bcf/d from current 10.1 bcf/d to 14.5 bcf/d sometime in 2025, and then to ultimate 16.6 bcf/d sometime in 2027."

Natural Gas – Japan weather in March was hottest on record since 1898

Japan had warmest March since 1898

No wonder JKM LNG prices crashed in March – it was very hot in Asia so there was no real late winter natural gas demand. On Thursday, the Japan Meteorological Agency provided its March recap [LINK], which noted that average temp anomalies for the month of March were the hottest on record since 1898. Notably, the northern and eastern regions experienced particularly hot temperatures throughout the month which tied 2021 temps for the highest since 1946. We tweeted [LINK], *"Reminder why JKM #LNG prices crashed in March. Japan Meteorological Agency "Monthly mean temperature anomaly over Japan was +2.75 ℃, the highest on record for March since 1898." #NatGas. #OOTT."* Below is a figure from the JMA's monthly highlights.

Figure 12: JMA Temperature Anomalies for March 2023



Source: Japan Meteorology Agency

Natural Gas – Japan's LNG stocks down -0.83% WoW to ~115 bcf

Japan LNG stocks -0.83% WoW

Japan had a mild winter and was able to escape any weather-driven LNG shortages. It's shoulder season now 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 Apr 9 were ~115 bcf -0.83% WoW from Apr 2 of ~116 bcf and well above the 5-year average of 94 bcf. Below is the LNG stocks graph from the METI weekly report.

Figure 13: Japan's LNG Stocks

Source: METI

Natural Gas – China's YTD natural gas imports down -3.6% YoY in March

China natural gas imports

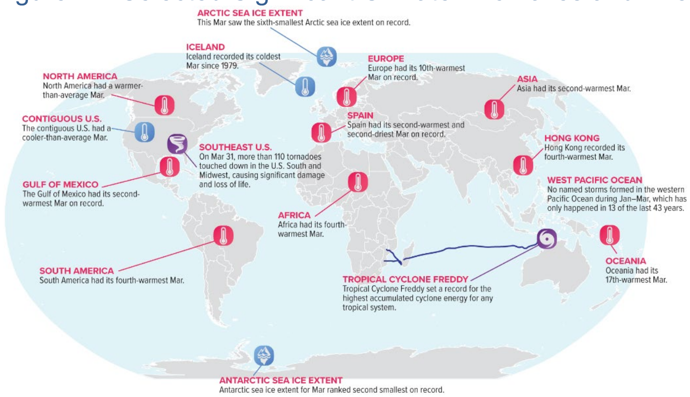
No one should have been surprised to see China natural gas imports down YoY in Jan/Feb with the mild weather, increasing domestic natural gas production, earlier Lunar New Year, etc. And as noted below, it was the 2nd hottest March in Asia. China's natural gas import data reflects the cumulative YTD import volumes up to March with YoY comparisons to using YTD total imports for the same 3-month period last year. On Thursday, Bloomberg reported on China's preliminary import data for Mar that was posted on the General Administration of Customs website. Bloomberg reported "*[China] Natural gas imports in March 8.869m tons; Natural gas imports YTD fell 3.6% y/y to 26.749m tons".* Natural gas imports for Mar totalled 8.869m MT (~11.75 bcf/d) bringing total YTD imports to 26.749m MT (~12.21 bcf/d) which is down -3.6% compared to the same 3-month period last year. Although a MoM comparison is not possible due to the Jan-Feb data being consolidated, YTD import volumes of ~12.21 bcf/d in March is -2.2% below the YTD imports of ~12.48 bcf/d in Feb. 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 – Europe was saved this winter with 2nd warmest March for the globe

2nd warmest March for the globe

We reported regularly this winter on the mild temperatures around the world this winter. It was a mild winter and March was near record warmth around the world, which led to the crashing of JKM LNG and TTF Europe natural gas prices in March. On Thursday, we tweeted [LINK] "*No surprise Europe escaped a natural gas shortage this winter and JKM #LNG and TTF #NatGas prices crashed in March. A mild winter ended with 2nd warmest March in Asia and 10th warmest March in Europe. Thx @NOAA #OOTT."* This week, NOAA posted its Global Climate Recap for March [LINK] and March 2023 was the 2nd warmest March for the globe in NOAA's 174-year record. And that included it being the 2nd warmest March on record for Asia and the 10th warmest March on record to Europe. No wonder Europe was saved from a natural gas crisis this winter.

Figure 14: Selected Significant Climate Anomalies and Events: March 2023



Source: NOAA

Natural Gas – Germany shuts down remaining nuclear power plants

Germany shuts down nuclear plants

Last night, Germany went thru with its promise to shut down its last three nuclear power plants, and now will be relying on renewables, natural gas and coal for power. Germany will be hoping for another warm winter. Last night, Handelsblatt reported [LINK] "*Nuclear power plants have been shut down for good. With the Isar 2 reactor, the last nuclear power plant still in operation in Bavaria has been taken off the grid. At 23:52 p.m., the connection to the grid was disconnected from the nuclear power plant in Essenbach, Lower Bavaria, as a spokeswoman for the operator Preussen-Elektra told the German Press Agency. Lingen The reactor has also been shut down in the meantime. A good hour earlier, the Emsland nuclear power plant in Lower Saxony had already been shut down. The third remaining nuclear power plant Neckarwestheim 2 in Baden-Württemberg was also to be taken off the grid by midnight, but initially no announcement was available. This would mean that the German nuclear phase-out would then be completed.*

Natural Gas – Bloomberg, minimal flows resumed at France's Elengy's LNG terminals

France LNG terminals

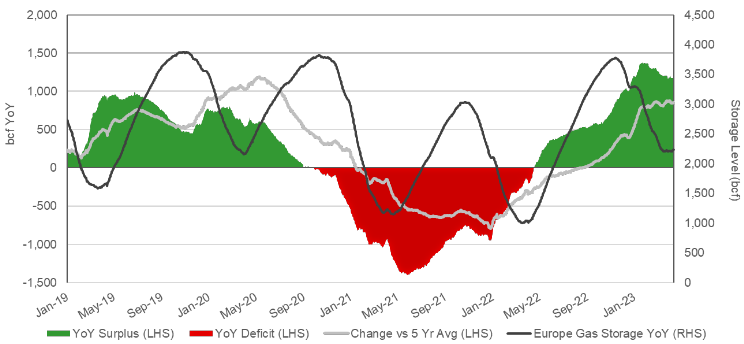
It's hard not to worry about what will happen in France with the increasing protests/strikes on a broad scale. And there is no predictability on what will happen including to LNG, oil and nuclear. But for now, it seems like the France LNG import facilities are operating at reduced levels. On Friday, Bloomberg reported "*Three of France's liquefied natural gas terminals, operated by Elengy SA, have been largely blocked by the strikes since early March. A fourth, Dunkerque LNG, faces regular interruptions. Ships hauling the fuel have diverted to nations including Spain and the UK. Minimal flows have now resumed at Elengy's terminals, and vessel offloadings may restart from this weekend onwards. But the country's LNG imports have already taken a serious hit. Flows declined by 1.1 million tons from February to March, mainly due to strike disruptions, vessel-tracking data show. That's about €650 million worth of LNG, according to Bloomberg calculations.*"

Natural Gas – Europe storage is now +20.82% vs 5-yr average, but within 5-yr range

Europe gas storage

The big global natural gas story for Q1/23 was how mild winters in Europe and Asia were the key reason why Europe made it through winter without a natural gas shortage. There was negligible weather driven demand for natural gas, which along with the continued industrial demand destruction, meant storage levels are at still at high levels. However, we are seeing a narrowing of Europe gas storage surplus with the lower European natural gas price and strikes halting some France LNG imports. This winter (Nov 1/22) began with gas storage at 94.94% capacity, up 17.86% YoY and is now a YoY surplus of 28.80%. However, temperatures remained a bit warmer this past week resulting in storage increasing slightly by +0.65% WoW to 56.09% on Apr 14. Storage is now +28.80% greater than last year levels of 27.29% and is +20.82% above the 5-year average of 35.27%. In addition, current storage is currently within the 5-year range, albeit at the top end of the range. Below is our graph of Europe Gas Storage Level.

Figure 15: Europe Gas Storage Level



Source: Bloomberg

Oil – US oil rigs down -2 rigs WoW to 588 oil rigs on April 14

US oil rigs down -2 WoW

Baker Hughes released its weekly North American drilling activity data on Friday. This week total US oil rigs were down another -2 to 588 rigs as of April 14. The total US oil rig count is now at 588 rigs, up +40 YoY, +107 from the 2022 low of 481 rigs in January and +416 since the 2020 low of 172 rigs on Aug 14. Notably, on a per basin basis the Permian added +3 rigs to 351 oil rigs while the Eagleford, Cana Woodford, and Granite Wash each saw a -1 rig decline to 61, 28 and 4 rigs, respectively which makes sense granted WTI is currently >$80. In addition, Haynesville saw a -2 gas rig decline which also makes sense given weakness in HH prices. US gas rigs were down -1 rig WoW to a total of 157 rigs, an increase of +14 rigs YoY, which came to some surprise while continue to expect that US gas rigs will decline to a greater extent over the coming weeks. Below is our graph of total US rigs.

Figure 16: Baker Hughes Total US Oil Rigs

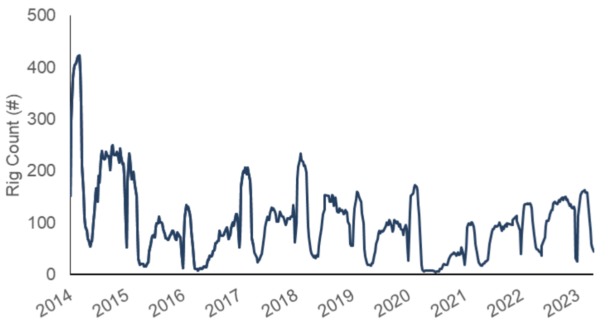
Source: Baker Hughes

Oil – Total Cdn rigs down -16 WoW to 111 total rigs, +8 rigs YoY

Cdn total rigs -16 WoW

The traditional winter drilling season in Canada has come to an end and as expected, Cdn rigs saw another material WoW decline. Moving forward, we expect to see small rig declines over the next few weeks as we get deeper into spring breakup. Total Cdn rigs were down -16 WoW to 111 rigs as of Apr 14. Notably, the week of Apr 14 saw declines of -15 rigs in AB and -1 rig in BC, with all other provinces flat WoW. There is now a total of 111 active rigs, +55 rigs vs the comparable Covid period of 56 rigs on Apr 16, 2021. Cdn oil rigs fell by -7 rigs WoW and gas drilling rigs fell by -9 rigs WoW to 45 and 66 rigs, respectively. Cdn oil rigs are now -4 YoY compared to 49 rigs last year while gas rigs are +12 YoY from 54 rigs. Below is our graph of total Cdn oil rigs.

Figure 17: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production up +0.100 mmb/d WoW to 12.3 mmb/d

US oil production up WoW

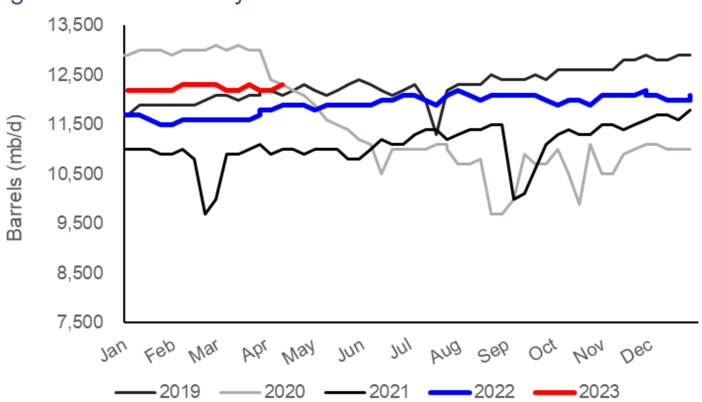
The EIA estimates US oil production was up +0.100 mmb/d WoW to 12.3 mmb/d for the week ended Apr 7 with the Lower 48 and Alaska both up to 11.9 mmb/d and 0.440 mmb/d, respectively. US oil production, based on the weekly estimates, was mostly range bound in 2022 between 11.9 to 12.1 mmb/d since the 2nd week of May. But this year production broke above 12.1 mmb/d to 12.2 mmb/d for the week ended Jan 6, and has remained at or above 12.2 mmb/d ever since. The first time since it touched 12.2 mmb/d since the pandemic was the 1st week of August in 2022. Total US production reached its highest level since March 13, 2020, this year on Feb 3 at 12.3 mmb/d. US oil production is up +0.400 mmb/d YoY at 12.3 mmb/d but is still down significantly at -0.800 mmb/d since the 2020 peak of 13.1 mmb/d on March 13.

Figure 18: EIA's Estimated Weekly US Oil Production

Year-Month	Week 1		Week 2		Week 3		Week 4		Week 5	
	End Date	Value	End Date	Value	End Date	Value	End Date	Value	End Date	Value
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	03/17	12,300	03/24	12,200	03/31	12,200
2023-Apr	04/07	12,300								

Source: EIA

Figure 19: US Weekly Oil Production



Source: EIA, SAF

EIA Jan actuals were +262,000 b/d vs EIA weekly estimates
As a reminder there is a sizeable difference between what the EIA looks as "actuals" for US oil production vs the EIA's weekly estimates noted above. Here is what we wrote in last week's (Apr 2, 2023) Energy Tidbits memo. *"On Friday, we tweeted [LINK] "US oil production stronger than most expect. Jan 23 was 12.462 mmbd, +1.093 mmbd YoY vs 11.369 in Jan 22. @EIAgov actuals from Form 914 today. Biggest YoY increases: New Mexico +0.449 YoY to 1.792 mmbd. Texas +0.384 YoY*

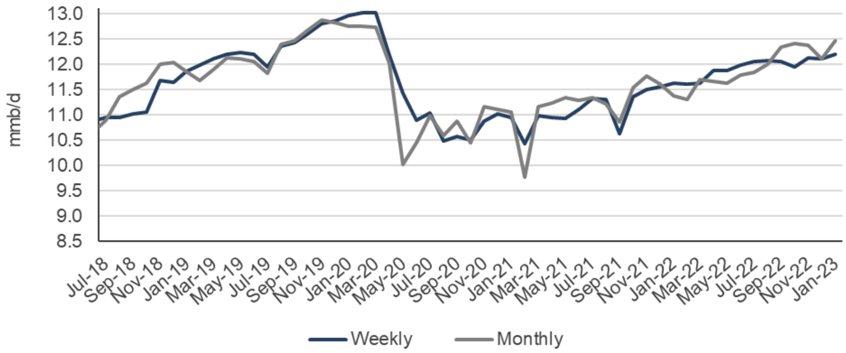
to 5.237 mmbd. Offshore GoM +0.206 YoY to 1.914 mmbd. #OOTT." On Friday, The EIA released its Form 914 data [LINK], which is the EIA's "actuals" for January US oil and natural gas production. There were two key takeaways from the EIA's weekly US oil production data for Jan – the actuals were 262,000 b/d more than the weekly estimates, and Jan was the highest US oil production since Covid at +1.093 mmb/d YoY to 12.462 mmb/d. There was a moderate MoM increase in US oil production in Jan. (i) Form 914 estimates total US oil production was up +347,000 b/d MoM to 12.462 mmb/d in January. The actuals for January were 262,000 b/d higher than the EIA's weekly estimates that worked out to 12,200 mmb/d. December actuals were adjusted higher to 12.115 mmb/d from 12.101 mmb/d in last months Form 914. (ii) This is the highest since Covid. There was a big MoM jump of +0.347 mmb/d vs Dec of 12.115 mmbd but remember Dec was hit by weather. Our Supplemental Documents package includes the New Mexico, Texas and offshore Gulf of Mexico tables attached to our tweet."

Figure 20: EIA Form 914 US Oil Production (thousand b/d)

State	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	12,462											
2022	11,369	11,316	11,701	11,668	11,629	11,797	11,844	12,002	12,337	12,417	12,379	12,115
2021	11,124	9,925	11,326	11,305	11,356	11,356	11,347	11,277	10,918	11,569	11,790	11,634
2020	12,852	12,842	12,797	11,914	9,713	10,442	11,006	10,577	10,921	10,457	11,196	11,168
2019	11,869	11,673	11,913	12,149	12,154	12,218	11,902	12,486	12,590	12,809	13,000	12,978
2018	10,001	10,281	10,467	10,500	10,435	10,641	10,897	11,392	11,443	11,509	11,886	11,945
2017	8,875	9,110	9,166	9,101	9,185	9,111	9,247	9,250	9,517	9,669	10,085	9,983

Source: EIA

Figure 21: EIA Form 914 US Oil Production vs Weekly Estimate



Source: EIA

Oil – EIA STEO increases 2023 oil production; Q1/23 revised up by +0.23 mmb/d

EIA increases 2023 oil production forecast

The EIA posted its April Short-Term Energy Outlook on Tuesday [LINK]. (i) Last month, the EIA decreased its 2023 oil production forecasts based on lower Q4/22 exit production while the April STEO forecast shows an increase in 2023 production to 12.54 mmb/d, up +97,500 b/d from March's forecast of 12.44 mmb/d. Notably, all four quarters were revised up while Q1/23 saw that largest increase of +0.23 mmb/d to 12.54 mmb/d, which is in-line with the full-year average production estimate. (ii) The EIA made no revisions to its 2022 forecast with

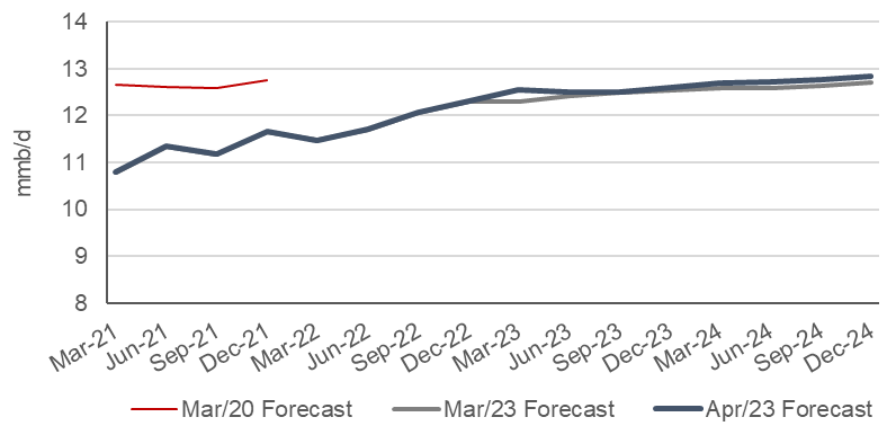
Q4/22 production at 12.30 mmb/d in the April STEO. (iii) STEO 2023 average forecast is 12.54 mmb/d, which is up ~65,000 b/d YoY from 2022's exit production of 12.44 mmb/d. (iv) The EIA increased its 2024 oil production forecast by +122,500 b/d to 12.75 mmb/d compared to 12.63 mmb/d in the March STEO, which is a YoY increase of +0.21 mmb/d.

Figure 22: Estimated US Crude Oil Production by Forecast Month

(million b/d)	Q1/21	Q2/21	Q3/21	Q4/21	2021	Q1/22	Q2/22	Q3/22	Q4/22	2022	Q1/23	Q2/23	Q3/23	Q4/23	2023	Q1/24	Q2/24	Q3/24	Q4/24	2024
Apr-2023	10.79	11.34	11.18	11.66	11.24	11.47	11.70	12.06	12.30	11.88	12.54	12.50	12.50	12.61	12.54	12.69	12.71	12.77	12.83	12.75
Mar-2023	10.79	11.34	11.18	11.66	11.24	11.47	11.70	12.06	12.30	11.88	12.31	12.43	12.48	12.54	12.44	12.58	12.58	12.64	12.71	12.63
Feb-2023	10.82	11.34	11.18	11.66	11.25	11.47	11.70	12.06	12.36	11.90	12.44	12.46	12.49	12.56	12.49	12.63	12.62	12.65	12.70	12.65
Jan-2023	10.82	11.34	11.18	11.66	11.25	11.47	11.70	12.05	12.23	11.86	12.37	12.34	12.40	12.51	12.41	12.63	12.72	12.86	13.03	12.81
Dec-2022	10.82	11.34	11.18	11.66	11.25	11.46	11.70	12.03	12.29	11.87	12.24	12.24	12.34	12.51	12.33					
Nov-2022	10.82	11.34	11.18	11.66	11.25	11.46	11.70	11.99	12.15	11.82	12.22	12.24	12.32	12.48	12.31					
Oct-2022	10.82	11.34	11.18	11.66	11.25	11.46	11.70	11.83	11.99	11.74	12.27	12.29	12.36	12.50	12.35					
Sep-2022	10.82	11.34	11.18	11.66	11.25	11.47	11.70	11.81	12.16	11.79	12.42	12.55	12.70	12.87	12.63					
Aug-2022	10.82	11.34	11.18	11.66	11.25	11.46	11.69	12.01	12.28	11.86	12.39	12.50	12.82	13.10	12.70					
Jul-2022	10.69	11.28	11.13	11.63	11.19	11.46	11.75	12.08	12.34	11.91	12.45	12.58	12.87	13.17	12.77					
Jun-2022	10.69	11.28	11.13	11.63	11.19	11.45	11.71	12.08	12.43	11.92	12.64	12.82	13.07	13.33	12.97					
May-2022	10.69	11.28	11.13	11.63	11.19	11.42	11.78	12.07	12.35	11.91	12.56	12.71	12.94	13.18	12.85					
Apr-2022	10.69	11.28	11.13	11.63	11.19	11.52	11.90	12.15	12.46	12.01	12.73	12.88	13.02	13.17	12.95					
Mar-2022	10.69	11.28	11.13	11.62	11.18	11.59	11.89	12.15	12.48	12.03	12.75	12.91	13.06	13.24	12.99					
Feb-2022	10.69	11.28	11.13	11.69	11.20	11.67	11.86	12.06	12.27	11.97	12.46	12.54	12.63	12.75	12.60					
Jan-2022	10.69	11.28	11.12	11.54	11.16	11.58	11.70	11.88	12.05	11.80	12.26	12.33	12.46	12.58	12.41					
Dec-2021	10.69	11.28	11.11	11.63	11.18	11.67	11.72	11.91	12.09	11.85										
Nov-2021	10.69	11.28	11.07	11.47	11.13	11.69	11.77	11.97	12.16	11.90										
Oct-2021	10.69	11.28	10.98	11.13	11.02	11.54	11.64	11.78	11.96	11.73										
Sep-2021	10.69	11.28	11.06	11.28	11.08	11.42	11.58	11.81	12.06	11.72										
Aug-2021	10.69	11.22	11.26	11.30	11.12	11.46	11.62	11.86	12.11	11.77										
Jul-2021	10.70	11.20	11.17	11.34	11.10	11.54	11.72	11.95	12.20	11.85										
Jun-2021	10.70	11.04	11.17	11.38	11.08	11.55	11.67	11.88	12.05	11.79										
May-2021	10.65	10.97	11.12	11.34	11.02	11.51	11.68	11.96	12.21	11.84										
Apr-2021	10.75	10.93	11.13	11.35	11.04	11.54	11.74	11.99	12.18	11.86										

Source: EIA STEO

Figure 23: Estimated US Crude Oil Production by Forecast Month



Source: EIA STEO

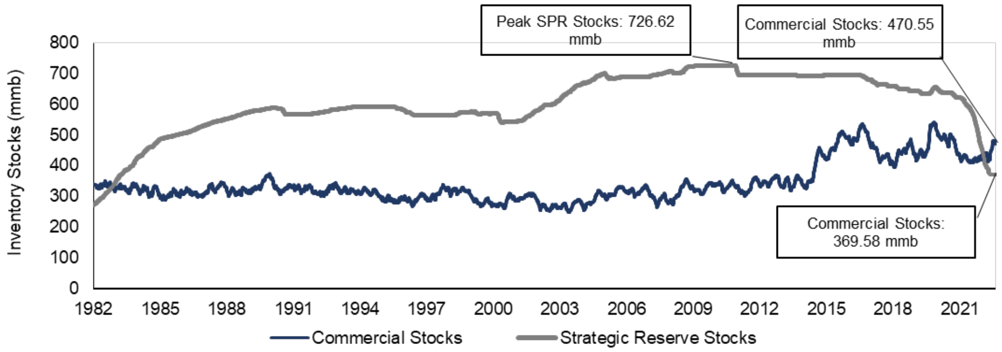
Oil – US SPR reserves now -100.97 mmb lower than commercial crude oil reserves

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 again this week due to the build in commercial oil stocks. However, this week's data showed another SPR draw of -1.60 mmb compared to the -0.404 mmb draw last week and came after 10 consecutive weeks of no change up until the Jan 13 week. The EIA's new weekly oil data for Apr 7 has SPR reserves at 369.58 mmb vs commercial crude oil reserves at 470.55 mmb.

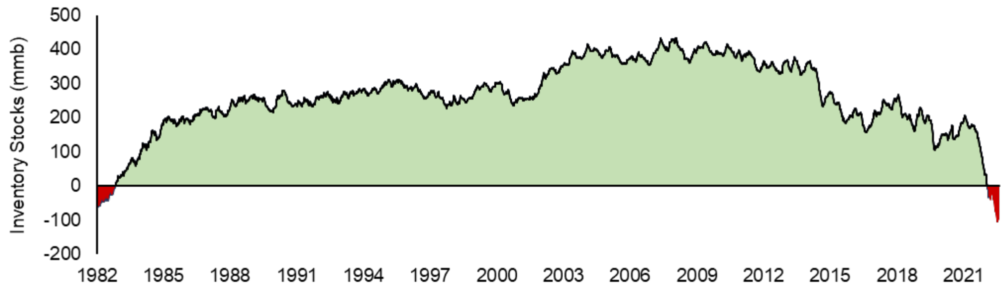
The last time the SPR was down at this level was in Nov 1983 at 369.57 mmb. The below graphs highlight the difference between commercial and SPR stockpiles.

Figure 24: US Oil Inventories: Commercial & SPR



Source: EIA

Figure 25: 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 – Granholm look to buy for SPR post Jun/July if advantageous to taxpayer

Granholm on SPR purchases

It looks like Energy Secretary Granholm I snow out there with a consistent clearer message on what Biden plans to do with SPR refilling. Recall her first comments that there wasn't going to be any buying for the SPR, then after the flack, she changed to say they would be starting to buy in 2023. She is now sticking to the latter messaging. And we believe Biden will be looking to do at least some nominal buying for the SPR just so he can say he delivered on his promise to buy back oil for the SPR. On Wednesday, we tweeted [LINK] "*Clearer #SPR message but nominal buying? @SecGranholm "planning on filling it, refilling it", post Jun/Jul "will look to take advantage of prices if it is advantageous to the taxpayer in the rest of the year. so we hope we will be able to START refilling" Thx @JasonBordoff #OOTT.*" Our tweet included the transcript we made of her comments at the Columbia Global Energy Summit 2023. [LINK]. Items in "*italics*" are SAF Group created transcript. Energy Secretary Jennifer Granholm on refilling the SPR. "*we are planning on filling it, refilling it. We want to get it to the place it would have been had it not been for the war and the sales as a result of that. The way the SPR works, it's got four sites, four main sites, two of them are in maintenance right now and two of them are selling oil on the market right now because Congress has mandated the sale of 26 million barrels from previously in order to fill budget holes. So we have a legal obligation to do that. And because of the way the SPR works, you cannot sell and take in at the same time. And so the sales for the Congress's requirements will be finished in the June/July time frame and then we will look to take advantage of prices if it is advantageous to the taxpayer in the rest of the year. So we hope that we will be able to start refilling but it's a lot to refill, meaning 160 milion barrels, so we've go to, its actually a little bit more than that so we've got to recognize and this is another odd thing about the strategic petroleum reserve is that it takes more time to put the oil back in than it does to take it out. So the fill rate is significantly slower than the sell rate, than the outgo rates. So, but we are doing that, so we've got a plan to do it. We're going to cancel some of the sales that Congress had mandated, about 140 million barrels worth of sales so that we will get back up to where we would have been had it not been for these sales. We still have the largest petroleum reserve in the world right now. So be clear about that, we have lots of reserve but we also want to take advantage if the market is right.*"

Granholm's original not buying for SPR in 2023 irritated the Saudis

Here is what we wrote in last week's (Apr 9, 2023) Energy Tidbits. "*We don't think Granholm's comments about not buying oil for SPR in 2023 were the deciding factor in why OPEC went ahead with the surprise cuts, but we have to believe it was a reminder to OPEC that Biden's promise to buy back for the SPR was not something OPEC could count on as they looked at 2023 demand/supply. The FT reported [LINK] "People familiar with Saudi Arabia's thinking say Riyadh was irritated last week that the Biden administration publicly ruled out new crude purchases to replenish a strategic stockpile that had been drained last year as the White House battled to tame inflation. Energy secretary Jennifer Granholm's statement that it could take "years" to refill the reserve sent oil prices briefly lower. The White House had previously offered reassurance to Saudi Arabia that it would step in to make purchases for its strategic reserve if prices fell." Our Supplemental Documents package includes the FT report.*"

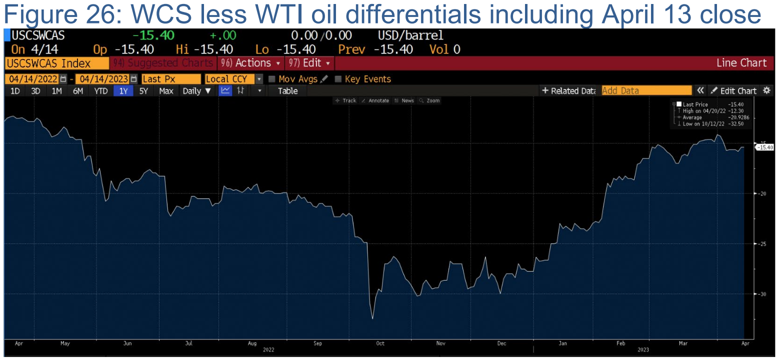
Oil – Cdn oil differentials narrowed slightly $0.20 to close at $15.40 on Apr 13

It will be interesting to watch how the April 3 announced OPEC+ voluntary cuts effective May 1 play out on global heavy/medium oil differentials. Normally, the first barrels cut by OPEC members like Saudi Arabia are medium/heavy barrels, which would tend to compete vs

WCS less WTI differentials

WCS. So less barrels OPEC medium/heavy barrels is normally a boost to WCS prices. Since the Apr 3 OPEC+ announcement, WCS differentials widened $1.45 last week and only narrowed $0.20 this week to close at $15.40 on Apr 13. The WCS-WTI differential has narrowed significantly since it reached $26.60 on Jan 6, closed at $23.00 on Jan 31, $16.50 on Feb 28, and then $14.15 on March 31, which was the Friday before the weekend news of the OPEC+ voluntary cuts. For perspective, a year ago, the WCS-WTI differential was $12.80 on April 14, 2022. Below is Bloomberg's current WCS–WTI differential as of April 13, 2023 close.

Figure 26: WCS less WTI oil differentials including April 13 close



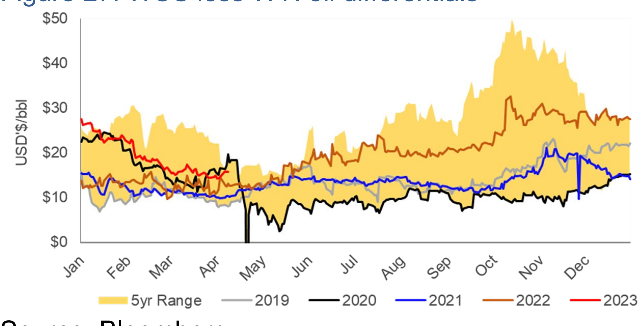
Source: Bloomberg

Oil – This is the season that normally sees narrowing of Cdn heavy oil differentials

WCS differentials normally narrow in spring

Unfortunately, there are often items like Keystone pipeline outage that impact Cdn heavy oil differentials. And the huge item, the release 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 just moving into the time of the year that normally sees Cdn heavy oil differentials narrow. This is the time of year, when refineries tend to maximize production of asphalt ahead of the annual summer paving season. As is said in Canada, there are two seasons in Canada – winter and paving season. Below is graph showing WCS-WTI differentials that shows this normal seasonal trend of narrowing WCS-WTI differentials from Feb thru May.

Figure 27: WCS less WTI oil differentials



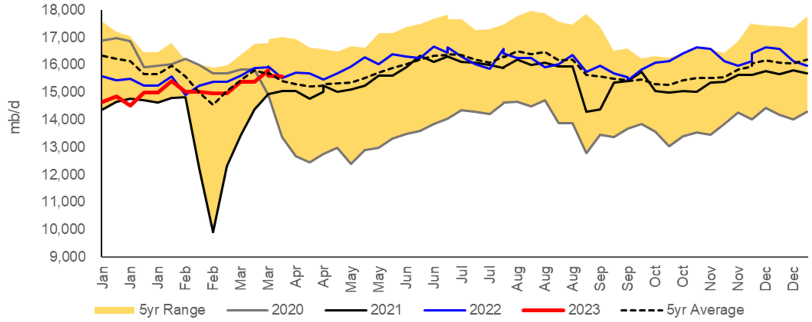
Source: Bloomberg

Oil – Refinery inputs down -0.03 mmb/d WoW to 15.585 mmb/d

Refiners switching to summer fuel blends

Refinery crude oil inputs decreased again this week. There are always unplanned refinery issues, and 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 Apr 7. The EIA reported crude oil inputs to refineries were down -0.03 mmb/d this week to 15.585 mmb/d but are up +0.062 mmb/d YoY from 15.523 mmb/d for the week ended Apr 8, 2022. This week's refinery utilization was down -0.3% WoW to 89.3% and is down -0.7% YoY. Total products supplied (i.e., demand) decreased WoW, down -1.544 mmb/d to 19.055 mmb/d, and Motor gasoline was down -0.359 mmb/d to 8.936 mmb/d from 9.295 mmb/d last week. The 4-week average for Motor Gasoline was up +0.475 mmb/d YoY to 9.084 mmb/d. The 4-week average of Total demand was up +0.143 mmb/d YoY to 20.039 mmb/d.

Figure 28: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA

Oil – Strikes ended, for now, at France's oil refineries will bring back demand

France refineries resume operations

Last week's (April 9, 2023) Energy Tidbits noted the good news for oil markets with the reports that strikes were being lifted this week at TotalEnergies and Exxon's refineries in France. This has been a negative to oil as there has been up to 900,000 b/d of refinery capacity offline because of the strikes. On Friday, Bloomberg reported "*As with LNG facilities, the strikes halted operations at France's fuel terminals, oil refineries and petrochemicals plants. Tankers have also diverted to countries that are able to unload oil cargoes. France has has relied more on fuel inventories during this round of strikes than it did during separate walkouts in October, due to disruptions at ports, according to researcher Facts Global Energy. Meanwhile, the French government has released more than 3 million barrels of crude from its strategic stockpiles since early March. France has six major oil refineries, and while operations have recovered to some extent, the damage from the strikes could linger. It may take weeks to restream some plants because of the length of time they were out of service, FGE said.*"

Figure 29: France oil refinery operating status

Refinery	Owner	Status
Port Jerome-Gravenchon	Exxon Mobil	Operating normally as of April 14, according to company.
Fos-Sur-Mer	Exxon Mobil	Operating normally as of April 14, according to company.
Lavera	PetroIneos	Crude unit restarted early April, according to Wood Mackenzie.
Donges	TotalEnergies	Halted before the latest strikes due to fault. Restart in progress as of April 11.
Gonfreville	TotalEnergies	Restarting units as of April 11.
Feyzin	TotalEnergies	In service, though the full extent isn't known. Wood Mackenzie reported some units down as of April 12.

Source: Bloomberg

Oil – US "net" oil imports up +1.561 mmb/d WoW to 3.466 mmb/d

US net oil imports

US "NET" imports were up +1.561 mmb/d to 3.466 mmb/d for the Apr 7 week. US imports were down -0.951 mmb/d to 6.193 mmb/d. US exports were down -2.512 mmb/d to 2.727 mmb/d. The WoW decrease in US oil imports was driven in part by "Others" while the Top 10 had a decrease of -0.918 mmb/d. Some items to note on the by country data. (i) Canada was down this week -0.390 mmb/d to 3.590 mmb/d. (ii) Saudi Arabia was down -0.138 mmb/d to 0.376 mmb/d. (iii) Colombia was up +0.088 mmb/d to 0.159 mmb/d. (iv) Ecuador was up +0.162 mmb/d to 0.242 mmb/d. (v) Iraq was down -0.104 mmb/d to 0.241 mmb/d. (vi) Mexico was down -0.470 mmb/d to 0.450 mmb/d.

Figure 30: US Weekly Preliminary Oil Imports by Major Countries

(thousand b/d)	Jan 20/23	Jan 27/23	Feb 3/23	Feb 10/23	Feb 17/23	Feb 24/23	Mar 3/23	Mar 10/23	Mar 17/23	Mar 24/23	Mar 31/23	Apr 7/23	WoW
Canada	3,419	3,587	3,856	3,556	3,197	3,605	3,780	3,371	3,240	2,957	3,980	3,590	-390
Saudi Arabia	433	640	384	262	545	310	476	385	483	228	514	376	-138
Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	511	758	913	690	683	725	556	633	1,118	541	920	450	-470
Colombia	244	216	70	143	284	143	222	294	244	269	71	159	88
Iraq	195	469	230	322	251	290	265	346	144	138	345	241	-104
Ecuador	69	243	207	156	145	97	55	46	0	118	80	242	162
Nigeria	114	317	248	75	256	98	243	170	129	104	302	236	-66
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	4,985	6,230	5,908	5,204	5,361	5,268	5,597	5,245	5,358	4,355	6,212	5,294	-918
Others	920	1,053	1,150	1,028	965	940	674	971	814	970	932	899	-33
Total US	5,905	7,283	7,058	6,232	6,326	6,208	6,271	6,216	6,172	5,325	7,144	6,193	-951

Source: EIA

Oil – OPEC MOMR: Neutral on the data, but voluntary cuts set up even stronger H2

OPEC Monthly Oil Market Report

On Thursday, OPEC released its Monthly Oil Market Report at ~5:30 am MT. (i) We thought the overall takeaway from the data and forecasts was neutral, but the Aprll 3 announced OPEC voluntary cuts set up an even stronger H2/23. (ii) Reminder OPEC does not forecast OPEC+ production so it's 2023 forecast doesn't the impact of the April 3 voluntary cuts of 1.16 mmb/d. These cuts start May 1 and run thru year-end. In addition, Russia had its voluntary cut of 500,000 b/d by the end of March thru at least June 30. These additional OPEC cuts are what makes H2/23 much stronger given OPEC hasn't really changed its balance of 2023 oil supply and demand forecasts. (iii) 2023 average demand was basically unchanged at 101.89 mmb/d (was 101.90). (iv) Notably, the 2023 outlook does not seem show the normal quarterly trends in oil demand. Normally, Q1 is down vs the prior year Q4, and Q2 tends to see a marginal ramp up followed by a significant seasonal increase in Q3. In contrast, OPEC's current 2023 outlook shows a QoQ increase of +0.53 mmb/d between Q4/22 and Q1/23, and a QoQ decrease of -0.85 mmb/d from Q2/23 to Q3/23. OPEC's 2023 demand changes by quarter: Q1/23 now 101.55 mmb/d (was 101.28) which implies a +0.53 mmb/d increase over Q4/22. Q2/23 now 100.70 mmb/d (was 100.77) implying a -0.85 mmb/d decrease from Q1. Q3/23 now 102.03 mmb/d (was 102.14), an increase of +1.33 mmb/d over Q2. Q4/23 demand now 103.27 mmb/d (was 103.39). This means 2023 YoY growth remains unchanged at +2.32 mmb/d. (v) China demand forecast for 2023 was increased to 15.61 mmb/d, compared to 15.56 mmb/d in the Mar MOMR and 15.40 mmb/d in the Feb MOMR. The increase was due to a stronger Q1/23 China demand up to 15.43 mmb/d (was 15.23), while all other quarters remained unchanged with Q2/23 at 15.40 mmb/d, Q3/23 at 15.43. (vi) non-OPEC supply. For 2023, YoY growth was decreased slightly to +1.43 mmb/d with average production of 67.19 mmb/d (was +1.44 and 67.20). Note that 2023 growth is inclusive of NGLs. Key YoY non-OPEC growth areas are US +1.04 mmb/d YoY (was +1.07), Brazil +0.25 mmb/d YoY (was +0.20), Norway +0.18 mmb/d YoY (was +0.20), Canada +0.17 mmb/d YoY (unchanged), and Kazakhstan +0.11 mmb/d YoY (was +0.16). In contrast, Russia was unchanged at -0.75 mmb/d YoY. For the US, OPEC estimates +1.04 mmb/d YoY to 20.24 mmb/d in 2023 (was +1.07 mmb/d to 20.27 mmb/d) and US tight/shale oil supply was increased slightly to YoY growth of +0.69 mmb/d to 8.53 mmb/d (was +0.72 mmb/d to 8.49 mmb/d). (vii) OPEC Secondary Sources for Mar was down -86,000 b/d MoM to 28.797 mmb/d. The OPEC10 share of the MoM decrease was -1.273 mmb/d and the non-OPEC share was -0.727 mmb/d. (vii) Direct Communications (what the OPEC countries report). There were a few items to note vs what countries directly reported vs Secondary Sources estimates: Libya did not provide direct communications estimate for Mar. Venezuela says it produced 754,000 b/d in Mar, above the 695,000 b/d reported by Secondary Sources. Iraq says it produced 4.200 mmb/d vs Secondary Sources of 4.358 mmb/d. Finally, Nigeria says it produced 1.268 mmb/d compared to the 1.354 mmb/d reported by Secondary Sources. Our Supplemental Documents package includes excerpts from the Mar OPEC MOMR.

Oil – IEA OMR: bullish oil view fo H2/23

IEA Oil Market Report

On Friday, the IEA released its monthly Oil Market Report for March at 2am 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. We tweeted [LINK], *"Brent is only +$0.60 since @IEA OMR at 2am MT. OECD stocks "show a hefty 38.9 mb decline in Mar". solid China Q1 recovery. oil market balance was already set to tighten in H2/23 with potential "substantial supply deficit to emerge" and that was before new OPEC cuts. #OOTT."* (i) The overall message is bullish with the OPEC voluntary cuts and higher prices ahead. Plus, China oil demand is stronger than expected and global stocks look to flip to a deficit sooner than they expected last month. The IEA forecasts another new record oil demand in 2023 and with huge YoY oil demand momentum to exit 2023. (ii) The IEA made an minor reduction in its 2023 oil demand forecast to 101.9 mmb/d (was 102.0), implying YoY growth of +2.0 mmb/d. Despite the slight downward revision, total demand of 101.9 in 2023 mmb/d is a record high and well above pre-Covid of 100.5 mmb/d. (iii) The IEA sees oil markets moving from a surplus in H1 to a deficit in H2. IEA forecasts Q2/23 demand +0l.8 mmb/d QoQ to 101.2

mmb/d, Q3/23 +1.9 mmb/d QoQ to 103.1 mmb/d, Q4/23 down 0.1 mmb/d QoQ to 103.0 mmb/d. (iv) IEA notes, *"Russian oil exports in March soared to the highest since April 2020"*. IEA estimates Russia oil production was down -290,000 b/d in March to 9.58 mmb/d from 9.97 mmb/d in Feb. Note this is an average for the month and wouldn't reflect the full impact of Russia saying they cut more at the end of March. (v) The IEA writes *"While oil demand in developed nations has underwhelmed in recent months, slowed by warmer weather and sluggish industrial activity, robust gains in China and other non-OECD countries are providing a strong offset. In 1Q23, OECD oil demand fell 390 kb/d y-o-y, but a solid Chinese rebound lifted global oil demand 810 kb/d above year-earlier levels to 100.4 mb/d. A much stronger increase of 2.7 mb/d is expected through year-end, propelled by a continued recovery in China and international travel. For 2023 as a whole, world oil demand is forecast to rise by an average 2 mb/d, to 101.9 mb/d, with the non-OECD accounting for 87% of the growth and China alone making up more than half the global increase. Meeting those gains may prove challenging as the new OPEC+ cuts could reduce output by 1.4 mb/d from March through year-end, more than offsetting a 1 mb/d increase in non-OPEC+ production."* (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 - stocks are moving from surplus to deficit. This is sooner than the IEA previously expected, they thought it wouldn't flip to a deficit until H2/23 and now it looks like it is doing so in Q2/23, although they don't say so specifically. However, in Feb the IEA estimated the deficit of OECD industry stocks narrowed at Dec 31 vs Nov 30. The Feb OMR estimated 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) Apr OMR noted that non-OPEC supply growth increased by +0.4 mmb/d YoY for 2023, now +1.6 mmb/d YoY to 67.1 mmb/d (was 66.9 mmb/d). Our Supplemental documents package includes the IEA release and the Bloomberg reports.

Figure 31: 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
Apr 23	91.0	97.7	6.7	99.6	98.7	100.7	100.7	99.9	2.2	100.4	101.2	103.1	103.0	101.9	2.0
Mar 23	91.0	97.7	6.7	99.6	98.8	100.8	101.0	99.9	2.2	100.7	101.3	101.9	101.9	101.5	1.6
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 –Bloomberg "*Fracturing US-Saudi Oil Pact Adds to Fed's Inflation Stress*"

Fracturing US-Saudi oil pact

We wonder why people seem surprised that Saudi Arabia no longer marches to the tune of the US in all matters. It's almost like the Biden Administration believes if more of the western media highlights the deteriorating Saudi/US relations, it will force the Saudis to come back into the fold. Our view is simple – no one should assume MBS will be marching to the US tune. Rather, he will be doing whatever he thinks is best for Saudi Arabia. The Saudi/US relationship is getting more attention and analysis since the April 2 announcement of voluntary production cuts by several OPEC members, led by Saudi Arabia. At that time, the focus was on the US reaction to the cuts or lack of outrage. And what messaging the US would have on this move. It's been two weeks now since the cut and so we have seen more stories/analysis on the Saudi/US relationship. A good example was Thursday's Bloomberg report "*Fracturing US-Saudi Oil Pact Adds to Fed's Inflation Stress*." Bloomberg starts off "*Just three years ago, when OPEC+ oil giants fell out, the US found itself playing the role of peacemaker. Now it looks more like their target. The Saudi-Russia oil alliance has the potential to cause all kinds of trouble for the US economy — and even for President Joe Biden's re-election campaign. This month's OPEC+ decision to cut crude output, for the second time since Biden flew to Saudi Arabia last summer seeking an increase, may be just the start. That April 2 announcement has lifted oil prices by about $5 a barrel. OPEC's own projections show that the cuts will widen the supply shortfall later this year. That means inflation will be higher, and recession risks are bigger than they otherwise would have been — because consumers spending more on energy will have less cash left for other stuff. Russian President Vladimir Putin, meanwhile, gets a bigger war-chest to fund his attack on Ukraine. But more significant is what the OPEC+ move says about the likely path of oil prices over the coming years. In a world of shifting geopolitical alliances, Saudi Arabia is breaking away from Washington's orbit.*" Bloomberg also notes how Biden's comments on MBS have contributed to this relationship fracturing. We don't think anyone disagrees with that, but we do think it is more. And a more fundamental reason is that Saudi Arabia knows it can't necessarily count on the US to help defend its interests in the event of a major attack. Our Supplemental Documents package includes the Bloomberg report.

MBS Saudi first reminds of Kissinger's famous quote

We can't help think of Henry Kissinger when we think of MBS Saudi first priority. The Silent Generation and Baby Boomers will remember former US Secretary of State under Richard Nixon, Henry Kissinger, and one of his famous lines ""*America has no permanent friends or enemies, only interests".* We note that because that is how we see MBS ruling Saudi Arabia. It's also why we wonder why so many people seem surprised that Saudi Arabia no longer marches to the tune of the US in all matters.

Tipping point in Saudi/US relation: Sept 2019 Houthi drone attack on Abqaiq

We agree that Biden's election comments were reinforcing negatives for Saudi Arabia, but we agree with RBC's Helima Croft that the tipping point was the lack of US response to a massive drone attack on Abqaiq in Sept 2019. Here is what we wrote in last week's (April 9, 2023) Energy Tidbits memo. "*We hadn't appreciated the significance to Saudi Arabia of the lack of US response when Saudi's huge Abqaiq oil facility was bombed by the Houthi drone attack in Sept 2019. That is, until we listened to RBC's Helima Croft's Tues webcast "OPEC+ and Geopolitical Update with Helima Croft". On Tuesday, we tweeted [LINK] "Tipping point US/Saudi relations. US response to 09/2019 drone attack on Abqaiq Oil facility. @CroftHelima "from the standpoint of the Saudis, they're also saying look we learned in Sept 2019 if something happens to Saudi, a major attack, that we're kind of on our own" #OOTT." Our tweet included the transcript we made of Croft's comments. SAF Group created transcript of comments by Helima Croft (RBC) on her webcast OPEC+ and Geopolitical UPdagte with Helima Croft on Apr 4, 2023. Transcript* *made from IPhone recording of the call. At 8:24am MT, Croft "… when we think of the broader Saud relationship, the US is not going to be Partner #1. Now the question is if you had a different occupant in the White House, would that change? Is this basically a reflection of the US or just this administration. But even with the Trump administration which was the height I would say of the US/Saudi relations since the Bush administration. Even then, for example when you have that attack on the Abqaiq facility in Sept 2019, the Saudi perspective was they learned the US no longer had a Carter doctrine. We're no longer saying that the protection of energy infrastructure was a core national security interest of the US. So even with Trump, we signaled to the Saudis, hey you know what, Abqaiq is terrible, sorry the Iranians did it but no Americans were killed and this is oil going for Asia. So there has been a decline in that relationship. Even with someone they thought of as a very good partner. The deal they cut with Iran, it caught a lot of people off-guard, but I think the deal with Iran and that China negotiated it was very important. So from the standpoint of the Saudis, they're also saying look we learned in September 2019 if something happens to Saudi, a major attack, that we're kind of on our own."*

05/02/22: Saudi said US relationship has been in the "downs" since Biden election

As a reminder, Saudi Arabia was clear that its relationship went down with Biden's election. Here is what we wrote in our May 8, 2022 Energy Tidbits memo. "*As noted above, we think this interview may be even more significant given the King's going to the hospital today for medical checkups. On Monday, we tweeted [LINK] "Must read. No political speak here. Saudi says US relationship is in the downs since #Biden election. Also US #Oil problems are is "because of its energy policy" Biden made it a policy "to cut all links to what is called the oil and gas industry .." #OOTT". Arab News posted a great interview "Frankly Speaking: Saudis feel let down by America, says Prince Turki Al-Faisal" [LINK] because there were direct comments from Al-Faisal on the current negative relationship with the US. We believe these comments would not have been made in Saudi Arabia media unless MBS was onside and wanted this clear messaging to the Biden administration. We call this a must read as it is a good reminder that the US shouldn't expect any favors from Saudi Arabia. One of Al-Faisal's key comments was "We've had our ups and downs over the years and perhaps, at this time, it's one of the downs, particularly since the president of the US, in his election campaign, said that he will make Saudi Arabia a pariah. And, of course, he went on to practice what he preached: First of all, by stopping the joint operations that America had with the Kingdom in meeting the challenge of the Houthi-led rebellion in Yemen against the Yemeni people. And, second, among other similar actions, by not meeting with (Saudi Arabia's crown prince) and publicly declaring that he would not meet with the crown prince, and, at one stage, withdrawing anti-aircraft missile batteries from the Kingdom when we were facing an increase in attacks by the Houthis using Iranian equipment like missiles and drones." Our Supplemental Documents package includes the Arab News report.*"

Remember MBS's Atlantic March 3, 2022 interview

The April 3 OPEC+ voluntary production cuts were another reminder to the US that Saudi Arabia has its own priorities and isn't going to do what the US wants. We can't help but remember what we wrote in our March 6, 2022 Energy Tidbits. "*Oil – Saudi*

MBS "simply, I do not care" if Biden misunderstands something about him. The Atlantic's March 3 report "Absolute Power" [LINK] based on its interviews Saudi crown prince Mohammed bin Salman got some good headlines. MBS says their "aim is to keep it and strengthen it" talking about their long historical relationship with the US. The headlines were on his Biden comments and warning to not interfere in Saudi domestic issues. The Atlantic wrote "We asked whether Biden misunderstands something about him. "Simply, I do not care," he replied. Alienating the Saudi monarchy, he suggested, would harm Biden's position. "It's up to him to think about the interests of America." He gave a shrug. "Go for it." For now, MBS's main request to the outside world, and especially the United States, is the usual request of misbehaving autocrats—namely, to stay out of his internal affairs. "We don't have the right to lecture you in America," he said. "The same goes the other way." Saudi affairs are for Saudis. "You don't have the right to interfere in our interior issues." It reminds that no one should expect the Saudi's to bend over in anyway to the US on oil. The problem for Biden and the Democrats is that it's difficult to reverse their view on MBS. We look at it as another of the situations where Biden and the Democrats like to have a villain to make sure they can get people onside their views. But by doing so, it makes it difficult for Biden to back track in a public way. It's like now with the oil companies, they really can't say anything positive about them or ask them to help without looking very weak. They made the oil companies the villains to sell energy transition for so long. How can they go back and say something good. They made MBS out to be a huge villain, Biden's team making it clear that Biden wouldn't meet or talk with MBS, only the King, they pulled out a Patriot missile defense system from Saudi Arabia, and have supposedly not given in to Saudi's request for more Patriot missiles to replace the shot missiles. So no surprise by the MBS comments on US. And unfortunately for the US, it means that Saudi isn't likely to help the US unless it helps them. We will be watching to see if there are reports on restocking Patriot missiles and any potential MBS/Biden meeting. Our Supplemental Documents package includes The Atlantic report."

Oil –Saudi's Abdulaziz "who will be the master of this sector"

Abdulaziz is The Man

We have called Saudi Energy Minister Abudlaziz "The Man" because of the way he has been able to be manage oil markets thru the biggest oil shock ever – Covid. There was a good tweet thread by Energy Intelligence's Amena Bakr on comments from Abdulaziz on a Saudi documentary talking about what he did in 2020. It reminded us of his strategic thinking and most of all, how he is acting to ensure Saudi Arabia has control over oil markets. And the reality is that if Saudi controls the oil market, it is good for oil price outlook for 2020s. (i) On Tuesday, we tweeted [LINK] *"Good 👇@Amena__Bakr thread. Why #oil markets look solid for 2020s. Oil consumption is not declining, companies around the world continue to be disciplined on capex, which means Saudi and "The Man", Saudi Energy Minister Abdulaziz, have ability to manage oil markets. #OOTT."* (ii) Here is the Amena Bakr thread. [LINK] "*Saudi Arabia's energy minister Prince Abdulaziz appeared in a documentary series aired by Saudi-owned MBC Group, where he talked about the 2020 decision to flood the oil markets (remember when Russia didn't agree with the cut output). #OOTT*." ""*It wasn't a matter of pricing, or a matter of profit or a matter of income," the minister said of the 2020 decision. "Rather, it's a matter of 'To be or not to be'; who will be the master of this sector?" #OOTT #Opec." "Please go back and read that quote again, because that's at heart of many of the* *policy decisions we are seeing today including the recent voluntary cut. Its NOT about price, its about control, its about ensuring long term market management survival. #OOTT #opec." "To understand why certain decisions happen you also need to understand the background of the person making the decision. There are so many nuances that are missed because it's just too easy to point to price as the main driver. #OOTT."*

Oil – No deal yet but 1sr round of Houthis/Saudi negotiations seemed positive

Saudi/Houthi negotiations

Last week's (Apr 9, 2023) Energy Tidbits memo highlighted the reports that the Houthis and Saudi Arabia would going to start direct, not indirect, negotiations to try to reach an agreement to end the conflict. The direct negotiations were being set up by Oman. Based on the reporting from both sides, it sounds like the meetings were positive and the tone was calm, but there are still outstanding issues to resolve. From afar, it seems like a pretty good first step. After all, we can't believe that after more than eight years there would be an immediate deal. On Friday, Saba (Yemen news that is pro Houthis) reported [LINK] on the meetings and wrote "*The head of the national negotiating delegation, Mohammed Abdel Salam, accompanied the Omani mediation delegation, left on Friday the capital, Sana'a, heading to Muscat. "We finished a round of consultations with the Saudi delegation, in the presence of the Omani mediation in the capital, Sana'a, in a positive and serious atmosphere," Abdulsalam said in a press statement before leaving Sana'a International Airport. He added: "We went through very difficult and intensive consultations that discussed thorny and intertwined issues in the humanitarian, military and political file, and we made progress in some files." He pointed out that other files were not completed, and that the Saudi negotiating delegation left Sana'a for further consultations. He stressed that it was agreed to continue the atmosphere of calm, which is based on the armistice, and to maintain communication. Abdul Salam reaffirmed, "Our view is firm in terms of paying salaries, stopping the comprehensive aggression by land, sea, and air, ending the siege, and completing the file of prisoners, which we witnessed its beginnings today." He stressed that if any setback occurs, the Yemeni armed forces are on standby, and we hope that we will not reach this situation. And not to lose the atmosphere of optimism. He added, "With what has been achieved in the issue of prisoners, we believe that we are progressing towards peace further, and this depends on what we will achieve in the future, and we have not reached the final point yet." The head of the national negotiating delegation had announced, earlier today, the end of the negotiation work that took place with the Saudi aggression party, through Omani mediation, in the capital, Sana'a. Abdul Salam said in a tweet on "Twitter": The delegations ended the negotiation work in the capital, Sana'a, after serious and positive discussions, and progress on some issues, in the hope of completing the research on outstanding issues at a later time. The head of the national delegation expressed his thanks to the brothers in the Sultanate of Oman for their responsible efforts to overcome difficulties and support the peace option."*

Oil – Turkey still hasn't resumed exports of ~450,000 b/d Iraq/Kurdistan oil via Ceyhan

Turkey holds up Kurdistan oil exports

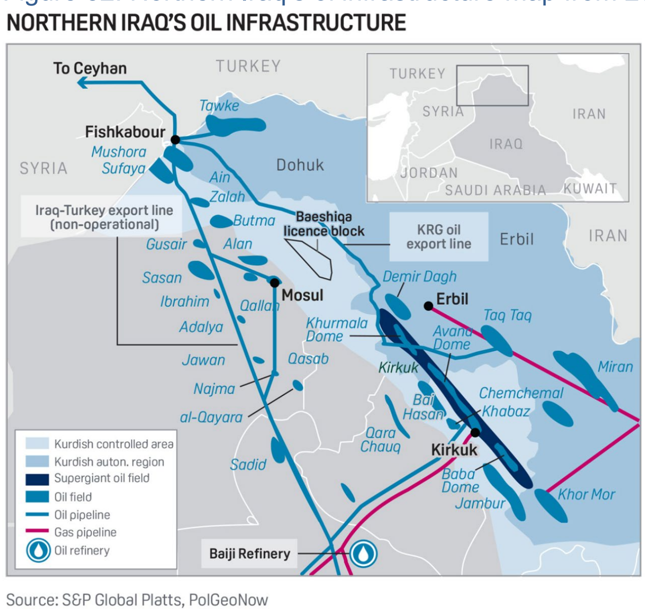
As of our 7am MT news cut off, we have not seen any reports indicating any movement by Turkey to allow the resumption of ~450,000 b/d of Iraq/Kurdistan oil exports via Ceyhan. Recall that Iraq/Kurdistan reached a deal and Kurdistan originally thought it would lead to a resumption of its oil exports to resume on Tues Apr 4. That still hasn't happened and there is no visibility to when it might happen. Yesterday, we tweeted [LINK] "*No visibility to when 450,000 b/d of Iraq/Kurdistan #oil exports via Turkey will resume. "Turkey is seeking in-*

person negotiations relating to the $1.5b if was ordered to pay Iraq in damages". Thx @RowenaCaine @warningforever @Ahmed_Rasheed_R @mahaeldahan. #OOTT." Our tweet included the Reuters Apr 15 report "*Iraq's northern oil exports stuck on Turkey negotiations*". The key excerpt from Reuters was "*Pipeline operators have yet to receive any instruction to restart flows, a source familiar with the exports told Reuters on Friday on condition of anonymity. Two other sources told Reuters that Baghdad has yet to request Turkey reopens the pipeline. "Anything regarding the resumption of oil flows now is in the hands of Baghdad and Turkey, both sides have to reach an agreement to restart flows," said Lawk Ghafuri, head of foreign media affairs for the KRG. Turkey is seeking in-person negotiations relating to the $1.5 billion it was ordered to pay Iraq in damages, a separate source told Reuters. Iraq's state-owned marketer SOMO is waiting to finalise some technical issues essential to restarting flows with the KRG's ministry of natural resources, two Iraqi oil officials told Reuters."* Our Supplemental Documents package includes the Reuters report.

Iraq's court case win halted 370,000 Kurdistan & 75,000 b/d Iraq oil exports
Here is what we wrote in our March 26, 2023 Energy Tidbits memo. "*Breaking news yesterday that Iraq reportedly halted 445,000 b/d of crude oil exports thru its north on the export pipeline to Ceyhan, Turkey. Iraq won an arbitration with Turkey, which means that Turkey has to deal with Iraq's oil marketing arm for approval of all Iraq oil exports, including oil from Kurdistan. It's not clear how long it will take to get to a mechanism for Iraq dealing with Turkey on the oil exports. Don't know if's wishful thinking but Kurdistan media was pointing to not too long to get an understanding. Regardless, until Iraq resumes oil exports via Turkey, it means there will be ~445,000 b/d of crude oil off the market. Yesterday, we tweeted [LINK] Iraq reportedly halts 370 kbd KRG + 75 kbd federal oil thru export pipeline thru Turkey reports @Ahmed_Rasheed_R @RowenaCaine. Positive for #Oil until Iraq resumes northern exports ie. agrees on mechanism to export Iraq oil thru Turkey in line with its arbitration win. #OOTT." Yesterday, Reuters reported [LINK] "Iraq halted crude exports from the semi-autonomous Kurdistan region and northern Kirkuk fields on Saturday, an oil official told Reuters, after the country won a longstanding arbitration case against Turkey. The decision to stop shipments of 450,000 barrels per day (bpd) of crude relates to a case from 2014, when Baghdad claimed that Turkey violated a joint agreement by allowing the Kurdistan Regional Government (KRG) to export oil through a pipeline to the Turkish port of Ceyhan. Baghdad deems KRG exports via Turkish Ceyhan port as illegal. The International Chamber of Commerce ruled in favour of Iraq on Thursday, Iraq's oil ministry confirmed on Saturday. Turkey has informed Iraq that it will respect the arbitration ruling, a source said. Turkish shipping officials told Iraqi employees at the Ceyhan oil export hub that no ship will be allowed to load Kurdish crude without the approval of the Iraqi government, according to a document seen by Reuters. Turkey subsequently halted the pumping of Iraqi crude from the pipeline that leads to Ceyhan, a separate document seen by Reuters showed. On Saturday, Iraq stopped pumping oil through its side of the pipeline which runs from its northern Kirkuk oil fields, an official told Reuters. Iraq had been pumping 370,000 bpd of KRG crude and 75,000 bpd of federal crude through the pipeline, according to a source familiar with its operations. "A delegation from the oil ministry will travel to Turkey soon to meet energy officials to agree on new mechanism to export Iraq's northern crude oil in line with the arbitration ruling," a*

second oil ministry official said." Kurdistan region Prime Minister Masrour Barzani expects this to be quickly resolved. Yesterday Kurdistan 24 news reported [LINK] *"Kurdistan Region Prime Minister, Masrour Barzani, on Saturday reiterated the Kurdistan Regional Government's (KRG) good relations with the Iraqi federal government. "Our recent understandings with Baghdad have laid the groundwork for us to overcome the arbitration ruling today," PM Barzani wrote in the tweet. "A team from the KRG will visit Baghdad for talks tomorrow to build on the goodwill of our discussions," Barzani added." Below is a Platts Northern Iraq's oil infrastructure map from 2020* [LINK].

Figure 32: Northern Iraq's oi infrastructure map from 2020



Source: Platts

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

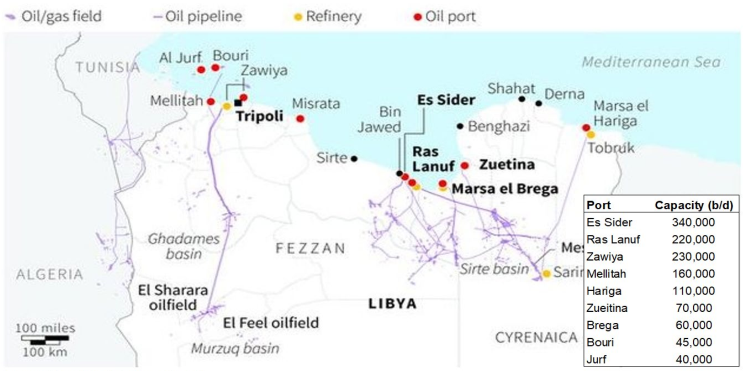
Libya oil production 1.2 mmb/d

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 six months or so. The Libya National Corporation tends to post a short oil production update on its Facebook [LINK]. The latest update was Wednesday and the Google Translate was "*Crude oil production reached 1.215 million barrels per day, and condensate production reached 54 thousand barrels per day during the past 24 hours.*

SAF GROUP

Figure 33: Libya Ports, Major oilfields and Terminals map

SAF Group Compiled Libya Ports & Terminals Status



Port	Capacity (b/d)
Es Sider	340,000
Ras Lanuf	220,000
Zawiya	230,000
Mellitah	160,000
Hariga	110,000
Zueitina	70,000
Brega	60,000
Bouri	45,000
Jurf	40,000

Source: Bloomberg, HFI Research, SAF

Source: SAF Group

Libya sees low-risk development to go from 1.2 to 1.5 mmb/d in 2023

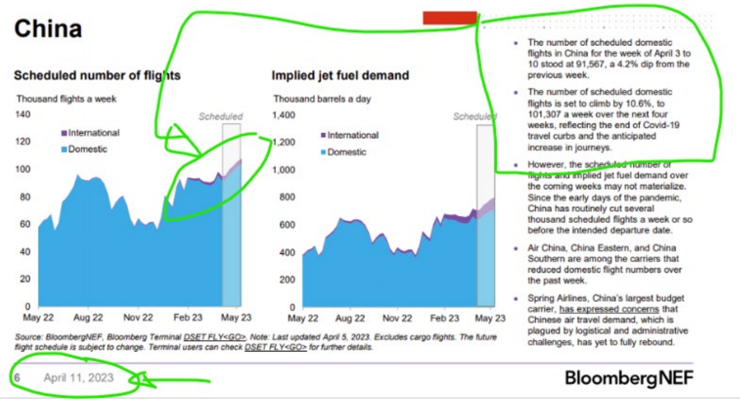
Here is what we wrote in our Feb 19, 2023 Energy Tidbits memo. "*We have been reporting on how Libya has surprisingly been able to keep oil production steady ~1.2 mmb/d. At the same time, we have always highlighted the big near term upside potential to its oil production if east vs west armed fighting can stay on the sidelines as that will see the return of foreign capital for both natural gas and oil. But even before foreign capital, the Libya National Oil Corporation has many low risk development opportunities to increase oil production. On Tuesday, the Libya Herald reported [LINK] on comments from one of Libya NOC's operating companies, Arabian Gulf Oil Company (AGOCO) Chairman Salah Gatrani. The Libya Herald wrote "The continuation of the Arabian Gulf Oil Company's (AGOCO) development operations at this pace will inevitably lead to Libya reaching a production rate of more than 1.5 million barrels of oil per day in 2023, AGOCO chairman Salah Gatrani said in an exclusive statement to Libya Herald. He said this was because of the stability witnessed by the country in general, and by the oil sector in particular. Therefore, he continued, the Gulf Company has developed its own plan within the efforts of the National Oil Corporation (NOC). Libya has been unable to maintain production beyond 1.2 million bpd. Gatrani was commenting to Libya Herald following Sunday's AGOCO's meeting on developing reserves and increasing oil production in the sector companies, attended by relevant AGOCO and NOC management. The AGOCO chairman said that his company has already begun to implement the plan prepared by the NOC to raise production and increase reserves." Our Supplemental Documents package includes the Libya Herald report."*

Oil – Big reduction in China scheduled domestic air flights for April

China domestic flights

The Chinese mobility indicators are continuing to point to a stalling China recovery in April. On Tuesday, we tweeted [LINK] "*Stalling China recovery. China scheduled domestic flights -4.2% WoW for Apr 3-10 to 91,567 flights. Forecast is +10.6% WoW to 101,307 for next 4-weeks, BUT well below 119,180 for next 4-weeks per Mar 28 schedule. Thx @BloombergNEF Claudio Lubis #OOTT."* The negative is that the scheduled next 4 weeks flights are 101,307 flights, which is still well below the next 4 weeks flights forecast from two weeks ago for April of 119,180 flights. This big drop from two weeks ago for April flights is the negative as it is showing the recovery seems to be stalling out. BNEF wrote "*The number of scheduled domestic flights in China for the week of April 3 to 10 stood at 91,567, a 4.2% dip from the previous week. The number of scheduled domestic flights is set to climb by 10.6%, to 101,307 a week over the next four weeks, reflecting the end of Covid-19 travel curbs and the anticipated increase in journeys*."

Figure 34: China scheduled domestic air flights



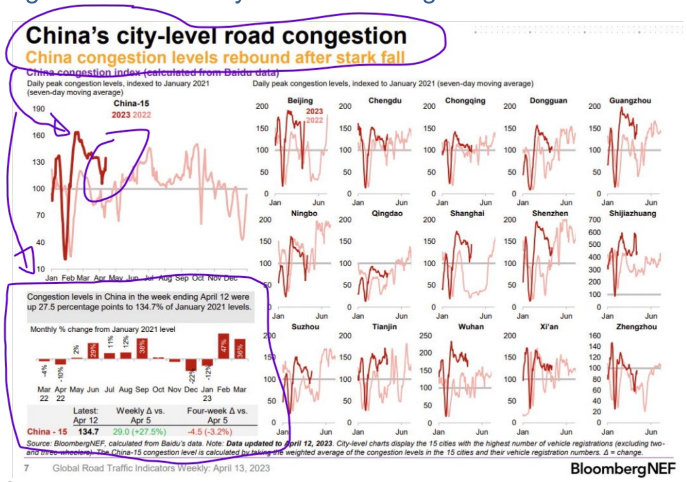
Source: BloombergNEF

Oil – China congestion bounce right back up and more after last week's nosedive

China road traffic congestion

There was a big immediate recovery in China traffic congestion levels this week following last week's nosedive. On Thursday morning, we tweeted [LINK] *"#Gasoline #Diesel. China traffic congestion jumps +27.5% WoW, reverses last wk's -21.7% WoW nosedive. Easter hit all other regions. EU -21.1% WoW, Asia excl China -14.4% WoW, NA -13.4% WoW. Thx @BloombergNEF #OOTT."* Last week's (April 9, 2023) Energy Tidbits memo highlighted the nosedive in China traffic that was down -21,7% WoW to 105.7% of Jan 2021 levels. This week, the big drop was more than made up. BloombergNEF reported on Baidu data that "*congestion levels in China in the week ending April 12 were up 27.5 percentage points to 134.7% of January 2021 levels."* Our tweet also included the below BloombergNEF graphic on China road congestion.

Figure 35: China city-level road congestion for week ended Apr 12



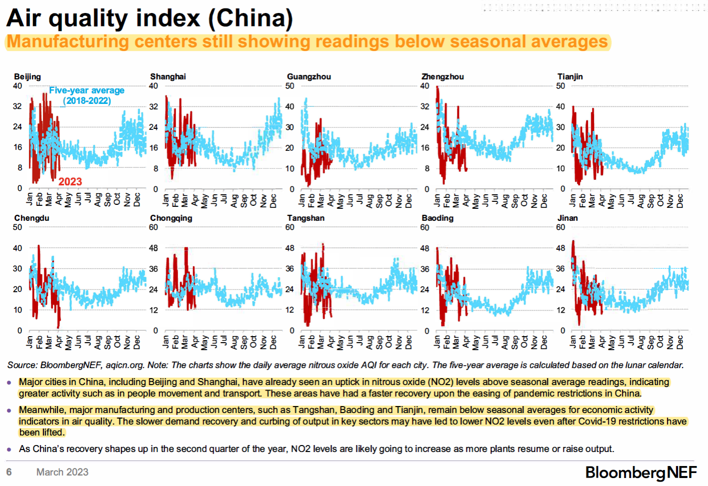
Source: BloombergNEF

Oil – China reopening indicator, air quality is worse in cities, but not in manufacturing

China air quality index

On Wednesday, BloombergNEF posted its Industrial Metals Monthly, which also included a good graph on China's air quality index that provide a good indicator of how China has reopened – major cities are back, but manufacturing and production centers are not back. Poor air quality means more emissions. BNEF included the below Air quality index (China) graphs and wrote "*Major cities in China, including Beijing and Shanghai, have already seen an uptick in nitrous oxide (NO2) levels above seasonal average readings, indicating greater activity such as in people movement and transport. These areas have had a faster recovery upon the easing of pandemic restrictions in China. Meanwhile, major manufacturing and production centers, such as Tangshan, Baoding and Tianjin, remain below seasonal averages for economic activity indicators in air quality. The slower demand recovery and curbing of output in key sectors may have led to lower NO2 levels even after Covid-19 restrictions have been lifted. As China's recovery shapes up in the second quarter of the year, NO2 levels are likely going to increase as more plants resume or raise output.*"

Figure 36: China air quality index – 2023 vs 2018-2022 average



Source: BloombergNEF

Oil – India reaches record high fuel consumption in March

India record fuel consumption in March

The big changing oil story in 2022 was how India became the big buyer of discounted Russian crude oil. That should not have surprised anyone given how India had been clear to the US that it buys its oil where it wants and where it gets the best deals. And it makes sense that India wants to buy as much discounted oil as possible given it is setting new record high fuel consumption. On Monday, we tweeted [LINK] "*Reminder why India will continue to be the big buyer of discounted Russian crude oil. Keeps fuel prices as low as possible in the face of India fuel consumption reaching record high of 4.83 mmb/d in March. Thx @Reuters. #OOTT.*" India hit record high fuel consumption in March. On Monday, Reuters reported [LINK] "*India's fuel consumption jumped to a record high in March, data showed on Monday, fuelled by robust economic activity in the world's third biggest oil consumer. Consumption of fuel, a proxy for oil demand, rose by 5% from a year earlier to 4.83 million barrels per day (20.5 million tonnes), the highest recorded in data* going *back to 1998 from the Indian Oil Ministry's Petroleum Planning and Analysis Cell.*" Our Supplemental Documents package includes the Reuters report.

Oct 8, 2022, India in Washington said they would buy oil from anyone

India has been clear with the US that it would buy oil from anyone. Here is what we wrote in our Oct 9, 2022 Energy Tidbits memo. "*It got very little press but US Energy Secretary Jennifer Granholm met in Washington with India oil minister Hardeep Singh Puri. The US Dept of Energy released a joint ministerial statement from the ministers that does not even note their names or quotes. Not the norm. And, to no surprise, it made zero mention of oil, LNG or Russia. We did see the photo-op but didn't see a joint press conference as is normally the case. No surprise why it looks like they didn't have a joint press conference based Puri's comments at a subsequent press conference in Washington. We watched multiple ANI (Indian news) video clips and their posted stories hit the highlights. (i) Russian oil. We tweeted [LINK] "1/3.*

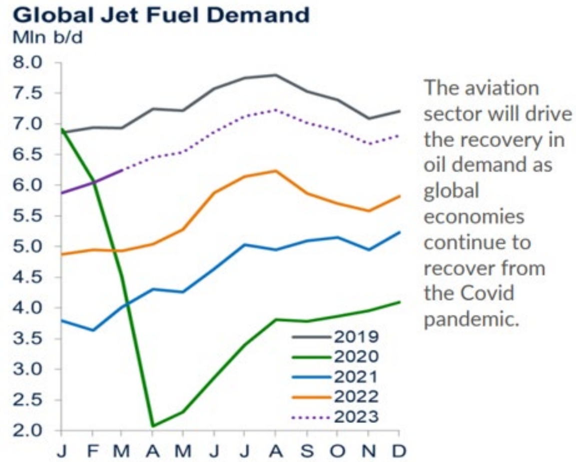
Great @ANI reporting on clear India energy position from @HardeepSPuri post @SecGranholm meeting. "Have I been told by anyone to stop buying Russian oil? The answer is a categorical No". #OOTT #NatGas #LNG". (ii) India will buy oil from anyone. We tweeted [LINK] "2/3. "India will buy oil from wherever it has to for the simple reason that this kind of a discussion cannot be taken to the consuming population of India" says @HardeepSPuri. #OOTT @ANI." (iii) Priority is energy security/affordability. We tweeted [LINK] "3/3. ""If you are clear about your policy, which means you believe in energy security, energy affordability you will buy from wherever you have to. Our energy purchases from sources hitherto unheard of, we are in discussion with them." @HardeepSPuri. Thx @ANI. #OOTT." (iv) India has been able to keep prices down. Puri also noted that they have been able to keep oil price impact low. ANI wrote ""In terms of petrol and diesel, if the increases in North America are 43-46 per cent, in India we allow prices to go up by only 2 per cent or so. In terms of gas, global benchmarks went up by 260-280 per cent and our own ability to contain gas price increases was something around 70 per cent," Puri told reporters in Washington DC." (v) There are other items n the ANI reports. Our Supplemental Documents package includes three ANI reports."

Oil – Vitol sees air travel pickup to add 1.1 mmb/d to demand in 2023

Vitol on jet fuel

We have always highlighted the seasonality of oil consumption and how the largest QoQ increase in oil consumption comes in the summer. On Tuesday, Vitol posted a Linkedin post [LINK] that reminded of the upcoming pickup in fuels consumption. We tweeted [LINK] *"Moving into seasonal oil demand growth period. Vitol expects jet fuel demand to strengthen thru H1, reaching 90% of pre-Covid by peak summer travel. Est to add +1.1 mmbd of global #Oil demand growth of total +2 mmb/d growth in 2023. Thx @vitolnews. #OOTT."* Driven by the China economy reopening, Vitol "*expects jet fuel demand to strengthen throughout the first half of the year, with consumption reaching around 90% of pre-Covid levels (compared to 80% in 2022) by the time of the peak summer travel season*." And "*This improvement in the aviation sector will contribute 1.1m b/d to global oil demand growth, which we expect to be 2m b/d this year.*" Note that one of our views on the pickup in jet fuel consumption, it is increasing in 2023 but still not back to 2019 levels. Our Supplemental Documents package includes the Vitol Linkedin post.

Figure 37: Vitol forecast for Global Jet Fuel Demand



Source: Vitol

Oil – Why Warren Buffett likes oil – world will need 100 mmb/d for several years

Warren Buffett on oil

On Wednesday, CNBC Squawk Box's 3-hour show was basically almost all a 3-hour interview with Berkshire Hathaway CEO Warren Buffett in Tokyo. The first hour also included Vice Chairman and the CEO designate to take over after Buffett, Greg Abel. Abel grew up in Alberta and was a University of Alberta grad before moving to the US for his working career. Buffett has been a big oil fan with his increasing investment in Occidental Petroleum. In the interview, Buffett also spoke on his bullish view for oil. We tweeted [LINK] the video clip of Buffett's oil comments and wrote "*why #Buffet likes #Oil. "you will be producing more #Oil 5 yrs from now or about the same and if you spent trillions $ now you'd still be needing it. you can't change the world that fast" says Buffett to @JoeSquawk ask on potential $20T spend on #EnergyTransition. #OOTT".* CNBC's Joe Kernen was asking Buffett what he thought about the Energy Transition and also how some are suggesting $20 trillion will spent on it over the next 15-20 years. Buffett just noted his fundamental view on oil – demand isn't going down and it doesn't make a difference how many trillions are being spent on the energy transition, it can't change the energy markets that fast. Our tweet included the clip of the lengthier Buffett oil comments.

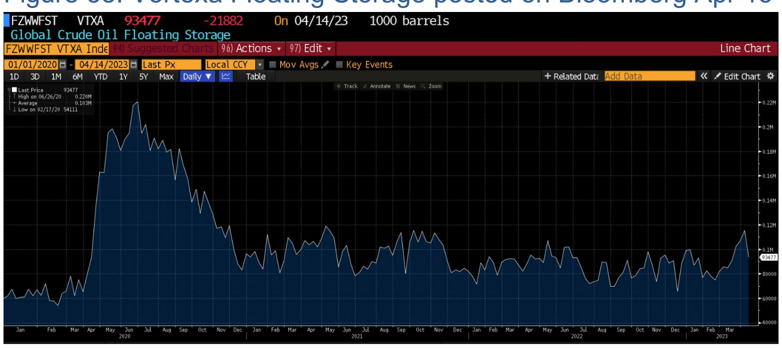
Oil – Vortexa crude oil floating storage at Apr 14 was 93.48 mmb, -21.88 mmb WoW

Vortexa floating storage

We are referencing the Vortexa global crude oil floating storage data posted on the Bloomberg terminal as of 9am 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 Apr 8 at 9am MT. (i) As of 9am MT yesterday, Bloomberg posted Vortexa crude oil floating storage estimate for Apr 14 at 93.48 mmb, which was -21.88 mmb vs upwardly revised Apr 7 of 115.36 mmb. Note Apr 7 was revised +5.88 mmb vs the 109.48 mmb posted on Bloomberg as of 9am MT on Apr 8. (ii) Most of the revisions for the past seven weeks were up, but not as much as the Apr 7 revision. The revisions from the estimates posted yesterday at 9am MT vs the estimates posted on Bloomberg at 9am on Apr

8 are as follows: Apr 7 revised +5.88 mmb. Mar 31 revised -0.20 mmb. Mar 24 revised +2.63 mmb. Mar 17 revised +2.04 mmb. Mar 10 revised +0.69 mmb. Mar 3 revised -1.32 mmb. Feb 24 revised +0.45 mmb. (iii) There is a wide range of floating storage estimates for the past seven weeks, but a simple average for the past seven weeks is 97.06 mmb, which is up vs last week's then seven week average of 93.93 mmb. The increase is due to the upward revisions and the dropping off of a low Feb 24 week of 81.71 mmb from the seven week average. (iv) Also remember Vortexa revises these weekly storage estimates on a regular basis and we do not track the revisions through the week. (v) Apr 14 estimate of 93.48 mmb is -126.90 mmb vs the post-Covid peak on June 26, 2020 of 220.38 mmb. (vi) Note the below graph now goes back to Jan 1, 2020 and not just three years as floating storage in Apr 2020 had started to reflect the Covid impact. (vii) Apr 14 estimate of 93.48 mmb is +27.87 mmb vs pre-Covid Feb 28, 2020 of 65.61 mmb. (viii) Apr 14 estimate of 93.48 mmb is -1.87 mmb YoY vs Apr 15, 2022 of 95.35 mmb. (ix) Below are the last several weeks of estimates posted on Bloomberg as of 9am MT Apr 15, 9am MT Apr 8, and 6am MT Apr 3.

Figure 38: Vortexa Floating Storage posted on Bloomberg Apr 15 at 9am MT



Source: Bloomberg, Vortexa

Figure 39: Vortexa Estimates Posted Apr 15 9am MT, Apr 8 9am MT, Apr 3 6am MT

Posted Apr 15, 9am MT

FZWWFST VTXA Index — 01/01/2020 - 04/14/2023

	Date	FZWWFST VT... Last Px
Fr	04/14/2023	93477
Fr	04/07/2023	115.359k
Fr	03/31/2023	106.904k
Fr	03/24/2023	102.396k
Fr	03/17/2023	90897
Fr	03/10/2023	84666
Fr	03/03/2023	85714
Fr	02/24/2023	81712
Fr	02/17/2023	74957
Fr	02/10/2023	77699
Fr	02/03/2023	82290

Apr 8, 9am MT

FZWWFST VTXA Index — 01/01/2020 - 04/07/2023

	Date	FZWWFST VT... Last Px
Fr	04/07/2023	109.475k
Fr	03/31/2023	107.102k
Fr	03/24/2023	99773
Fr	03/17/2023	88863
Fr	03/10/2023	83975
Fr	03/03/2023	87025
Fr	02/24/2023	81255
Fr	02/17/2023	75236
Fr	02/10/2023	77570
Fr	02/03/2023	81992
Fr	01/27/2023	76501

Apr 3, 6am MT

FZWWFST VTXA Index — 03/30/2020 - 03/31/2023

	Date	FZWWFST VT... Last Px
Fr	03/31/2023	104.596k
Fr	03/24/2023	99243
Fr	03/17/2023	90019
Fr	03/10/2023	84464
Fr	03/03/2023	87296
Fr	02/24/2023	83599
Fr	02/17/2023	75267
Fr	02/10/2023	78471
Fr	02/03/2023	84053
Fr	01/27/2023	78563
Fr	01/20/2023	93451

Source: Bloomberg, Vortexa

Oil – Vortexa crude oil floating storage WoW changes by regions

Vortexa floating storage by region

We haven't been including the Vortexa crude oil floating storage changes by region as we tend to be in a rush on Saturday and Sunday mornings on our memo. But when there are big WoW changes in the Vortexa global crude oil floating storage estimates, we like to see the regional WoW changes. Bloomberg posts the Vortexa crude oil floating storage in the key regions, but not all regions of the world. The regions covered are Asia, Europe, Middle East, West Africa and US Gulf Coast. The largest WoW changes were in Asia -10.24 mmb WOW to 44.61 mmb, and then Europe -6.55 mmb WoW to 18.96 mmb. Below is the table we created of the WoW changes by region posted on Bloomberg and we backed out to get "Other".

Figure 40: Vortexa Floating Crude Oil Storage Weekly Changes by Region

Vortexa Crude Oil Floating Storage (mmb)			
Region	Apr 14/23	Apr 7/23	WoW
Asia	44.61	54.85	-10.24
Europe	18.96	25.51	-6.55
Middle East	10.87	8.84	2.03
West Africa	4.62	5.89	-1.27
US Gulf Coast	0.33	3.24	-2.91
Other	14.09	17.03	-2.94
Global Total	93.48	115.36	-21.88
Vortexa crude oil floating storage posted on Bloomberg 9am MT on Apr 15			
Source: Vortexa, Bloomberg			

Source: Bloomberg, Vortexa

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

Vortexa tracking the "dark fleet"

One of the questions we get on the Vortexa floating oil storage estimates is if they track Russia's increasing dark fleet. The answer is Yes, and it is a priority tor Vortexa to do so. Here is what we wrote in our March 19, 2023 Energy Tidbits memo. "*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 – Bloomberg Oil Demand Monitor: "Asia signals strength but headwinds loom"

Bloomberg Oil Demand Monitor

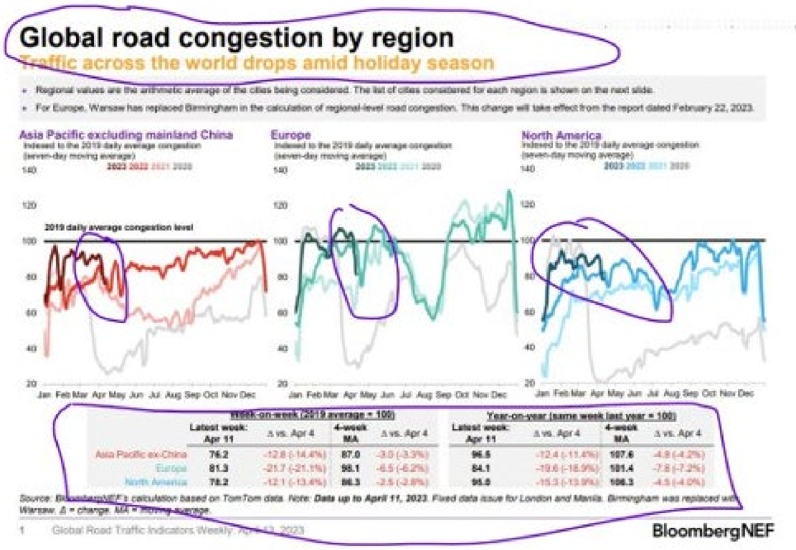
We recommend reading the Bloomberg Terminal Oil Demand Monitor for a good recap of key oil demand indicators around the world. Jet fuel, the most impacted indicator of oil demand by the Covid-19 pandemic is set to play a pivotal role in oil consumption growth this year. Oil consumption has increased so for this year due to an increase in are and road travel. OPEC is forecasting continued demand growth throughout 2023 followed by an eventual supply deficit later in the year and estimates that consumption will reach a record high of 101.89 mmb/d with non-OECD countries (i.e., China) expected to underpin demand growth. In contrast, EIA is forecasting global oil supply to exceed demand by year-end and expects diesel demand to contract YoY in 2023. To this end, the IEA and Bloomberg commented, "*Plenty of data suggest oil consumption has picked up as highways and the skies have gotten busier. But while some market watchers see that trend continuing through the year, others caution that lackluster economic prospects threaten to undercut demand.*" China, the world's largest oil importer, saw a rebound in demand following the Lunar holiday and lifting of Covid restrictions. India's consumption of oil also reached a new high over the last 12 months and the US has shown signs of increased gasoline demand heading into the summer peak driving season. The article noted, *"In China, demand for transportation fuels is anticipated to increase further "amid increased mobility and air travel in early spring, as people travel freely following the easing of pandemic-led restrictions," OPEC said. Traffic levels in the Asian nation's major cities remained elevated in the latest data, even as congestion in many major world cities eased amid Easter holidays, according to a BNEF analysis of Baidu figures."* However, headwinds such as sticky inflation, high interest rates, looming recessionary fears, and the recent banking crises continue weigh on the oil demand outlook moving forward. Commercial airline flights at the start of this week were ~3.2% higher than 2019 levels (pre-Covid), according to a 7-day average tracked by Flightradar24. As of Monday morning, road congestion was below pre-pandemic levels in all the 13 major global cities tracked by TomTom mobility data, with China's traffic continuing to remain strong in major cities following the huge initial recovery seen after the country's zero-Covid policy was lifted. Refinery utilization as of Apr 8 was down -0.3% WoW to 89.3% and down -0.7% YoY. Our Supplemental Documents package includes the Bloomberg Oil Demand Monitor.

Oil – TomTom mobility indicators: traffic mostly static; down slightly in Asia Pacific

Global road traffic indicators

In the BloombergNEF Global Road Traffic Indicators Weekly report we continue to see the same signals as the US gasoline consumption data from BloombergNEF US Oil Indicators Weekly. On Thursday, we tweeted [LINK], *"#Gasoline #Diesel. China traffic congestion jumps +27.5% WoW, reverses last wk's -21.7% WoW nosedive. Easter hit all other regions. EU -21.1% WoW, Asia excl China -14.4% WoW, NA -13.4% WoW. Thx @BloombergNEF. #OOTT."* Mobility indicators like TomTom data point to stable levels in global driving YoY, although road congestion has yet to recover to 2019 levels in Asia Pacific (ex-China) and North America. For the week ending Apr 11, traffic levels across all tracked regions were down significantly which is not surprising given the Easter holiday. Asia Pacific (ex-China) road congestion was down -14.4% WoW, European congestion down -21.1% WoW, and North America congestion was down -13.4% WoW. Traffic levels in the Asia Pacific (ex-China) region were down -11.4% YoY and sat at 76.2% of average 2019 levels for the week ending Apr 11, European traffic levels were down -18.9% YoY to 81.3% of 2019 levels, and finally North American traffic was down -13.9% YoY and now sits at 78.2% of 2019 levels. Traffic in the Asia-Pacific region had been exceptionally high since Feb but this week's significant decline effectively erased the positive differential from historical levels. The TomTom mobility data seems logical because despite the large WoW decline seen across all tracked regions, road congestion remains strong relative to 2020 and 2021 and is more or less in-line with 2022 levels. 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 41: Mobility Indicators



Source: BloombergNEF

Oil – Delta airlines CEO see "record advance bookings for the summer"

Delta's bullish air travel bookings

On Thursday morning, Delta Airlines CEO Ed Bastian was on CNBC Squawk Box talking about the just released Q1 earnings and the outlook for air travel. Bastian had very bullis comments on the outlook for air travel in 2023. But we also remind that there is still more upside beyond 2023 for air travel to get back to 2019 levels for international and business travel. We tweeted [LINK] *"#JetFuel. Bullish @Delta bookings update. "record advance bookings for the summer" small/medium business bookings in Q1 "fully recovered vs 2019 levels: corporate sales "approx 90% recovered to 2019 levels excl China" domestic corporate sales "approx 85% recovered to 2019" #OOTT."* In the Q1 release, Delta also highlighted how the Q1 results "*reflect the strength in the underlying demand environment and continued momentum in premium products and loyalty revenue," said Glen Hauenstein, Delta's president. "With record advance bookings for the summer, we expect June quarter revenue to be 15 to 17 percent higher on capacity growth of 17 percent year over year."* And in the Q1, Delta said "*Business travel improvement led by International and small and medium-sized business demand: Small and medium business bookings stepped up in the March quarter to fully recovered versus 2019 levels. International Corporate sales* accelerated sequentially to approximately 90 percent recovered to 2019 levels, excluding China. Domestic Corporate sales* in the March quarter were approximately 85 percent recovered to 2019 levels. Recent corporate survey results indicate that 96 percent of companies expect their travel will increase or stay the same sequentially in the June quarter."*

Delta airlines CEO reminds summer travel is always challenging
No surprise, Delta Airlines CEO Ed Bastian was asked if last summer's travel chaose will be avoided this summer. We tweeted a video of his comments on this question [LINK] "*Hope @Delta avoids last summer chaos. "we just want to make sure our customers have a great experience. much, much better than what it was last summer, but summer travel is always challenging, you can't get away from that, that's when everyone wants to go" @Lebeaucarnews. #OOTT."* But in the lead up to Bastian's quote in our tweet, he started off with the reminder that infrastructure is still at risk. Bastian said "*We've said all along that infrastructure around aviation is still fragile. And with the health of the demand set is putting pressure on the fragility of the infrastructure."* And he then went thru some of the things the FAA is doing and Delta is doing to alleviate that pressure this summer. It sounds like they are trying to plan to ensure it's not as bad as last summer. But the test will come as demand is up.

Oil – International air passenger travel continues to grow since China reopening

Air travel up significantly in Feb

We remind that the IATA air passenger data is for February and the data showed a material MoM improvement compared to Jan. The International Air Transport Association (IATA) announced passenger data for February 2023 on April 4 [LINK]. Total traffic in February, measured in revenue passenger kilometers, rose +55.5% YoY and is up +5.6% MoM, and compares to the +67.0% YoY growth seen in January. Globally, traffic is now at 84.9% of February 2019 levels. Domestic traffic for February was up +25.2% YoY, now at 97.2% of pre-pandemic levels. This is down from the +32.7% YoY growth seen in January, which stood at 97.4% of January 2019 levels. Similar to last month, international traffic saw the largest increase in February with growth coming in at a staggering +89.7% YoY, reaching 77.5% of pre-pandemic levels. All markets continued reporting strong growth, led by Asia-Pacific. IATA's Director General Willie Walsh stated, *"Total domestic RPKs grew 25.2% YoY in February and were within 2.8% of pre-pandemic levels. The broad improvement in domestic RPKs we have seen over the past two months was driven by travel policy relaxations in China. China's domestic market has seen further recovery compared to January when the country's reopening had an immediate and strong effect on the recovery of domestic air travel."* Our Supplemental Documents package includes the IATA release.

Figure 42: February 2023 Air Passenger Market

	World share[1]	February 2023 (% year-on-year) RPK	ASK	PLF (%-pt)[2]	PLF (level)[3]
TOTAL MARKET	***100.0%***	**55.5%**	**35.7%**	**9.9%**	**77.8%**
Africa	*2.1%*	87.9%	62.3%	10.3%	75.6%
Asia Pacific	*22.1%*	105.4%	61.2%	17.1%	79.2%
Europe	*30.7%*	44.1%	27.9%	8.5%	75.2%
Latin America	*6.4%*	23.7%	21.1%	1.7%	81.1%
Middle East	*9.8%*	70.6%	37.6%	15.4%	79.8%
North America	*28.9%*	25.1%	19.0%	3.8%	77.1%
International	***57.9%***	**89.7%**	**53.5%**	**14.8%**	**77.7%**

Source: IATA

Oil – Air cargo demand shows improvement in Feb following a weak start to the year

Air cargo demand improved in Feb

We remind that the IATA air cargo data is for February which, similar to passenger data, showed a material MoM improvement from the weak data in Jan. The International Air Transport Association (IATA) announced on Apr 5 [LINK] that global demand in air cargo markets weakened for the 12th consecutive month in February 2023. However, Feb's decline was just half of that seen in Jan, which provides a sense of optimism toward next month's analysis of March's data. Global demand, measured in cargo tonne-kilometres, fell -7.5% YoY compared to January's -14.9% YoY decline but despite the YoY weakness total demand was +2.9% above pre-pandemic levels. This is the first time cargo demand has been at or above 2019 levels in eight consecutive months. On the international level, all regions but Latin America saw their YoY declines lesson in Feb compared to Jan but still remain below levels seen a year ago. Asia-Pacific airlines saw their air cargo volumes decrease by -8.3% YoY in Feb (-20.0% YoY in Jan), North American carriers posted a -1.0% YoY decrease (-8.7% YoY in Jan), European carriers saw a -16.0% YoY decline (-20.4% YoY in Jan, and finally, Middle Eastern carriers experienced an -8.0% YoY decline in cargo volumes (-11.8% YoY in Jan). In contrast, Latin American carriers reported a decline of -2.1% YoY in Feb which was a big change from the +4.2% YoY growth seen in Jan. IATA's Director General Willie Walsh said, *"Demand for air cargo faces increasing headwinds from the current economic environment. Although the annual growth in global inflation is slowing, the general price level has increased and will continue to diminish the purchasing power of consumers. This impacts overall consumption and global trade."* And *"The decline in air cargo traffic also steadied in January, attenuating the relative performance of air cargo growth. Further improvement in the performance of CTKs in February suggests strengthening in global trade and potential progress in the relative importance of air cargo in global trade."* Our Supplemental Documents package includes the IATA release.

Figure 43: February 2023 Air Cargo Market

	World share[1]	February 2023 (% year-on-year) CTK	ACTK	CLF (%-pt)[2]	CLF (level)[3]
TOTAL MARKET	***100.0%***	**-7.5%**	**8.6%**	**-7.9%**	**45.6%**
Africa	*2.0%*	-3.4%	4.7%	-3.9%	46.8%
Asia Pacific	*32.4%*	-6.0%	19.9%	-12.8%	46.4%
Europe	*21.8%*	-15.3%	-1.5%	-9.4%	57.4%
Latin America	*2.7%*	-2.7%	27.6%	-11.2%	36.1%
Middle East	*13.0%*	-8.1%	9.3%	-8.4%	44.5%
North America	*28.1%*	-3.2%	2.8%	-2.5%	40.0%

Source: IATA

Oil & Natural Gas – Klotzbach forecasts slightly below average hurricane activity

Slightly below average hurricane activity

On Thursday, Phil Klotzbach and his team at Colorado State University posted their first forecast for the 2023 Atlantic hurricane season, which s a call for "*slightly below-average activity. Current neutral ENSO conditions look fairly likely to transition to El Niño this summer/fall. However, there is considerable uncertainty as to how strong an El Niño would be, if it does develop. Sea surface temperatures in the eastern and central Atlantic are much warmer than normal, so if a robust El Niño does not develop, the potential still exists for a busy Atlantic hurricane season. Larger-than-normal uncertainty exists with this outlook. We anticipate a near-average probability for major hurricanes making landfall along the continental United States coastline and in the Caribbean.* " The early hurricane season forecasts tend to have greater uncertainty. Our Supplemental Documents package includes excerpts from the Klotzbach forecast.

Figure 44: EIA STEO US Natural Gas Supply Forecasts by Forecast Month

Forecast Parameters	CSU Forecast for 2023	Average for 1991-2020
Named Storms	13	14.4
Named Storm Days	55	69.4
Hurricanes	6	7.2
Hurricane Days	25	27.0
Major Hurricanes	2	3.2
Major Hurricane Days	5	7.4
Accumulated Cyclone Energy+	100	123

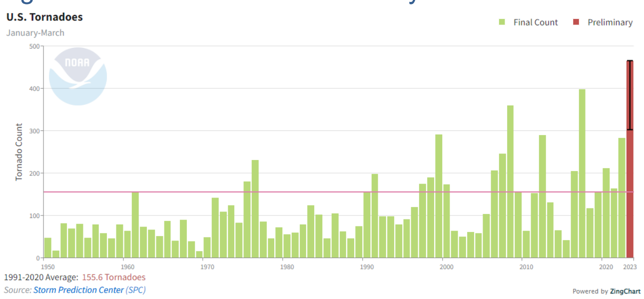
Source: Colorado State University

Oil & Natural Gas –Record tornadoes for March this year

Record tornadoes in March

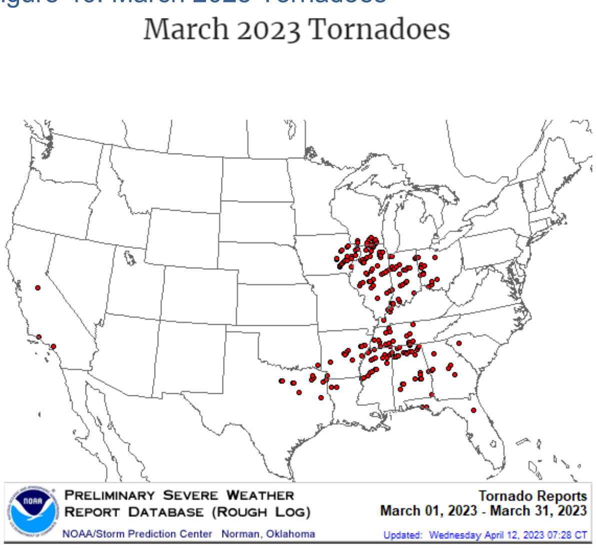
We follow tornado activity as it can impact oil and gas onshore operations in Oklahoma and Kansas. Most of Texas oil and gas operations tend to be south of major tornado activity. But so far, we haven't seen any reports of any major impact to oil and gas from the record number of tornadoes in March. In fact, it looks like there were almost zero tornadoes in Oklahoma and Kansas in March. This week, NOAA's National Centers for Environmental Information posted its "March 2023 Tornadoes Report" [LINK]. NOAA wrote "*According to* *data from NOAA's Storm Prediction Center, during March, there were 244 preliminary tornado reports. This is more than triple the 1991-2010 average of 80 tornadoes for the month of March. The high count of preliminary tornadoes during March 2023 is comparable to March 2022, March 2017 and March 2021. It is unclear what the final, confirmed torando count will be for March 2023, as the preliminary total of tornadoes will likely decrease. In addition, the year-to-date tornado count is currently the highest on record, with 2017 now as the second highest. A majority of the March 2023 tornadoes occurred during three separate tornado outbreaks at the beginning and at the end of the month*."

Figure 45: U.S. Tornadoes: January-March



Source: NOAA

Figure 46: March 2023 Tornadoes

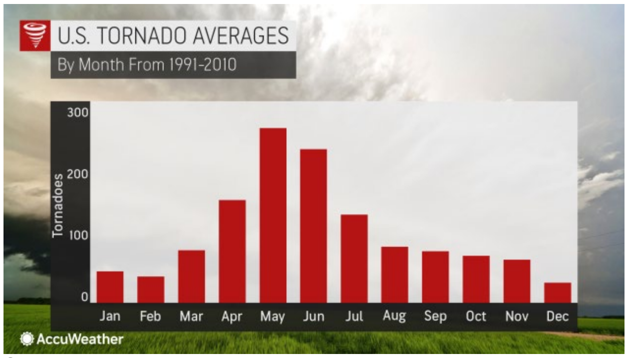


Source: NOAA

But peak tornado season isn't until May

We remind that March is still an early and typically low month for tornadoes. Our April 11, 2021 Energy Tidbits included AccuWeather's 2021 tornado forecast [LINK], which called for 1,350 to 1,500 tornadoes (vs 1,376 actual). AccuWeather also included the below graph that shows the tornado distribution throughout the year and that the normal peak tornado month is May followed by June, April and July.

Figure 47: Monthly Tornado Averages



Source: AccuWeather

Tornados Enhanced Fujita Scale (EF Scale) Intensity & Rating

NOAA's National Weather Service has a recap of the Enhanced Fujita Scale (EF Scale) for the intensity and rating of tornadoes. [LINK]. NOAA explains "*The Fujita Scale. Fujita Scale (or F Scale) of tornado damage intensity. The F Scale was developed based on damage intensity and not wind speed; wind speed ranges given are estimated, based on the extent of observed damage*." But there is also the Enhanced Fujita Scale (EF Scale). NOAA explains "*The Enhanced Fujita Scale or EF Scale, which became operational on February 1, 2007, is used to assign a tornado a 'rating' based on estimated wind speeds and related damage. When tornado-related damage is surveyed, it is compared to a list of Damage Indicators (DIs) and Degrees of Damage (DoD) which help estimate better the range of wind speeds the tornado likely produced. From that, a rating (from EF0 to EF5) is assigned. The EF Scale was revised from the original Fujita Scale to reflect better examinations of tornado damage surveys so as to align wind speeds more closely with associated storm damage. The new scale has to do with how most structures are designed.*" Our Supplemental Documents package includes the NWS explanation.

Figure 48: Enhanced Fujita Scale (EF Scale) for Tornadoes

EF SCALE	
EF Rating	**3 Second Gust (mph)**
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200

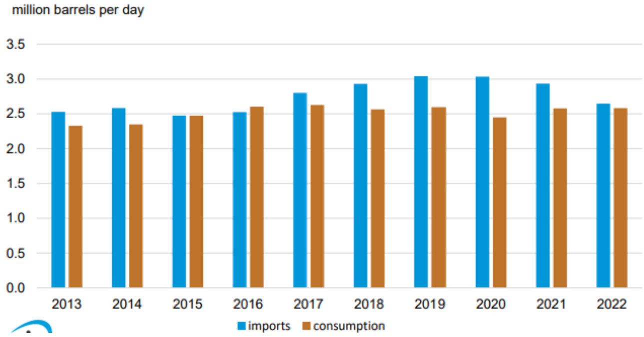
Source: NOAA

Oil & Natural Gas – Updated EIA South Korea country brief

EIA's country brief on South Korea

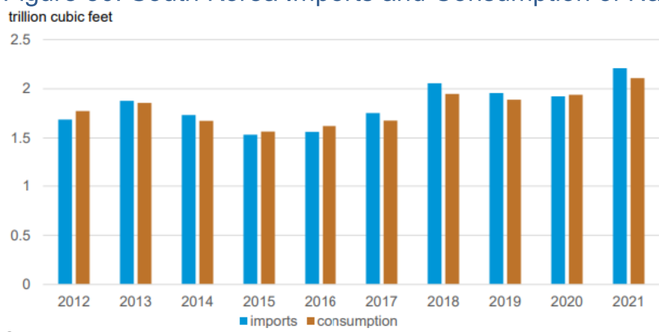
We continue to recommend adding the EIA's country analysis briefs to reference libraries as good quick references, in this case its new EIA country executive summary [LINK] on South Korea. South Korea is a major consumer of energy and was ranked the 8th largest consumer of petroleum in the world in 2021. Despite being a significant player in energy consumption, the country has insufficient resources to be self-sustaining and imports ~98% of its fossil fuels from other countries. South Korea has no pipeline infrastructure, so it relies almost exclusively on LNG and crude oil tanker shipments to meet its demand needs. In 2021, South Korea produced a total of 108,000 b/d of oil, primarily driven by refinery processing gains and non-conventional liquids. To this end, the country imported ~2.9 mmb/d of crude oil in 2021 and consumed a total of ~2.6 mmb/d the same year. What South Korea lacks in terms of production, it makes up for in refining capacity with 3.3 mmb/d of crude oil refining capacity in 2022, making it the 5th largest refiner in the world at the time. The oil and gas production South Korea does have is controlled almost entirely by the Korea National Oil Corporation (KNOC) and production takes place at its overseas operations. KNOC produced >100,000 b/d of crude oil and 0.21 bcf/d in 2021 with most of its current production coming from North American assets such as the Eagleford in the US (~23,000 boe/d in 2022) and a mix of conventional and oil sands assets across Canada (~22,000 boe/d in 2021). However, KNOC's Al Dahfra project in the UAE is expected to produce ~33,000 boe/d which would surpass individual North American production volumes, but it is unclear as to when it will reach peak production levels. The country held ~98.0 mmb of strategic crude oil reserves in 2021, of which 50% was stored as international reserves under agreements with other countries. While South Korea was the 5th largest refiner, it was also the 3rd largest LNG importer in the world in 2021, falling short of China and Japan. Total natural gas imports were ~21.0 tcf in 2021, which was the highest level in over 10 years. Domestic natural gas production totalled just 2.0 bcf in 2021 and has been steadily declining YoY after reaching peak production of 12 bcf in 2017. In 2021, South Korea had the world's 2nd most regassification capacity at 18.1 bcf/d and a ~9% YoY increase in natural gas demand in 2021 resulted in annual utilization increasing 34% from 30% in 2020. Our Supplemental Documents package includes the EIA brief.

Figure 49: South Korea Imports and Consumption of Crude Oil (mmb/d)



Source: EIA

Figure 50: South Korea Imports and Consumption of Natural Gas (tcf)



Source: EIA

Oil & Natural Gas– Tough Q1 reporting ahead for E&P with prices down QoQ & YoY

Tough Q1 reporting for Cdn E&P

We should start to see Q1 reporting for the Cdn oil and gas companies in the next two weeks one thing is clear, it will be a tough Q1 reporting when comparing to Q4/22 and Q1/22 with oil and gas prices down QoQ and YoY. On April 8, we tweeted [LINK] "*Tough Q1 reporting for E&P in a few weeks. See 👇#Oil #NatGas price table. Q1/23 prices down QoQ for all prices except WCS. Q1/23 prices down even more YoY for all prices. Looking further ahead, Q2/23 YoY price comparison will be even worse as Q2/22 was peak prices. #OOTT.*" Our tweet included our quarterly oil and gas price table. Q1/23 Ed Par prices of US$73.80 were -7.5% QoQ and -21.0% YoY. Q1/23 WCS prices of US$56.52 were +3.4% QoQ and -31.3% YoY. Q1/23 AECO prices of $3.10 were -38.2% QoQ and -31.2% YoY. Our tweet reminded that the YoY comparisons for Q2/23 reporting this summer will be even worse as Q2/22 was the period of peak oil and natural gas prices. Below is our updated table of quarterly oil and natural gas prices.

Figure 51: Oil and Natural Gas Prices

Quarter	Brent US$	WTI US$	EdPar US$	WCS US$	HH US$	AECO C$
Q1/18	$67.00	$62.86	$57.19	$37.07	$3.11	$1.97
Q2/18	$74.41	$67.83	$60.78	$49.88	$2.83	$1.17
Q3/18	$75.27	$69.69	$59.81	$42.32	$2.92	$1.18
Q4/18	$68.18	$59.41	$36.53	$25.63	$3.79	$1.53
Q1/19	$62.91	$54.49	$50.28	$43.79	$2.93	$2.42
Q2/19	$68.58	$59.96	$54.41	$47.46	$2.57	$1.07
Q3/19	$61.95	$56.48	$52.43	$43.91	$2.38	$0.94
Q4/19	$62.51	$56.83	$50.61	$37.98	$2.40	$2.33
Q1/20	$51.28	$46.73	$39.75	$28.55	$1.92	$1.94
Q2/20	$31.14	$27.67	$21.84	$18.02	$1.70	$1.90
Q3/20	$42.70	$40.87	$36.83	$31.13	$1.96	$2.14
Q4/20	$44.47	$42.67	$37.92	$31.34	$2.46	$2.51
Q1/21	$60.51	$57.75	$54.17	$45.83	$3.39	$2.97
Q2/21	$68.44	$65.90	$61.94	$53.11	$2.89	$2.80
Q3/21	$72.95	$70.57	$66.90	$57.65	$4.28	$3.40
Q4/21	$79.45	$77.26	$73.78	$60.87	$4.74	$4.47
Q1/22	$99.08	$94.57	$93.40	$82.27	$4.60	$4.51
Q2/22	$112.72	$108.76	$107.10	$93.41	$7.46	$6.89
Q3/22	$99.67	$92.38	$90.52	$71.50	$7.98	$4.17
Q4/22	$88.35	$82.63	$79.74	$54.66	$5.59	$5.02
Q1/23	$81.44	$76.17	$73.80	$56.52	$2.69	$3.10
Q1/23 YoY	-17.8%	-19.5%	-21.0%	-31.3%	-41.6%	-31.2%
Q1/23 QoQ	-7.8%	-7.8%	-7.5%	3.4%	-52.0%	-38.2%

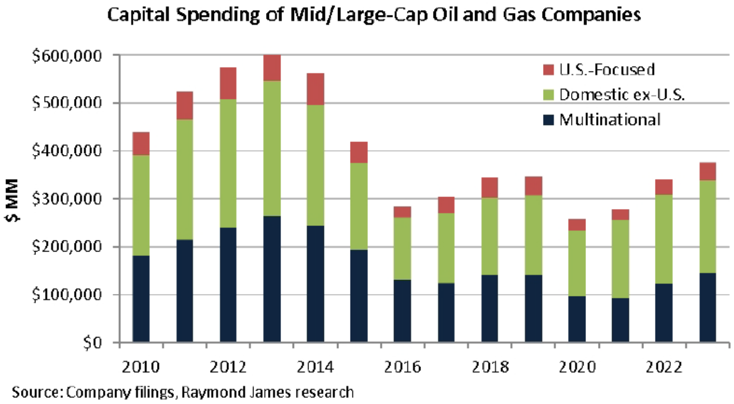
Source: Bloomberg

Oil & Natural Gas– RJ's Global oil and gas 2023 capex survey

On Monday, Raymond James posted its 2023 Global oil and gas capex survey. (i) We tweeted [LINK] "*Global #Oil #NatGas capex est +11% YoY to $376b in 23, followed +23% YoY to $340b in 22. Over pre-Covid, BUT not really as RJ warns 22 incl "a substantial amount of cost inflation" "continues to be an important factor in 23". Thx @RJResearch Molchanov, Freeman* & Jenkins! #OOTT." (ii) Extensive survey. RJ said "*we believe that our survey captures 45-50% of spending in the U.S. and 75-80% of spending outside the U.S., which brings the global weighted average to 65-70%.*" (iii) RJ 's survey is for 2023 capex to be the highest levels since 2015, but still well below the 2012 to 2014 levels. (iv) RJ notes 2022 global oil and gas spending was +23% YoY to $340b, and the initial 2023 budget figures were for 2023 global capex to be +11% YoY to $376b. (iv) These look to be solid YoY increases, but RJ also noted that cost inflation is a big factor, which means that the real increases are not much at all over the past two years. On 2022 capex, RJ wrote "*As is intuitive, this included a substantial amount of cost inflation.*" On 2023 capex, RJ wrote "*On the flip side, as noted earlier, cost inflation was very visible in 2022, and it continues to be an important factor in 2023.*" Our Supplemental Documents package includes excerpts from the RJ comment.

Global oil and capex

Figure 52: Capital spending survey



Source: Raymond James

Energy Transition – G7 hide/deny need for more investment in LNG/natural gas supply

Post this weekend's G7 climate/energy meeting, we are more concerned that the G7 leaders are setting up a future energy crisis in the later 2020s by their hiding/denial that LNG demand will continue to grow and more investment in natural gas and LNG is needed. We recognize the G7 leaders do not want to say more fossil fuels are needed. But the reality is simple - hiding the need for more investment in natural gas and LNG will only cause more supply shortfalls down the road. (i) We had trouble finding the actual communique issued today, but did rely on the Reuters reporting "*Factbox: Key excerpts from G7 statement on energy and climate change*" that provided excerpts from the communique. [LINK] (ii) The G7 didn't disappoint, they do what they can to NOT say more investment in natural gas and LNG supply is needed to meet growing LNG demand. Earlier this morning, we tweeted [LINK]

G7 hide/deny need for LNG & natural gas

"*Why can't #G7 simply say #LNG demand is growing & need investment in #NatGas #LNG supply? Rather G7 political speak ""investment in the gas sector can be appropriate to help address potential market shortfalls". Thx @Reuters Katya Golubkova. #OOTT".* Here is what Reuters quoted from the G7 communique "*GAS INVESTMENTS. "Recognising the primary need to accelerate the clean energy transition through energy savings and gas demand reduction, investment in the gas sector can be appropriate to help address potential market shortfalls provoked by the crisis, subject to clearly defined national circumstances, and if implemented in a manner consistent with our climate objectives and without creating lock-in effects, for example by ensuring that projects are integrated into national strategies for the development of low-carbon and renewable hydrogen*." (iii) This denial/hiding was our concern and confirms the Reuters report from Tuesday "*G7 climate ministers drop language on growing LNG demand*". [LINK] Reuters reported *"A previous draft communique for this week's meeting of G7 climate change and energy ministers had called for "necessary upstream investments in LNG and natural gas" amid the energy fallout from Russia's invasion of Ukraine and said "demand for LNG will continue to grow". But, as negotiations over the communique resumed on Tuesday ahead of the ministerial meeting on April 15-16 in Sapporo, Japan, the wording was changed, the latest draft reviewed by Reuters showed."* (iv) On Tuesday, we tweeted [LINK] *"Recipe for #EnergyCrisis & stronger for longer #LNG #NatGas prices in late 2020s. Hide/Deny more LNG & capex is needed! See 👇 @KateAbnett @maki_yamaz report. #G7 drop text "demand for LNG will continue to grow", need "necessary upstream investments in LNG & NatGas" #OOTT."* (iv) As the week progressed, the reporting on the G7 didn't mention the dropping of the LNG demand growing and the need for more investment in LNG and natural gas. So on Thursday, we tweeted a reminder [LINK] "*Cover up is always worse than the crime. See 👇 04/11 tweet. G7 climate communique tomorrow not expected to acknowledge demand for #LNG will continue to grow. Hide/deny more LNG & Capex is needed can only add to higher global LNG #NatGas prices in late 2020s. #OOTT."* Our Supplemental Documents package includes the two Reuters reports.

G7 warns critical minerals shortfall

Energy Transition – G7 warns a critical minerals shortfall is coming

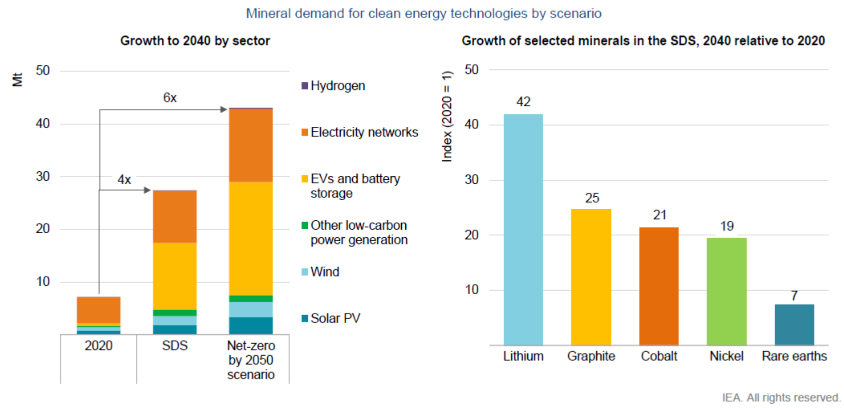
The most important excerpt we saw from the Reuters G7 excerpts was on critical minerals and raw materials. The G7 is warning there will be a supply shortfall ahead, but they will do their best to maintain products as long as possible. This would include wind, solar, EVs, etc. We wish the G7 had used the same language on the need for LNG and natural gas supply to provide electricity that they did for warning on a critical minerals supply shortfall. We were surprised by this warning and, earlier this morning, we tweeted [LINK] "*#NatGas is needed for longer, #EnergyTransition will take longer. G7 warns critical minerals shortfall is coming. "We are fully committed to maintain products containing critical minerals and raw materials in the economy as long as possible" Thx @Reuters Katya Golubkova #OOTT."* Critical minerals and raw materials are essential to the energy transition. Maybe people will look at the G7 using "products" and only think about mobile phones or electric toothbrushes. But it's the entire gambit of energy transition from power to mobility. And natural gas and LNG will be a big winner if the lack of critical minerals and raw materials impacts wind and solar generation. The G7 is saying they will maintain these products long as possible. Why not just say, we have a problem. Our Energy Transition plan depends on critical minerals and raw materials and there isn't enough supply. Here is the full G7 quote "*We reaffirm the growing importance of critical minerals for the clean energy transition and the need to prevent economic and* *security risks caused by vulnerable supply chains, monopolisation, lack of diversification of existing suppliers of critical minerals; "We are fully committed to maintain products containing critical minerals and raw materials in the economy as long as possible; "We emphasise the importance of countering geopolitical risks, including with respect to critical minerals, for the clean energy transition. "We boost up developing new mines and supply chains for critical minerals in a responsible manner that promotes transparency and traceability to meet the rising demand."*

Two years ago, IEA warned on critical minerals risk for the energy transition

We have been surprised that G7 leaders haven't jumped on the issue of critical metals supply. It is not a surprise. It was a huge risk prior to Russia and the increasing anti-China views. And those have both made a bad problem worse. Here is what we wrote in our May 9, 2021 Energy Tidbits memo. "*Energy Transition – IEA warns critical minerals risk for energy transition. We have been warning that the big IEA theme will be that the world is behind in where it needs to be to meet its Net Zero and Energy Transition aspirations. This is not a new IEA theme, rather they have been hammering this home for a year. Its one of the reasons why we continue to say the Energy Transition is happening, it will just take longer, be a bumpy road and cost more than the aspirations. On Wednesday, the IEA released a major report "The Role of Critical World Energy Outlook Special Report Minerals in Clean Energy Transitions" [LINK] that reinforced these concerns. The IEA release starts off "Supplies of critical minerals essential for key clean energy technologies like electric vehicles and wind turbines need to pick up sharply over the coming decades to meet the world's climate goals, creating potential energy security hazards that governments must act now to address, according to a new report by the International Energy Agency." The messaging isn't in any doubt here and why we tweeted [LINK] "Path to #EnergyTransition is clear, but demise of #Oil #NatGas won't be as quick as aspirations. Another @fbirol warning not on track to meet #NetZero aspirations. this time critical minerals raising risk of delayed or more expensive #EnergyTransition. Great report @IEA . #OOTT". This is a good report to read and for reference libraries. There are a huge amount of good insights and perspective report. One perspective example is that coal revenues will still be almost double energy transition minerals revenues in 2030. Its not just a potential shortage of critical minerals, it's the concentration of minerals sources that will cause increased security risks ie. China in the below chart. Its why the IEA recommendations include "as well as voluntary strategic stockpiles in some instances".*

Figure 53: Critical Minerals demand

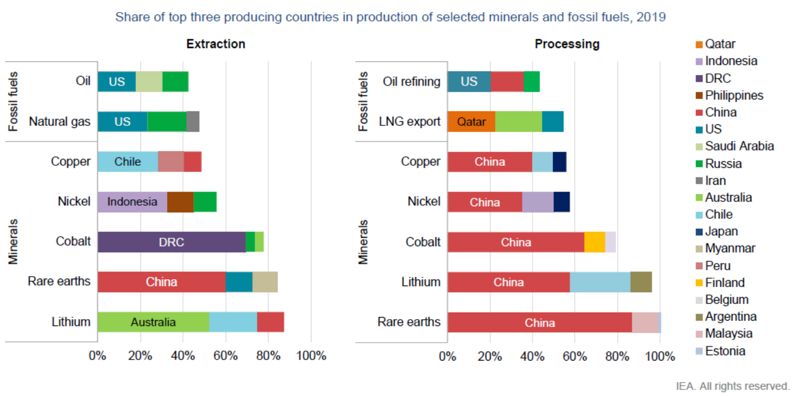
Mineral demand for clean energy technologies would rise by at least four times by 2040 to meet climate goals, with particularly high growth for EV-related minerals



Source: IEA May 2021

Figure 54: Extraction and Processing of Fossil Fuels and Critical Minerals

Production of many energy transition minerals today is more geographically concentrated than that of oil or natural gas



Source: IEA May 2021

Two years ago, IEA suggested strategic critical metals reserves

Here is another item from our May 9, 2021 Energy Tidbits memo. "*The IEA's report also brings a reminder as to why it was formed. The IEA warns on the risk of security of supply. The critical minerals report has 6 recommendations and one includes "4. Enhance supply chain resilience and market transparency. Policy makers need to explore a range of measures to improve the resilience of supply chains for different minerals, develop response capabilities to potential supply disruptions and enhance market transparency. Measures can include regular market assessments and stress-tests, as well as strategic stockpiles in some instances." Strategic stockpiles caught our attention. Its why we tweeted [LINK] "Hmm! @IEA 's recommendations incl "as well as voluntary strategic stockpiles in some instances". IEA was formed from*

#ArabOilEmbargo 73/74, members committed to 90 day strategic oil reserves. IEA doesn't see same no gas for cars, but more expensive, delayed #EnergyTransition #OOTT" As we have noted before, the IEA was created following the Arab Oil Embargo after the Arab producers shut out the west. And one of the key requirements for membership was that memos committed to have 90 day strategic oil reserves. Its also why the US created the Strategic Oil Reserves. Every year we remind on the Arab Oil Embargo and include the below picture that reminds of the block long line ups to get gasoline when the embargo hit. It was the game changer for energy for decades to come."

Figure 55: Gas station line up during Arab Oil Embargo 1973-74

Source: Time

Countries are setting up SPR equivalent for critical minerals/rare earths

Here is an excerpt from our Aug 8, 2021 Energy Tidbits memo. "*There was a good food for thought Argus report on Thursday "South Korea to increase stockpiles of rare metals" [LINK] as to why there is likely an additional leg of demand for critical metals (copper, zinc, cobalt, etc) and rare earths over and above an already strong decades long demand outlook. Argus reported "South Korea has announced plans to raise its stockpiles of critical metals such as cobalt, nickel and rare earths that are used in key emerging industries including electric vehicle (EV) batteries and renewable energy. The government has set a target to increase its stockpiles to cover 100 days of consumption, up from 56.8 days currently, the country's ministry of trade, industry and energy (Motie) said today. It did not give a target date. South Korea will build new facilities and expand existing ones to achieve this goal. State-run firm Korea Resources (Kores) will manage the stockpiles, Motie said." We thought the title could have calls it "critical metals" and "rare earths" because copper and nickel are included. It also would have been linked more to the IEA's recent report (see the following item). Critical metals and rare earths are the oil of the 70s. The arab oil embargo led to creation of the IEA and the IEA member countries committing to have 90 days of strategic petroleum reserves. But because that was a supply cut off, it forced governments to look to reduce oil consumption ie. small cars like the Honda Civic started to take off, increased fuel efficiency standards, etc. This is a little different in that it is a predictable demand driven cycle as the govts are putting the world, not just one region, on a path of decades acceleration in items like EVs that rely on critical metals and rare earths. At the same time, western countries* *are making it tougher for mining. We have to believe that there will be other manufacturing countries that will take a similar approach."*

Capital Markets – BlackRock CEO the most important thing is inflation will be stickier

BlackRock CEO warns on inflation

On Wednesday, BlackRock CEO Larry Fink stressed that the most important thing he was saying on Wednesday is his warning that high inflation is here to stay. We tweeted [LINK] "*#BlackRock CEO why inflation will be sticky. "all of that leads to a reimagination of supply chains ....means more fragmentation ...not trying to suggest that it is a bad outcome but we should just understand that outcome will lead to more elevated prices for longer" #OOTT."* Our tweet included the transcript we made of his comments that the most important thing he was saying is inflation was here to stay. SAF Group created transcript of comments BlackRock CEO Larry Fink with Columbia Climate School's Jason Bordoff at Columbia Global Energy Summit 2023 on April 12, 2023 [LINK] Items in "*italics*" are SAF Group created transcript. Fink "*<u>I think we're going to have stickier inflation for longer. To me that is probably the most important thing I am going to say. I don't see how we how we are going to get below 4% inflation anytime soon</u>. ……. To me everything flows through this inflationary issue. the prime reason why I believe inflation will be so sticky, when I spend time with leaders of different countries and our political leaders here, you don't hear the world globalization anymore. In fact, when you say you're a globalist, you're considered a bad human being today. And we are now refocusing on issues around national security. National security for food, chips. National security for energy. Three, four years ago, you never heard those issues uttered. All of that leads to is a reimagination of supply chains. I am saying that in a positive way. Reimagine of supply chains, which really means more fragmentation. Let's be clear, the reasons why we had these global supply chains is because for 30 years we believed we could provide cheaper products to more people. That's the ultimate way of providing a more progressive way of moving an economy. People can have more at a cheaper price. That is no longer the notion. The notion is more about security and other issues. I'm not making an editorialization. This may be the right policy, I am not an expert in terms of issues related to security that so many people in government know them a lot more than I do. But I asked everybody while we are doing this, while we are thinking about supply chains reimagination, I ask the question, have you factored in at what cost? What is the cost and I don't believe that has been ever a component of thought any more. We are building new chip factories in the US , at what cost. I am just taking a quote out of the founder of one of the companies that is building a factory here and he already made a notion that the chips are going to be a lot more expensive here than they would have been elsewhere. So we are doing this. I am not trying to suggest that it is a bad outcome, but we should just understand that outcome will lead to more elevated prices for longer."*

Capital Markets – Warren Buffet doesn't want mgmt. looking to retire at 65 or 70

Buffet wants experienced older managers

Warren Buffett bucks the trend and wants top management who aren't looking to retire at 65 or 70. That is far from the norm in business where most companies are not looking for management older than their 50's and, if anything, must younger. That should be no surprise given Berkshire Hathaway is run by Charlie Munger (99 yrs old) and Warren Buffett (92 yrs old). On CNBC Squawk Box on Wednesday, Buffett and Vice-Chairman and heir to be CEO, Greg Abel, were interviewed and Buffett was speaking about Abel as the next CEO. We tweeted out a recording *security that so many people in government know them a lot more than I do. But I asked everybody while we are doing this, while we are thinking about supply* *chains reimagination, I ask the question, have you factored in at what cost? What is the cost and I don't believe that has been ever a component of thought any more. We are building new chip factories in the US , at what cost. I am just taking a quote out of the founder of one of the companies that is building a factory here and he already made a notion that the chips are going to be a lot more expensive here than they would have been elsewhere. So we are doing this. I am not trying to suggest that it is a bad outcome, but we should just understand that outcome will lead to more elevated prices for longer.*"

Capital Markets – Pew, 60% of Americans say wealthy don't pay their fair share

Wealthy don't pay enough taxes

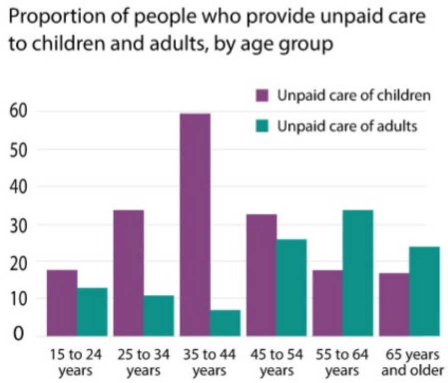
No one should be surprised by the Pew Research survey "*Top tax frustrations for Americans: The feeling that some corporations, wealthy people don't pay fair share*". [LINK]. If this is the message that western leaders consistently make, it will have increasing stickiness. And their messaging is only increasing given the increasing deficits in Canada, the US and other countries. As the Liberals will say, they are "asking" the wealthy to pay their fair share. It's an easy ask and one that is hard for any politicians to not oppose. So buckle up, more government take is coming. Pew wrote "*About six-in-ten adults now say that the feeling that some corporations don't pay their fair share (61%) bothers them a lot, while a nearly identical share say this about some wealthy people not paying their fair share (60%), according to a Pew Research Center survey of 5,079 U.S. adults conducted from March 27 to April 2, 2023. These percentages are essentially unchanged since 2021*." Our Supplemental Documents package includes the Pew report.

Demographics – More Cdns now provide care support for both young and old

Providing care for adults and children

We have to believe most adults of all age have seen increasing occurrence o adults over 45 whare providing unpaid care to both children and adults. On the older side, people are living longer and, with higher costs, are eating thru their savings and therefore increasingly reliant on their adult children. On the young side, more children are living at home with their parents well into their 20s instead of leaving after high school. As a result, more adults over 45 are providing unpaid care to both children and adults. Statistics Canada noted "*The provision of unpaid care changes throughout a person's life. For example, people in middle age are almost as likely to care for adults as for children.*" On April 3, Statistics Canada posted its infographic "Providing care in Canada, 2022" [LINK], which included the below graphic showing this trend.

Figure 56: % of people who provide unpaid care to children and adults, by age group



Source: Statistics Canada

Demographics – Russians are struggling to buy food, clothing or shoes

Russians are struggling to buy food

We were surprised to see the Izvestia report [LINK] "*Poverty and threshold: 25% of Russians spend the bulk of their income on food* ". We always are surprised to see Russian media comment on something that reflects negatively on Russia. But Izvestia reports that many Russians are having trouble paying for food, clothing or footwear in 2022. We don't normally see comments about people not being able to afford "footwear". No question, Russians are hurting. Izvestia wrote "*The lack of funds for food, clothing or footwear in 2022 was experienced by 17% of Russians, follows from the data of the Center for Civil Society Studies of the Higher School of Economics. 25% of respondents noted that they spend two-thirds or more of family income on food. At the same time, the authors of the study indicate that in comparison with previous years, these figures have decreased, the well-being of citizens is growing, albeit "not too dynamically." The positive trend is explained by the significant social support of these segments of the population from the state, experts say. They state that the indexation of child benefits, the introduction of other measures to support families with a low level of income allowed them to "rise above the poverty line." Immediate needs. Every sixth resident of Russia (17%) in 2022 experienced a shortage of funds for the purchase of food or clothes and shoes. This is evidenced by the data of the Center for Studies of Civil Society and the Non-Profit Sector of the Higher School of Economics. In particular, 4% reported that there is not enough money even for food, and 13% - that they have the opportunity to buy food, but not clothes or shoes.:*" Our Supplemental Documents package includes the Izvestia report.

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.

Henry Kissinger's more famous quote on being America's friend

Earlier, we reference former Secretary of State under Richard Nixon, Henry Kissinger's, quote that we thought applied to MBS approach on Saudi Arabia. That quote was "*America has no permanent friends or enemies, only interests". *But we have always thought he had a more famous quote about being America's friend. Kissinger said "*To be an enemy of America can be dangerous, but to be a friend is fatal*."

Former US Treasury Secretary on China vs US with developing countries

We wouldn't have included this Lawrence Summers quote if Summers wasn't a prominent Democrat as Secretary of the Treasury under Bill Clinton. Summers was on Bloomberg TV's "Wall Street Week" and Bloomberg reported "*"Somebody from a developing country said to me, 'what we get from China is an airport. What we get from the United States is a lecture,'" said Summers, a Harvard University professor and paid contributor to Bloomberg TV."*