SAF GROUP

Energy Tidbits

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Produced by: Dan Tsubouchi

Shell CEO “world is desperately in need of natural gas” and needs to “make up for the long-term loss of Russian supplies”

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. New Shell CEO comes out with clear views on natural gas, their focus on both oil and natural gas in their Upstream and less emphasis on the Energy Transition (Click Here)

2. TotalEnergies CEO visit to Mozambique looks to be a precursor to a near term decision to restart construction on their Mozambique LNG (Click Here)

3. Forecasters are call for a warm Feb in Europe, Japan and US (Click Here)

4. Europe's ban on petroleum products starts today (Click Here)

5. Cdn “oil” plays have very little associated natural gas whereas the big US “Oil” plays have much higher associated natural gas component (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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YoY storage at 222 bcf YoY surplus

Natural Gas – 151 bcf draw in US gas storage; now 222 bcf YoY surplus

It was a hot Jan that drove a widening YoY gas storage surplus and HH below $3. For the week of Jan 27, the EIA reported a -151 bcf draw (slightly above expectations of -145 bcf), a 44% decrease from the -268 bcf draw reported for the week of Jan 28 last year. This compares to last weeks draw of -86 bcf, and the 5-year average draw of -181 bcf. Total storage is now 2.583 tcf, representing a surplus of 222 bcf YoY compared to a deficit of -392 bcf last year and is +163 bcf above the 5-year average vs +314 bcf above last week. Note that last week's data was revised and now reflects a slightly smaller draw for the week of Jan 20. 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 (01/27/22)		5-year average (2018-22)	
Region	01/27/23	01/20/23	net change	implied flow	Bcf	% change	Bcf	% change
East	578	622	-44	-44	551	4.9	560	3.2
Midwest	708	754 R	-46	-46	628	12.7	656	7.9
Mountain	132	140	-8	-8	134	-1.5	137	-3.6
Pacific	140	150	-10	-10	197	-28.9	213	-34.3
South Central	1,025	1,067	-42	-42	851	20.4	854	20.0
Salt	297	310	-13	-13	238	24.8	250	18.8
Nonsalt	728	757	-29	-29	613	18.8	604	20.5
Total	2,583	2,734 R	-151	-151	2,361	9.4	2,420	6.7

Source: EIA

A very warm January

Natural Gas –Jan was very warm in the US

HH gas prices fell below $3 on Jan 25 and continue to languish. No surprise, it was very warm in January in the US on an overall basis. On Wed, we tweeted [LINK] "*Here's why HH #NatGas prices crashed in Jan. @aga_naturalgas HDD data. Jan 1-7: 32% warmer > normal. Jan 8-14: 21% warmer > normal. Jan 15-21: 21% warmer > normal. Jan 22-28: 9% warmer > normal. See 👇01/08 tweet, huge swings in res/com consumption in hot vs cold winters. #OOTT.*" Our tweet included the AGA heating degree days data for the week ended Jan 28. The AGA issues the weekly data on Monday nights. Our Supplemental Documents package includes the full AGA HDD recap. [LINK]

Figure 2: Excerpt AGA weekly heating degree days data for week ended Jan 28

WEEKLY COMPARISON

Week Ending	2022/ 2023	2021/ 2022	Normal	% Change: 22/23 from 21/22		% Change: 22/23 from Normal	
10/01/22	41	20	36	105.0	Colder	13.9	Colder
10/08/22	50	15	48	233.3	Colder	4.2	Colder
10/15/22	56	30	61	86.7	Colder	8.2	Warmer
10/22/22	89	58	76	53.4	Colder	17.1	Colder
10/29/22	75	77	91	2.6	Warmer	17.6	Warmer
11/05/22	72	111	106	35.1	Warmer	32.1	Warmer
11/12/22	97	95	122	2.1	Colder	20.5	Warmer
11/19/22	194	127	139	52.8	Colder	39.6	Colder
11/26/22	161	152	155	5.9	Colder	3.9	Colder
12/03/22	165	137	170	20.4	Colder	2.9	Warmer
12/10/22	163	161	185	1.2	Colder	11.9	Warmer
12/17/22	188	139	197	35.3	Colder	4.6	Warmer
12/24/22	254	183	209	38.8	Colder	21.5	Colder
12/31/22	200	156	218	28.2	Colder	8.3	Warmer
01/07/23	152	214	223	29.0	Warmer	31.8	Warmer
01/14/23	179	208	226	13.9	Warmer	20.8	Warmer
01/21/23	178	229	225	22.3	Warmer	20.9	Warmer
01/28/23	202	248	222	18.5	Warmer	9.0	Warmer
Cumulative	2516	2360	2709	6.6	Colder	7.1	Warmer

Source: AGA

Natural Gas – A hot vs cold month can be a swing of ~500 bcf of consumption

Jan is the big month for natural gas demand

Jan is now over and, as noted above, the AGA heating degree days data thru the week ended Jan 28 and shows Jan has been way warmer than normal. And a warm Jan is never good for HH gas prices. Jan is normally the peak weather temperature driven natural gas consumption month. So no surprise, HH gas prices crashed below $3 on Jan 25 and remain there given the warmer than normal temperatures across most of the US thru Jan. On Jan 7, we tweeted [LINK] on the below data on why temperature is key for winter natural gas demand and prices. It's why warm weather in the winter, especially in Jan, is never a positive for natural gas prices. There can be huge swings in residential/commercial natural gas demand depending if it's hot, normal, or cold. The different between a hot and cold month can be almost 500 bcf in a month. Below is a table we have previously posted that shows these swings. It shows AGA heating degree days vs US total natural gas consumption and US residential/commercial natural gas consumption. (i) Residential/commercial demand is normally >40% of total US natural gas consumption in DJF. (ii) For the last 10 year average, Jan was 46.7 bcf/d, Feb 43.4 bcf/d, and Dec 38.0 bcf/d. (iii) The high to low swings for Dec can be up to 12.6 bcf/d, Jan can be up to 9.8 bcf/d, and Feb can be up to 17.2 bcf/d. (iv) The biggest months over the past 10 winters were Jan 2014 at 51.9 bcf/d, Feb 2015 at 50.9 bcf/d, and then Dec 2017 at 49.5 bcf/d.

Figure 3: 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													

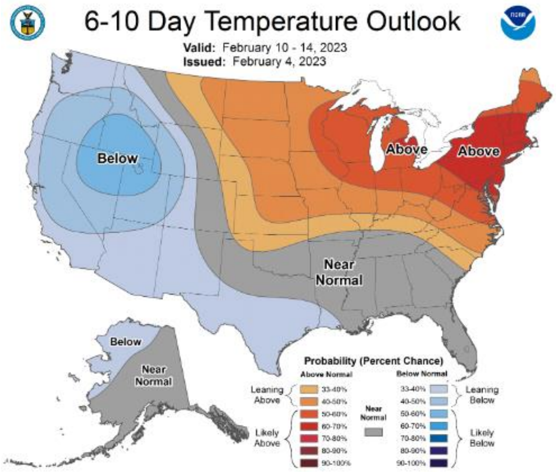
Source: EIA, AGA, SAF

Natural Gas – NOAA expects warm weather in Feb

NOAA 6-10 & 8-14 day temp outlook

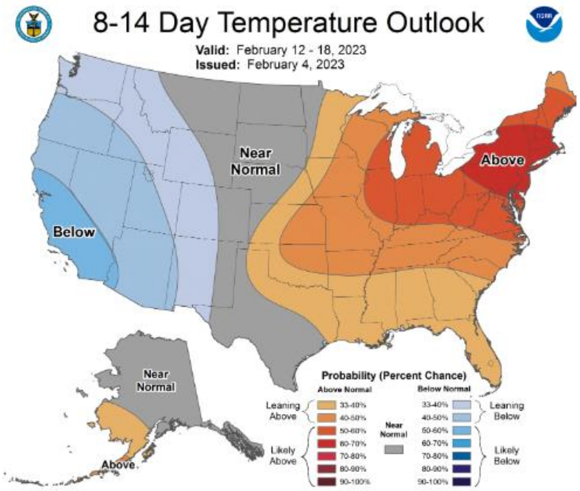
Yesterday, we tweeted [LINK] "*Cold this weekend, but continued negative tone to near term HH #NatGas prices. @NOAA calls for above normal temps for populous east part of US. Never good when its warm in Feb. See 👇01/08 tweet, Feb is 2nd most significant month for temperature driven res/com demand. #OOTT.*" It's cold this weekend but NOAA expects it to turn wamer. Our tweet yesterday included NOAA's below Feb 4 updated 6-10 day and 8-14 day outlook that run up thru Feb 18.

Figure 4: NOAA 6-10 day temperature outlook as of Feb 4



Source: NOAA

Figure 5: NOAA 8-14 day temperature outlook as of Feb 4



Source: NOAA

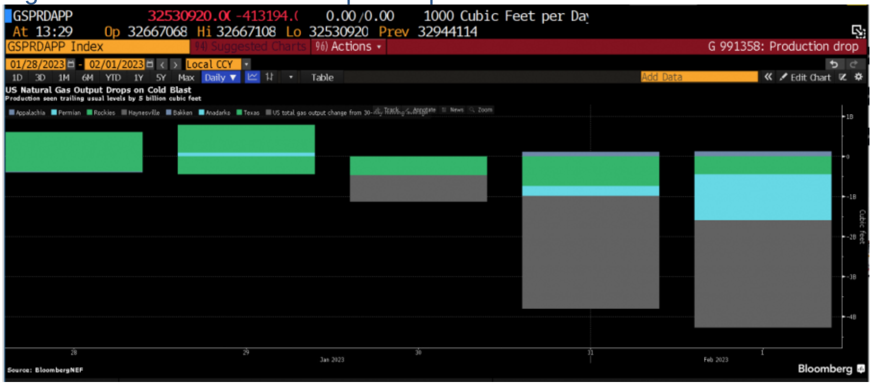
Natural Gas – Cold weather this week led to some US freeze-offs/shut-in

Our prior memo have noted it was turning colder to end Jan/start Feb and that has happened. But, as noted above, the cold isn't staying. However, the cold weather this week led to some estimated natural gas freeze-offs/shut-ins. On Wednesday, we tweeted [LINK] "*Too bad it wasn't cold in Dec and Jan and the current cold only expected to last a few days. @gersonjr writes @BloombergNEF model estimates Lower 48 US #NatGas production to trail normal levels >5 bcf/d on Wed. #OOTT.*" Bloomberg wrote "*US natural gas output is*

Cold weather shuts in some gas

taking a hit from the extreme cold blanketing southern states. Production of the heating and power-generation fuel in the contiguous 48 states is trailing normal levels by more than 5 billion cubic feet, or roughly 5%, on Wednesday, according to BloombergNEF data based on early pipeline nominations. Wells are freezing up in places like Texas, which accounts for almost half the losses." Below is the Bloomberg graph included with our tweet.

Figure 6: US Natural Gas output drops on cold blast



Source: Bloomberg

Natural Gas – US November gas production 100.5 bcf/d, continuing to move higher

US November gas production +3.8 bcf/d YoY

There is no change to the US natural gas story that US natural gas supply, driven by shale/tight natural gas, continues to be up strongly YoY. The EIA released its Natural Gas Monthly on Tuesday [LINK], which includes its estimates for "actuals" for November gas production. The key takeaway from the November actuals is that November (+0.2 bcf/d MoM to 100.8 bcf/d) is at its highest point, after revised October to 100.6 bcf/d from 100.5 bcf/d and is still comfortably above the pre-Covid February 2020 level of 98.1 bcf/d. November 2022 is +3.8 bcf/d YoY. Our Supplemental Documents package includes excerpts from the EIA Natural Gas Monthly.

Figure 7: US Dry Natural Gas Production

bcf/d	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	56.0	60.0	66.0	65.3	66.8	73.4	73.6	70.6	78.7	89.4	95.1	92.8	95.3
Feb	57.2	58.8	67.0	65.4	68.4	73.8	77.3	71.5	80.4	90.0	98.1	86.2	94.5
March	57.3	61.5	65.0	65.3	68.9	74.1	73.8	73.2	81.3	90.6	94.6	92.3	95.4
Apr	57.6	62.3	64.8	66.1	70.5	75.2	73.7	73.3	81.2	91.0	92.9	93.2	96.5
May	58.0	62.4	65.0	65.9	70.2	74.1	72.9	73.3	82.1	91.7	87.8	93.0	97.7
June	57.2	62.1	64.6	65.8	70.5	74.0	72.2	74.0	82.5	92.0	88.4	93.2	98.5
July	58.2	62.5	66.3	67.1	72.0	74.2	72.8	74.7	84.2	92.5	89.8	93.7	98.5
Aug	58.9	63.2	66.0	66.9	72.4	74.3	72.2	74.7	85.9	94.8	90.2	94.3	99.3
Sept	59.1	63.1	66.4	66.8	72.4	74.7	71.7	76.0	87.3	94.7	89.5	93.6	100.5
Oct	60.1	65.1	66.5	67.0	73.1	74.2	71.4	77.3	88.4	96.0	88.9	95.6	100.6
Nov	60.1	65.9	66.6	67.7	72.6	73.9	72.0	79.8	89.9	96.7	92.0	97.0	100.8
Dec	61.0	65.6	66.0	66.5	73.2	73.9	71.2	80.4	89.5	97.0	92.5	97.0	
Average	58.4	62.7	65.9	66.3	70.9	74.2	72.9	74.9	84.3	93.0	91.6	93.5	98.0

Source: EIA

Natural Gas – US pipeline exports to Mexico down MoM to 5.4 bcf/d in November

US pipeline exports to Mexico down MoM

The EIA Natural Gas Monthly also provides its "actuals" for gas pipeline exports to Mexico, which were 5.4 bcf/d in November, which was down 0.1 bcf/d YoY and down 0.1 bcf/d from October. There is no explanation given for the MoM changes. There were no material revisions to last month's data. Mexico's unchanged production over the past five years has created the need for increased US pipeline exports to Mexico as Mexico builds out its domestic natural gas infrastructure. Below is our table of the EIA's monthly gas exports to Mexico.

Figure 8: US Pipeline Gas Exports To Mexico (bcf/d)

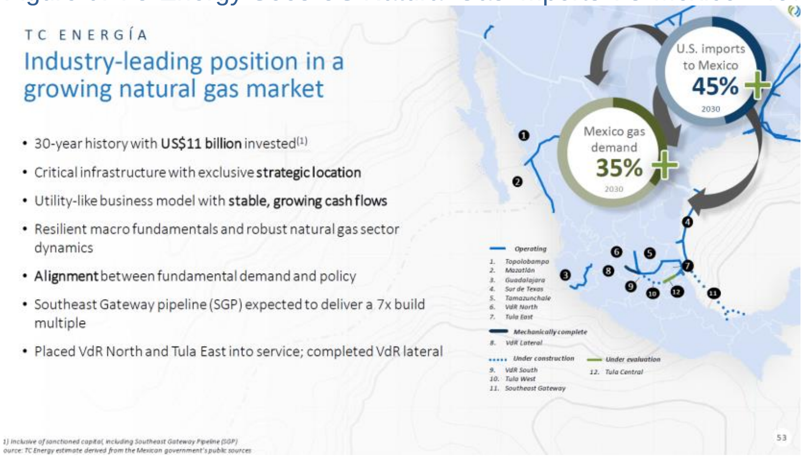
bcf/d	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	1.7	2.2	3.2	3.9	4.4	4.9	5.2	5.6	5.7
Feb	1.8	2.3	3.5	4.0	4.5	4.8	5.4	4.9	5.5
March	1.9	2.4	3.3	4.2	4.3	4.8	5.4	5.9	5.5
Apr	1.9	2.6	3.5	3.7	4.4	4.7	4.6	6.1	5.9
May	2.0	2.8	3.7	4.0	4.4	5.0	4.7	6.2	6.0
June	2.2	3.0	3.9	4.5	4.6	5.2	5.4	6.6	6.1
July	2.2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

Source: EIA

TC Energy expects +3 bcf/d of Permian gas via pipeline to Mexico by 2030

It may take a couple years to start to ramp up, but we believe an overlooked US natural gas factor is that there should be a big ramp up in Permian natural gas via pipeline to Mexico in the 2020s. TC Energy expects there will be an additional 3 bcf/d of Permian natural gas pipeline demand from Mexico to 2030. Here is what we wrote in our Dec 18, 2022 Energy Tidbits "*It won't affect stock trading, but for those that look at capital allocation on a mid to long term basis or look at tail-end risks/opportunities, the question of Mexico's natural gas infrastructure build-out is worth tracking. We had the opportunity to listen to a major energy analysis group recent US natural gas outlook and it didn't include any slides or commentary on the potential (or expectation by some) for Mexico to ramp up its natural gas pipeline imports from the Permian in the 2020s. It's something that most either overlook or discount or just don't care about, but a factor that could a material impact on the US natural gas view. TC Energy is probably the driving force behind much of Mexico's domestic natural gas pipeline infrastructure build-out and has a very bullish view that Mexico will attract an additional +3 bcf/d to 2030. If they are right, this will attract Permian natural gas, and that means there will be less Permian natural gas for LNG export. And will raise the question is there enough natural gas to support the growth in US LNG exports? And, since US LNG export growth, it means that there will be a need to try to get Appalachia natural gas down to the Gulf Coast. And, or course, TC Energy has the solution for that. But you can see how the TC view on Mexico has a very big impact on US natural gas in the 2020s, if not necessarily in the next couple years. We highlighted this in our Dec 4, 2022 Energy Tidbits.*"

Figure 9: TC Energy Sees US Natural Gas Imports TO Mexico +45% to 2030



Source: TC Energy

Natural Gas – US LNG exports up marginally MoM in Nov at 10.1 bcf/d

US November LNG exports

The Jan EIA Natural Gas Monthly estimates US LNG exports for November were 10.1 bcf/d and this is a reminder that the US LNG export data is available about two weeks prior to the Natural Gas Monthly. This is marginally different and it is likely a case of rounding vs the number as in the DOE monthly LNG data that was posted on Jan 17. And the LNG exports are still hurt by the continued shut-in of the 2.2 bcf/d Freeport LNG facility since its June 2022 fire. Here is what we wrote in our Jan 22, 2023 Energy Tidbits. "*As a reminder the US Dept of Energy posts monthly US LNG export data two weeks before the EIA (part of the US Dept of Energy) posts US LNG export data in its monthly Natural Gas Monthly report (next report is Dec 30). Normally, any differences in data points are due to rounding. The DOE report is better as it provides detailed information on LNG imports and exports including LNG volumes to the top US export countries. The US Department of Energy reported the November LNG export actuals on Tuesday [LINK] and we continue to see the impact of the Freeport LNG shut in in June (2.2 bcf/d). On Thursday, we tweeted [LINK] "US #LNG exports Nov/22 were 10.0 bcf/d, -1.2% YoY, +2.3% MoM Continued impact of #FreeportLNG 2.2 bcf/d June 8 shut. Nov/22 top 5 export countries: UK, France, Turkey, Japan, Dutch. Nov/21 top 5 export countries: China, Turkey, Japan, Korea, UK. @ENERGY data. #OOTT." November saw 302.3 bcf (10.0 bcf/d) of LNG exports, up 2.3% MoM."* The DOE reported *"The top 5 countries with export deliveries from the US were the UK (82.8 bcf), France (50.7 bcf), Turkey (31.4 bcf), Japan (24.4 bcf) and the Netherlands (20.6 bcf), representing 69.3% of total US LNG exports."* Our Supplemental Documents package includes excerpts from the DOE LNG Monthly.

Figure 10: US LNG Exports (bcf/d)

(bcf/d)	2016	2017	2018	2019	2020	2021	2022
Jan	0.0	1.7	2.3	4.1	8.1	9.8	11.4
Feb	0.1	1.9	2.6	3.7	8.1	7.4	11.3
March	0.3	1.4	3.0	4.2	7.9	10.4	11.7
Apr	0.3	1.7	2.9	4.2	7.0	10.2	11.0
May	0.3	2.0	3.1	4.7	5.9	10.2	11.3
June	0.5	1.7	2.5	4.7	3.6	9.0	10.0
July	0.5	1.7	3.2	5.1	3.1	9.7	9.7
Aug	0.9	1.5	3.0	4.5	3.6	9.6	9.7
Sept	0.6	1.8	2.7	5.3	5.0	9.5	9.8
Oct	0.1	2.6	2.9	5.7	7.2	9.6	10.0
Nov	1.1	2.7	3.6	6.4	9.4	10.2	10.1
Dec	1.3	2.7	4.0	7.1	9.8	11.1	
Full Year	0.5	1.9	3.0	5.0	6.6	9.7	10.6

Source: EIA, DOE

Natural Gas – Freeport LNG still moving towards a restart

Freeport LNG

Freeport LNG continues to move towards a restart with its request this week to FERC to allow the restart of some shipping activities, but it will still require a subsequent approval for the restart of commercial operations. There is no firm date for restart of commercial activities, but we have to believe it is pointing to sometime over the next couple weeks. On Thursday, Bloomberg reported "*Freeport LNG, the US natural gas-export terminal that's been shut since a June explosion, is seeking permission to restart some shipping activities as it moves closer to a long-delayed reopening. In a letter to the Federal Energy Regulatory Commission, the liquefied gas producer solicited authorization "for Loop 1 LNG return to service and the ability to dock and load LNG ships from its Dock 1 LNG berth." A subsequent approval still will be needed for Freeport LNG to resume commercial operations. US gas futures briefly spiked on the news. The reopening of the Texas terminal, one of the largest in the US, would boost demand for the heating and power-generation fuel at a time when domestic consumption has been eroded by mild weather conditions. The FERC has given the green light for Freeport LNG to resume some preparation activities, including the cool down of some systems. Gas flows to the terminal have inched higher and are seen reaching 130 million cubic feet on Thursday, the most since the shutdown, according to a BloombergNEF estimate based on pipeline nominations. The terminal has the capacity to process more than 2 billion cubic feet a day."*

Natural Gas – Another massive cost increase for Coastal GasLink pipeline

Coastal GasLink cost increases again

At its Nov 29 investor day, TC Energy warned of material cost increase for their Coastal GasLink pipeline and that they would be providing an update early in 2023. On Wed, they exceeded expectations and came up with a revised cost that was much more than expected by analysts. TC Energy announced that the project "*continues to face material cost pressures that include challenging conditions in the Western Canadian labour market; shortages of skilled labour; impacts of contractor underperformance and disputes; as well as other unexpected events like drought conditions and erosion and sediment control challenges.*
A comprehensive cost and schedule risk analysis (CSRA) was conducted to assess current market conditions and potential risks and uncertainties facing the remaining project scope. As a result of the CSRA, TC Energy's estimate of the costs to complete the Project has increased to approximately $14.5 billion. This estimate excludes potential cost recoveries and incorporates contingencies for certain factors that may be outside of the Company's control

such as labour conditions; contractor performance; and weather-related events. TC Energy expects to fund the incremental revised project costs and is actively pursuing cost mitigants and recoveries that may partially offset a portion of these costs, some of which may not be conclusively determined until after the Project is in service. Coastal GasLink is working closely with its prime contractors on implementing productivity improvement strategies targeting mechanical completion by year-end 2023, with commissioning and clean-up work continuing into 2024 and 2025." Our Supplemental Documents package includes the TC Energy release.

Figure 11: Coastal GasLink

Source: TC Energy Investor Day Nov 29, 2022

Natural Gas – Shell CEO "world is desperately in need of natural gas"

Shell on natural gas

One of the big messages from new Shell CEO Sawan was that the "*world is desperately in need of natural gas*" and the world has to "*make up for the long-term loss in Russian supplie*s." And we can't help believe Sawan hopes to FID LNG Canada Phase 2. (i) Sawan had some very bullish views on natural gas in his interview with Bloomberg. Bloomberg reported ""*Our natural gas business continues to grow in a world that is desperately in need of natural gas at the moment, and I think for a long time to come," Sawan said in an interview with Bloomberg TV on Thursday. "Gas has a critical role to play in the transition" to lower-carbon energy."* And "*Gas has been absolutely critical," Sawan said. "For a long time to come, a key focus area for us will be to continue to make sure that we lower the emissions from gas across the value chain." "There's no sign that the tight energy market that helped deliver bumper profits for the company last year will ease, Sawan said. There's no sign that the tight energy market that helped deliver bumper profits for the company last year will ease, Sawan said. "What you will have going into 2023 of course is the return of a significant appetite from China to take up gas" after it ended its Covid-zero policies, Sawan said. "I would not declare an end to the energy crisis. I think we have a way to go." There's still a lot* *of work to do to reorganize energy flows to make up for the long-term loss in Russian supplies. "The amount of rewiring of energy flows over the past year has been huge and we expect to see that continue," Sawan said. "This is going to be a journey of years. And I would caution anyone who looks ahead and assumes that the worst is over."*

Natural Gas – Shell reminds 2023 should be a big year of global LNG maintenance

Big year for LNG maintenance

One of the reasons we like earnings calls is that we often get sector insights from the Q&A, where mgmt has to respond outside of their planned script. Shell held its Q4 call on Thursday. It wasn't a detailed answer but, in the Q&A, Shell CEO Sawan warned that 2023 should be a big year for industry LNG plant maintenance, which makes sense how LNG export facilities were being pushed to deliver as much as possible with Europe needed to replace Russian pipeline gas. We aren't aware of any global LNG plant turnaround schedule. In the Q&A, Sawan replied "*Let's take the first one. There isn't a huge amount of LNG coming into the market over the next two years, it's around 20 million tons is what we see, but that's about it. And that one shouldn't also forget that many of these machines have been running hard now for a good year and you're beginning to see some of the challenges in just the reliability of the machines around the world. So that's, that's an issue*."

Natural Gas – LNG game changer, Mitsubishi won't deliver turbines for Gazprom LNG

Another hit to Russian LNG

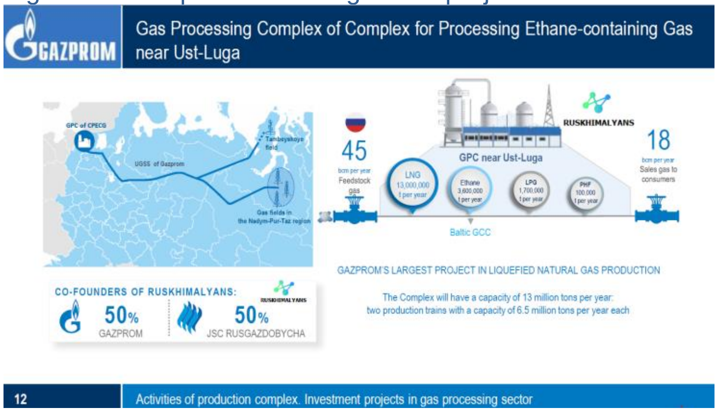
There was another major hit to Gazprom LNG development projects (and positive for LNG markets) on Wednesday morning (Russia time) with the reports that Mitsubishi is not going to provide its big gas turbines to Gazprom for its Ust-Luga LNG development. We tweeted [LINK] "*#LNG Game Changer. No Mitsubishi big turbines = lower & delayed RUS LNG supply adds in 2020s. #Kommersant reports will delay #Gazprom Ust-Luga 12-15 mths & be at lower LNG bcf/d. Exactly same as 👇12/12/22 tweet on Baker Hughes pull out impact. #OOTT."* The Mitsubishi move is just like happened last June with Baker Hughes (see below), this means that Gazprom will have to go with lesser power gas turbines made in Russia that don't have he necessary power to deliver the planned LNG supply volumes. And because the Ust-Luga was planned with Mitsubishi gas turbines, it means the project will be later (in this case 12-15 months) and with less LNG output (not disclosed. So Gazprom's LNG supply from Ust-Luga will be delayed and at lower LNG volumes. The reporting on this came from Kommersant, who also broke the news on Baker Hughes doing the same last June ie. Kommersant looks to have good Gazprom contacts. On Wednesday, Kommersant reported [LINK] "*According to Kommersant, For the LNG plant in Ust-Luga, Ruskhimalyans (50% each from Gazprom and Rusgazvydobuvannya) can purchase Russian GTD-110M turbines. These machines will be installed instead of Japanese gas turbines Mitsubishi Heavy Industries, which refused to fulfill the contract. Compressors for the project, which were also to be supplied by the Japanese, can be ordered from Kazancompressormash. The change in the composition of critical equipment to the Russian one, according to experts, can shift the launch of the project by 12-15 months, and the lower maneuverability of the GTD-110M will negatively affect the production of LNG."* Our Supplemental Documents package includes the Kommersant report.

Ust-Luga is 1.7 bcf/d of LNG from two trains each with 0.85 bcf/d

Our tweet included the below Gazprom May 27, 2021 slide on Ust-Luga. At that time, Gazprom noted that Ust-Luga was "Gazprom's largest project in liquefied natural gas production. The complex will have a capacity of 13 million tons per year.

Two production trains with a capacity of 6.5 million tons per year each. 6.5 million tons of LNG = 0.85 bcf/d.

Figure 12: Gazprom's Ust-Luga LNG project

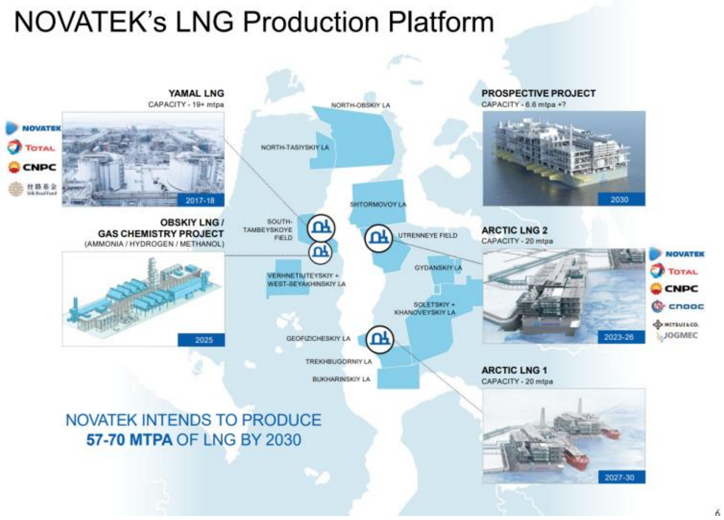


Source: Gazprom

Just like Baker Hughes game changer stopping work on 6.2 bcfd RUS LNG

The stopping of supplying big gas turbines to Russia's Gazprom was an overlooked game changer for LNG markets for the 2020s. Mitsubishi's stopping is just like what happened in Q2/22 (but on a smaller scale) when Baker Hughes stopped its providing of its big gas turbines to Gazprom. We highlighted this Baker Hughes move several times in our Energy Tidbits memos. Here is what we wrote in our June 19, 2022 Energy Tidbits. "*We are still surprised that others haven't jumped on what we called the game changer to LNG – the reports Baker Hughes is stopping servicing, replacing parts, etc for in operating Russian LNG projects and will not provide gas turbines for the under construction LNG projects. This is putting at risk 3.6 bcf/d of existing LNG supply and 2.6 bcf/d of under construction LNG. It is huge or, at least we think so. Don't forget Baker Hughes is the leading global services company for LNG and is involved in almost every recent LNG project. (i) On Thursday, we tweeted [LINK] "1/2. Game Changer for #LNG. 6.2 bcfd RUS LNG is now at risk incl operating 1.3 bcfd Sakhalin-2 LNG & 2.3 bcfd Yamal LNG, and under construction 2.6 bcfd Arctic LNG-2 w/ phase 1 0.87 planned 2023 in service. #OOTT #NatGas" and [LINK] "2/2. Must read, @Kommersant reports #BakerHughes stopping service/replacement parts for existing #LNG & shipping gas turbines for Arctic LNG-2. Projects are designed for specific turbines. Urgent need for LNG FIDs ie. how about @Shell #LNGCanada Phase 2 is 1.8 bcfd. #NatGas #OOTT". Baker Hughes is reportedly stopping servicing two in-service Russian LNG projects (Sakhalin-2 and Yamal LNG) and stopping deliveries on gas turbines for the under construction Arctic LNG-2 project. Sakhalin-2 LNG in operation. Think about what is happening with Nord Stream being shut down waiting on equipment repairs. The operating 3.6 bcf/d LNG will be at risk for now having Baker Hughes servicing and providing any equipment repairs/replacement. And the 2.6 bcf/d of under construction LNG can't be finished without Baker Hughes equipment. (ii) On Friday, we tweeted [LINK] "Game changer for #LNG. See 👇 Thurs thread, $BKR pullout is huge. RUS admits* *delays in new LNG adds, hopes no more than 1-2 yrs. Arctic LNG-2 2.6 bcfd from 3 phases, phase 1 0.87 bcfd starting in 2023, all on in 2026. Urgent need for FIDs ie. #LNGCanada Phase 2. #OOTT #NatGas." TASS reported on comments from Russia First Deputy Minister Sorokin, who admitted that the under construction 2.6 bcf/d Arctic LNG-2 would be delayed and they hoped the delay wouldn't be more than 1 to 2 years. In the Kommersant Thursday report, they noted that the Baker Hughes equipment could not be replaced. Kommersant wrote ""There is, in fact, nothing to replace this equipment now: analogues are not produced in the Russian Federation, and LNG production lines have already been designed for the LM9000". (iii) There was a good example on how nothing is every clear in Russia. And that Novatek still sees Phase 1 of Arctic LNG-2 starting on time in 2023. On Friday night, Bloomberg reported "Novatek plans to launch Arctic LNG 2 on time despite all the problems amid sanctions, Interfax reports, citing CEO Leonid Mikhelson at St. Petersburg International Economic Forum. * NOTE: Novatek holds 60% stake in the Arctic LNG 2 project with three LNG production trains with a capacity of 6.6m tons/year each. The first train was expected to start production in 2023 * Novatek has revised Arctic LNG 2 financing scheme, there are no problems with that."*

Figure 13: Novatek's LNG production platform, May 2021



Source: Novatek

Natural Gas – Another long-term LNG deal: Oman to supply BOTAS with 0.13 bcf/d

Another long-term LNG deal

There was a significant slowdown in long-term LNG deals in H2/2022 compared to the July 1, 2021 to June 30, 2022 period. Because most, if not all the available long term LNG supply available before 2026 was locked up in the July 1, 2021 to June 30, 2022 rush. Rather, the long-term deals now being done are generally for long term supply starting in 2026 or later. There was one long term LNG deal announced last week. On Monday, The Times of Oman reported on Oman LNG entered into a binding term-sheet agreement to supply BOTAS Petroleum Pipeline Corporation (Turkey) with 0.13 bcf/d for a 10-year period from 2025 to 2035 [LINK]. The article stated, *"The signed term-sheet agreement will see Oman LNG* *supplying BOTAS with a total volume of 1 million metric tonnes per annum of LNG based on a 10-year contract, starting from 2025; helping to emphasize Oman LNG's role in leveraging the Sultanate of Oman's reputation and Oman LNG as a reliable and trusted LNG supplier, coupled with the effective management of business processes to produce clean energy delivered to customers around the world safely and reliably.*" We checked the Oman LNG website again this morning and there is still no announcement posted on their website. Our Supplemental Documents package includes the Times of Oman report.

Asia was early to secure long term LNG supply

Our March 13, 2022 Energy Tidbits memo noted that Europe LNG buyers were starting 9 months behind the wave of Asian LNG buyers who started to lock up long term LNG supply starting in July 2021. The LNG supply crunch is not a 2022 development. Rather, it was clear in H1/21 that there was a major sea change in LNG outlook. We turned very bullish on LNG outlook for the 2020s once TotalEnergies went force majeure on its Mozambique LNG in April 2021. We posted our April 28, 2021 blog *"Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?"* as we thought the market had overlooked that this force majeure backed up 5.0 bcf/d of Mozambique LNG that was originally planned to start in phases in 2024. And that this would create an earlier and larger LNG supply gap in the mid 2020s. Then we started to see validation of this view when Asian LNG buyers in July made an abrupt change to their LNG contracting and pivoted to trying to lock in long term LNG supply. On July 14, 2021 we posted our 8-pg "*Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs".* Here is an excerpt from the blog "*The last 7 days has shown there is a sea change as Asian LNG buyers have made an abrupt change in their LNG contracting and are moving to lock in long term LNG supply. This is the complete opposite of what they were doing pre-Covid when they were trying to renegotiate Qatar LNG long term deals lower and moving away from long term deals to spot/short term sales. Why? We think they did the same math we did in our April 28 blog "Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?" and saw a much bigger and sooner LNG supply gap driven by the delay of 5 bcf/d of Mozambique LNG that was built into most, if not all LNG supply forecasts. Asian LNG buyers are committing real dollars to long term LNG deals, which we believe is the best validation for the LNG supply gap. Another validation, Shell, Total and others are aggressively competing to invest long term capital to partner in Qatar Petroleum's massive 4.3 bcf/d LNG expansion despite plans to reduce fossil fuels production in the 2020s. And even more importantly to LNG suppliers, the return to long term LNG contracts provides the financing capacity to commit to brownfield LNG FIDs. The abrupt change by Asian LNG buyers to long term contracts is a game changer for LNG markets and sets the stage for brownfield LNG FIDs likely as soon as before year end 2021. It has to be brownfield LNG FIDs if the gap is coming bigger and sooner. And we return to our April 28 blog point, if brownfield LNG is needed, what about Shell looking at 1.8 bcf/d brownfield LNG Canada Phase 2? LNG Canada Phase 1 at 1.8 bcf/d capacity is already a material positive for Cdn natural gas producers. A FID on LNG Canada Phase 2 would be huge, meaning 3.6 bcf/d of Cdn* *natural gas will be tied to Asian LNG markets and not competing in the US against Henry Hub. And with a much shorter distance to Asian LNG markets. This is why we focus on global LNG markets for our views on the future value of Canadian natural gas."* Our Supplemental Documents package includes our April and July blogs.

There have been 13.27 bcf/d of long-term LNG supply deals since July 1, 2021

We first highlighted this abrupt shift to long term LNG supply deals in our July 14, 2021 8-pg "*Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs".* We included a table of the deals done in that short two week period. We continue to update that table, which now shows 13.27 bcf/d of long term LNG deals since July 1, 2021. 65% of the deals have been by Asian LNG buyers, but we are now seeing rest of world locking up long term supply deals post Russia/Ukraine. Note in our non-Asian LNG deals will major LNG players (ie. Chevron, Shell, etc) buying for their LNG portfolio supply. China has been particularly active in this space, accounting for 75% of all Asian LNG buyers in long term contracts since July 1, 2021. Below is our updated table of Asian and Europe LNG buyers new long term supply deals since July 1, 2021.

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

Long-Term LNG Buyer Deals Since July 1, 2021							
Date	**Buyer**	**Seller**	**Country**	**Volume**	**Duration**	**Start**	**End**
			Buyer / Seller	**(bcf/d)**	**Years**		
Asian LNG Deals							
Jul 7, 2021	CNOOC	Petronas	China / Canada	0.30	10.0	2022	2032
Jul 9, 2021	CPC	QatarEnergy	Taiwan / Qatar	0.16	15.0	2022	2037
Jul 9, 2021	Guangzhou Gas	BP	China / US	0.13	12.0	2022	2034
Jul 12, 2021	Korea Gas	QatarEnergy	Korea / Qatar	0.25	20.0	2025	2045
Sep 29, 2021	CNOOC	QatarEnergy	China / Qatar	0.50	15.0	2022	2037
Oct 7, 2021	Shenzhen	BP	China / US	0.04	10.0	2023	2032
Oct 11, 2021	ENN	Cheniere	China / US	0.12	13.0	2022	2035
Nov 4, 2021	Unipec	Venture Global LNG	China / US	0.46	20.0	2023	2043
Nov 4, 2021	Sinopec	Venture Global LNG	China / US	0.53	20.0	2023	2043
Nov 5, 2021	Sinochem	Cheniere	China / US	0.12	17.5	2022	2040
Nov 22, 2021	Foran	Cheniere	China / US	0.04	20.0	2023	2043
Dec 6, 2021	Guangdong Energy	QatarEnergy	China / Qatar	0.13	10.0	2024	2034
Dec 8, 2021	S&T International	QatarEnergy	China / Qatar	0.13	15.0	2022	2037
Dec 10, 2021	Suntien Green Energy	QatarEnergy	China / Qatar	0.13	15.0	2022	2037
Dec 15, 2021	SPIC Guangdong	BP	China / US	0.03	10.0	2023	2033
Dec 20, 2021	CNOOC Gas & Power	Venture Global LNG	China / US	0.26	20.0	2023	2043
Dec 29, 2021	Foran	BP	China / US	0.01	10.0	2023	2032
Jan 11, 2022	ENN	Novatek	China / Russia	0.08	11.0	2024	2035
Jan 11, 2022	Zhejiang Energy	Novatek	China / Russia	0.13	15.0	2024	2039
Feb 4, 2022	CNPC	Gazprom	China / Russia	0.98	30.0	2023	2053
Mar 24, 2022	Guangdong Energy	NextDecade	China / US	0.20	20.0	2026	2046
Mar 29, 2022	ENN	Energy Transfer	China / US	0.36	20.0	2026	2046
Apr 1, 2022	Guangzhou Gas	Mexico Pacific Ltd	China / Mexico	0.26	20.0	n.a.	n.a.
Apr 6, 2022	ENN	NextDecade	China / US	0.26	20.0	2026	2026
Apr 22, 2022	Kogas	BP	Korea / US	0.20	18.0	2025	2043
May 2, 2022	Gunvor Singapore Pte	Energy Transfer LNG	Singapore / US	0.26	20.0	2026	2046
May 3, 2022	SK Gas Trading LLC	Energy Transfer LNG	Korea / US	0.05	18.0	2026	2042
May 10, 2022	Exxon Asia Pacific	Venture Global LNG	Singapore / US	0.26	n.a.	n.a.	n.a.
May 11, 2022	Petronas LNG	Venture Global LNG	Malaysia / US	0.13	20.0	n.a.	n.a.
May 24, 2022	Hanwha Energy	TotalEnergies	Korea / France	0.08	15.0	2024	2039
May 25, 2022	POSCO International	Cheniere	Korea / US	0.05	20.0	2026	2036
June 5, 2022	China Gas Holdings	Energy Transfer	China / US	0.09	25.0	2026	2051
Jul 5, 2022	China Gas Holdings	NextDecade	China / US	0.13	20.0	2027	2047
Jul 20, 2022	PetroChina	Cheniere	China / US	0.24	24.0	2026	2050
Jul 26, 2022	PTT Global	Cheniere	Thailand / US	0.13	20.0	2026	2046
Jul 27, 2022	Exxon Asia Pacific	NextDecade	Singapore / US	0.13	20.0	2026	2046
Sep 2, 2022	Woodside Singapore	Commonwealth	Singapore / US	0.33	20.0	2026	2046
Nov 21, 2022	Sinopec	QatarEnergy	China / Qatar	0.53	27.0	2026	2053
Dec 26, 2022	INPEX	Venture Global LNG	Japan/US	0.13	20.0	n.a.	n.a.
Dec 27, 2022	JERA	Oman LNG	Japan/Oman	0.11	10.0	2025	2035
Jan 19, 2023	ITOCHU	NextDecade	Japan / US	0.13	15.0	n.a.	n.a.
Total Asian LNG Buyers New Long Term Contracts Since Jul/21				**8.59**			
Non-Asian LNG Deals							
Jul 28, 2021	PGNiG	Venture Global LNG	Poland / US	0.26	20.0	2023	2043
Nov 12, 2021	Engie	Cheniere	France / US	0.11	20.0	2021	2041
Mar 7, 2022	Shell	Venture Global LNG	US / US	0.26	20.0	2024	2044
Mar 16, 2022	NFE	Venture Global LNG	US / US	0.13	20.0	2023	2043
Mar 16, 2022	NFE	Venture Global LNG	US / US	0.13	20.0	2023	2043
May 2, 2022	Engie	NextDecade	France / US	0.23	15.0	2026	2041
May 17, 2022	PGNiG	Sempra Infrastructure	Poland / US	0.40	20.0	n.a.	n.a.
May 25, 2022	RWE Supply & Trading	Sempra Infrastructure	Germany / US	0.30	15.0	n.a.	n.a.
Jun 9, 2022	Equinor	Cheniere	Norway / US	0.23	15.0	2026	2041
Jun 21, 2022	EnBW	Venture Global LNG	Germany / US	0.20	20.0	2026	2046
Jun 22, 2022	INEOS Energy	Sempra Infrastructure	UK / US	0.21	20.0	2027	2047
Jun 22, 2022	Chevron	Venture Global LNG	US / US	0.26	20.0	n.a.	n.a.
Jun 22, 2022	Chevron	Cheniere	US / US	0.26	15.0	2027	2042
Jul 12, 2022	Shell	Mexico Pacific Ltd	US / Mexico	0.34	20.0	2026	2046
Jul 13, 2022	Vitol	Delfin Midstream	US / US	0.07	15.0	n.a.	n.a.
Aug 9, 2022	Centrica	Delfin Midstream	UK / US	0.13	15.0	2026	2041
Aug 24, 2022	Shell	Energy Transfer	US / US	0.28	20.0	2026	2046
Oct 6, 2022	EnBW	Venture Global LNG	Germany / US	0.26	20.0	2022	2042
Dec 6, 2022	ENGIE	Sempra Infrastructure	France / US	0.12	15.0	n.a.	n.a.
Dec 20, 2022	Galp	NextDecade	Portugal / US	0.13	20.0	n.a.	n.a.
Dec 20, 2022	Shell	Oman LNG	UK/Oman	0.11	10.0	2025	2035
Jan 25, 2023	Sempra	PKN ORLEN	US / EU	0.13	20.0	2027	2047
Jan 30, 2023	BOTAS	Oman	Turkey / Oman	0.13	10.0	2025	2035
Total Non-Asian LNG Buyers New Long Term Contracts Since Jul/21				**4.68**			
Total New Long Term LNG Contracts since Jul/21				**13.27**			

*Excludes Asian short term/spot deals

*on Dec 20, CNOOC also agreed to buy an additional 0.13 bcf/d from Venture Global for an undisclosed shorter period

Source: Bloomberg, Company Reports

Prepared by SAF Group https://safgroup.ca/news-insights/

Source: Company reports, SAF Group

Natural Gas – TotalEnergies setting stage for a Mozambique LNG restart

TotalEnergies Mozambique LNG

It looks like TotalEnergies is setting the stage for a restart of construction for their Mozambique LNG project. If so, it will almost two years of force majeure. CEO Patrick Pouyanne went to Mozambique to see an on-the-ground situation and meet with Mozambique leaders. When we saw reports that he was planning to go to Mozambique, we tweeted [LINK] *"#LNG Game Changer. Only reason @TotalEnergies CEO @PPouyanne is going to Mozambique must be to restart its LNG project. Sets in motion 5 bcfd of LNG - its Phase 1 + Phase 2 + @Exxon Rozuma Phase 1. See 👇SAF 04/28/21 & 07/14/21 blogs. Thx @mattstephenhill @BorgesNhamirre #OOTT."* We do not believe Pouyanne would have risked going to Mozambique if he was truly concerned about his security. And we do not believe he would go there just to come back to Paris and say no idea of when they would restart. Rather, we saw this as clear indication that TotalEnergies is planning to restart the construction in the coming month or two. Post his trip, TotalEnergies announced "*During this visit, Patrick Pouyanné said he has entrusted Jean-Christophe Rufin, a recognized expert in humanitarian action and human rights, with an independent mission to assess the humanitarian situation in Cabo Delgado province. This mission will also evaluate the actions taken by Mozambique LNG and will propose any additional actions to be implemented, if required. The report of this mission will be delivered at the end of February and its conclusions will be shared with all Mozambique LNG's partners, who shall decide whether the conditions are met for resuming project activities. On April 26, 2021, considering the evolution of the security situation in the north of Cabo Delgado province, Mozambique LNG had decided to withdraw all project personnel from the Afungi site. This situation also led the Mozambique LNG project partners to declare force majeure. "Since 2021, the situation in Cabo Delgado province has improved significantly, thanks in particular to the support provided by the African countries that committed themselves to restore peace and security, said Patrick Pouyanné, CEO of TotalEnergies. The lifting of the force majeure and the resumption of activities at the Mozambique LNG project site require, in particular the restoration of security in the region, the resumption of public services and the return to normal life for the people of the region. The mission entrusted to Jean-Christophe Rufin should enable Mozambique LNG's partners to assess whether the current situation allows for a resumption of activities while respecting human rights."* We have to believe the Board wanted to have some sort of independent assessment that would confirm mgmt's assessment that it was okay to restart. Our Supplemental Documents package includes the TotalEnergies release.

No pictures of Pouyanne on the ground in Mozambique

We looked on Mozambique news and Twitter to see if there were any pictures of TotalEnergies CEO Pouyanne touring around the onshore LNG sites. Unfortunately, the only pictures we could see were Pouyanne meeting with Mozambique leaders inside. We have trouble believing that Pouyanne was travelling around the onshore LNG sites without some sort of security. The reason we wanted to see if that was the case was his prior comments about a key condition for a restart. Here is what we wrote in our Oct 9, 2022 Energy Tidbits. *"It looks like TotalEnergies is resisting the urging from Mozambique to restart its flagship Mozambique LNG around year end TotalEnergies does not estimate any time frame to make a restart decision, but they don't point to a restart in early 2023. TotalEnergies CEO Patrick Pouyanne presented at the Energy Intelligence Group forum in London. On Thursday, we* *tweeted [LINK] "More support for why @TotalEnergies doesn't include #MozambiqueLNG until after 2027. @EI_Forum "we will think to restart" the Mozambique #LNG project only on the day Pouyanne himself can visit without a military escort, says Pouyanne. #EIForum". #NatGas. [LINK]." Assuming Pouyanne is serious that this is the test, it's relatively high bar and one that we have trouble believing will be met within the next year."* We have to believe that any security accompanying Pouyanne won't be referred to as military escort.

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

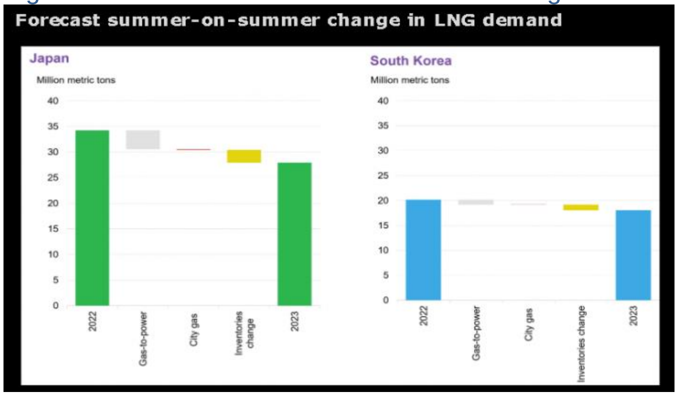
It is important to remember that a restart of TotalEnergies Mozambique Phase 1 is more than a restart of the 1.7 bcf/d for Phase 1 – it's really sets in motion 5.0 bcf/d of Mozambique LNG. This is why we have highlighting TotalEnergies force majeure on its Mozambique LNG Phase 1 for the past 21 months as the game changing event for LNG markets. TotalEnergies Mozambique Phase 1 at 1.7 bcf/d is significant, but our view has been because TotalEnergies delaying Phase 1 of 1.7 bcf/d is actually leading to a delay of 5.0 bcf/d. This was the reason why, on April 28 2021, we posted a 7-pg blog "*Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?*" [LINK] We thought, and still think, there has been a major change to the outlook for LNG supply in the 2020s and one that is still being overlooked – there is a big new LNG supply gap starting around 2025 that is hitting faster and bigger than anyone expects. We saw Total's April 27, 2021 announcement of force majeure at its Mozambique Phase 1 LNG of 1.7 bcf/d was much more significant that viewed. We just didn't see market focused on the fact that this situation backs up an additional 3.3 bcf/d of LNG supply that is also being counted on in all LNG supply forecasts. Total's Phase 2 of 1.3 bcf/d was to follow, and Exxon's Rozuma Phase 1 of 2.0 bcf/d was originally expected to go FID in 2019 but is now not expected to have a FID decision until 2022 at the earliest. Mozambique is considered a premium LNG supply region for Asia and is in LNG supply forecasts. Total's original in service for Phase 1 is 2024. We had been warning that Mozambique has a major LNG market impact and its why we posted the April 28 blog. Its also why earlier we said that this is starting the clock running for other LNG projects wanting to go FID to make their mind up ie. like LNG Canada Phase 2."

Natural Gas – Europe relief, BNEF sees lower Japan/Korea LNG imports this summer

Summer relief for Europe

All the stars lined up for Europe this winter for natural gas. The big one was a mild winter in Europe, but also Asia that freed up more LNG cargos for Europe. It looks like Europe will get another natural gas break this summer – LNG imports are expected lower in Japan and Korea this summer. On Thursday, we tweeted [LINK] "*Relief for EU #NatGas this summer. @BloombergNEF expects summer #LNG imports could drop YoY for Japan -18% & Korea -10%. Japan - restart of two Kansai nuclear reactors. Korea - new nuclear reactor start in Dec + net capacity additions of coal power. Thx @olympe_matte. #OOTT.*" BloombergNEF forecasts lower YoY LNG imports in Japan and Korea, which should free up more LNG cargos for Europe. Bloomberg wrote "** BloombergNEF expects Japan's LNG demand to drop sharply in the coming summer (April - September) with the restart of two Kansai Electric reactors increasing nuclear power generation. Lower power demand assuming normal weather in the base-case scenario will also reduce gas consumption from last year, when* *temperatures were above normal. * In South Korea, summer could play out similarly, with LNG demand dropping due to the commissioning of a new reactor at the end of 2022 which will boost nuclear power generation, as well as rising coal power output from net-capacity additions."* Our Supplemental Documents package includes the Bloomberg report.

Figure 15: Forecast summer-on-summer change in LNG demand



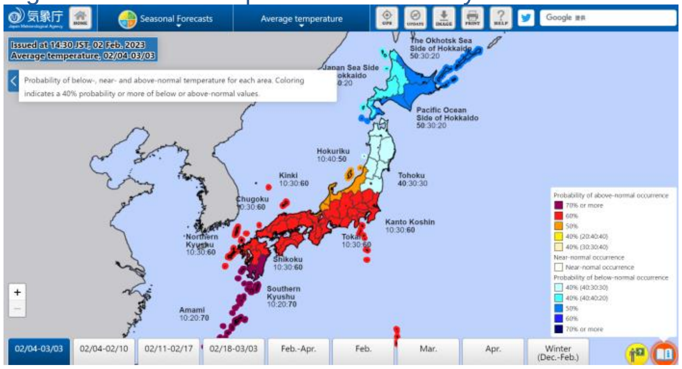
Source: Bloomberg

Natural Gas – Japan weather forecast now pointing to a warm end to winter

Japan expect a warmer than normal end to winter

Japan near-term weather forecasts continue to bounce around week to week. Last week's (Jan 29, 2023) Energy Tidbits memo noted the Japan Meteorological Agency's near term forecast for a colder than normal Feb. There was a big change in their new weekly forecast. On Thursday, the Japan Meteorological Agency updated its 30-day outlook [LINK] and is forecasting warmer than normal weather for the southern half of the country, which represents yet another forecast reversal. Note that the south is home to Japan's main populated areas, so a warmer than normal end of winter and subsequent decline in heating days would further curb the country's consumption of natural gas. Below is the JMA forecast for the next four weeks (Feb 4 – Mar 3), which expects above normal temperatures for the remainder of winter.

Figure 16: JMA Temperature Probability Feb 4 – Mar 3



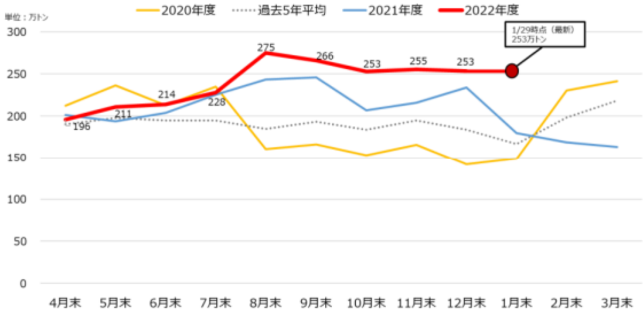
Source: Japan Meteorology Agency

Natural Gas – Japan's LNG stocks down -6.3% WoW to 122 bcf

Japan LNG stocks -6.3% WoW

It looks like the recent colder weather in Japan led to some draws on their LNG stocks. But generally, it has been milder winter, so Japan's LNG stocks are at high levels. It means that Japan is in pretty good shape to avoid LNG shortages in the winter. Especially since Europe is still warm. We always warn that Japan's LNG stockpiles are not huge relative to LNG imports that have ranged from 7 to 14 bcf/d since Jan 1, 2021. LNG stockpiles held by Japanese power producers continue to exceed both last year's level and the 4-year average. Japan's METI weekly LNG stocks data was released on Wednesday [LINK]. LNG stocks at Jan 29 were ~122 bcf -6.3% WoW from Jan 22 of ~130 bcf but above the 5-yr average of 80 bcf. Below is the LNG stocks graph from the METI weekly report.

Figure 17: Japan's LNG Stocks



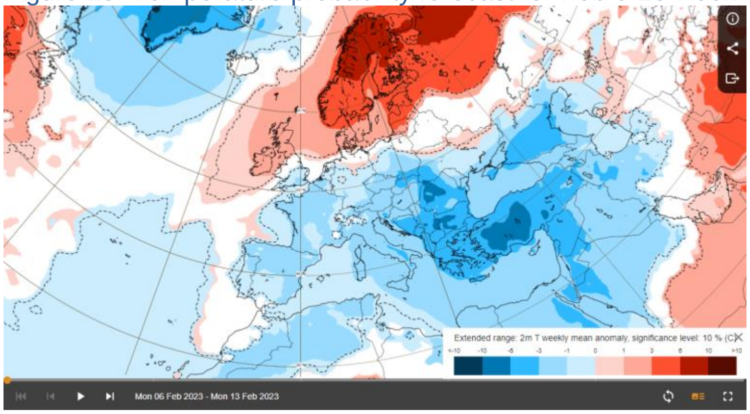
Source: METI

Natural Gas – A warmer than normal Feb to end winter in Europe

Warmer than normal forecast for Feb in EU

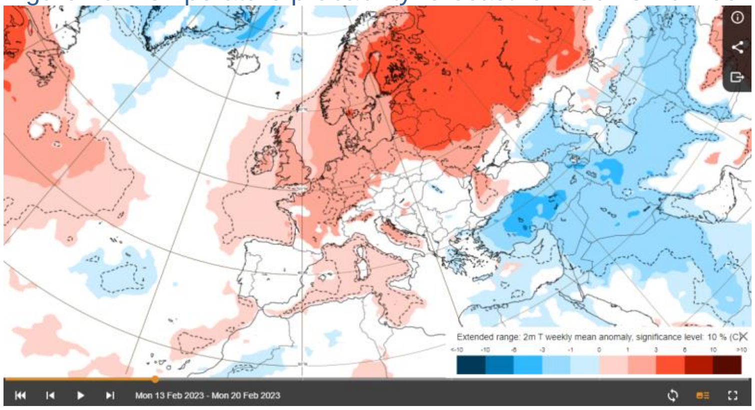
The big global natural gas and LNG story this winter was it was warmer than normal in many key areas of the world, but, in particular, Europe. And there is no change to the forecasts calling for a warm end to winter in Europe. Every Monday and Thursday, the European Centre for Medium-Range Weather Forecasts updates its near term forecasts. The forecasts normally are released in early afternoon MT. On Thursday, we tweeted [LINK] "*Same negative tone to end winter for TTF #NatGas #LNG price - it's warm in Europe. Every Mon & Thurs, ECMWF updates its near-term forecasts and 👇Thurs Feb 2 update calls for normal/slightly below normal temps to start Feb, but then warmer than normal for most of Feb. #OOTT".* Below are the Thursday updated European Centre for Medium-Range Weather Forecasts for the Feb 6-13, Feb 13-20 and Feb 20-27 weeks. [LINK] Red is never good in a temperature forecast for winter.

Figure 18: Temperature probability forecast for Feb 6-13 week



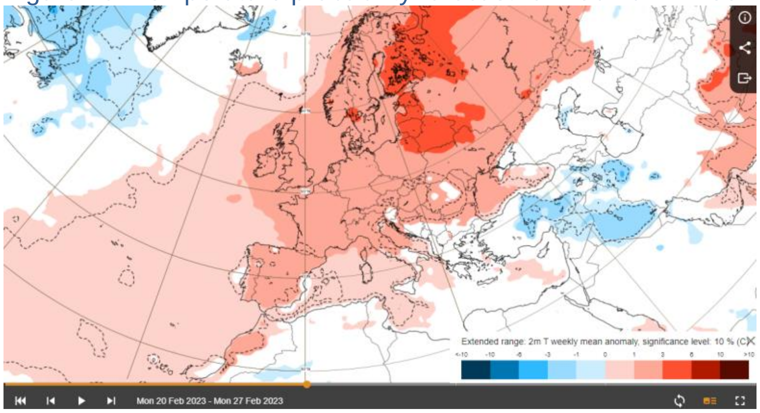
Source: ECMWF

Figure 19: Temperature probability forecast for Feb 13-20 week



Source: ECMWF

Figure 20: Temperature probability forecast for Feb 20-27 week



Source: ECMWF

Natural Gas – Italy natural gas consumption in Dec was -23.8% YoY

Italy natural gas consumption

There were good takeaways on Italy's natural gas supply/demand for 2022 from Bloomberg's report "*Italy December Natural Gas Balance: Statistical Summary*", which presented both Dec and 2022 data. (i) A hot Dec. Italy had its 2nd hottest Dec on record and that showed up in a big -23.8% YoY reduction in Italy's natural gas consumption in Dec 2022 to 8.40 bcf/d (vs 11.02 bcf/d in Dec 2021). There are other factors but clearly the 2nd hottest Dec on record was a huge factor. (ii) Natural gas consumption in 2022 was down -9.8% YoY to 6.63 bcf/d (vs 9.29 bcf/d in 2021). (iii) Italy's natural gas imports in Dec were -16.3% YoY to 6.76 bcf/d (vs 8.08 bcf/d in Dec 2021), and for 2022 were -0.3% YoY to 7.00 bcf/d (vs 7.02 bcf/d in 2021). (iv) Italy's major natural gas import point used to be Tarvisio (NE Italy) as that is the pipeline connection to Russia supply. Italy cut its pipeline imports at its main Tarvisio import point to 0.82 bcf/d in Dec 2022 (was 3.34 bcf/d in Dec 2021). And for full year 2022, down to 1.35 bcf/d in 2022 vs 2.81 bcf/d in 2022. Italy was able to replace the Russian gas with increased pipeline imports from Africa, via Turkey, Europe and LNG. Below is a Platts Oct 2022 map. Our Supplemental Documents package includes the Bloomberg report.

Figure 21: Italy Natural Gas Import Points

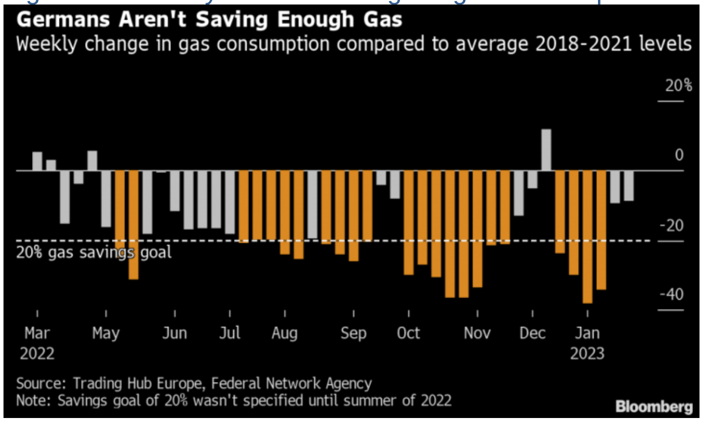
Source: IEA

Natural Gas – Germans getting tired of saving natural gas panic

German's natural gas savings

We probably shouldn't be surprised by the German regulator reporting that Germans natural gas consumption is now less than desired. The winter has been mild and Germany made it through winter with plenty of natural gas and no natural gas shortage. Germans didn't see any panic so it makes sense that Germans don't see the urgency to stay in a heightened natural gas saving mode continuously for another year. On Thursday, Germany regulator Klaus Muller tweeted [LINK] "*In the 4th week we again save less #Gas than desired: - 8 % industry (previous week - 10 %) - 9% household & commercial (- 9 %) Together: - 9% (- 9 %) The fact that we are well above the minimum storage level of 40% (February 1st) is* *good and helps for the winter of 23/24. @bnetza".* Below is Bloomberg's graph of weekly savings of natural gas since March 1.

Figure 22: Weekly German change in gas consumption vs 2018-2021 average



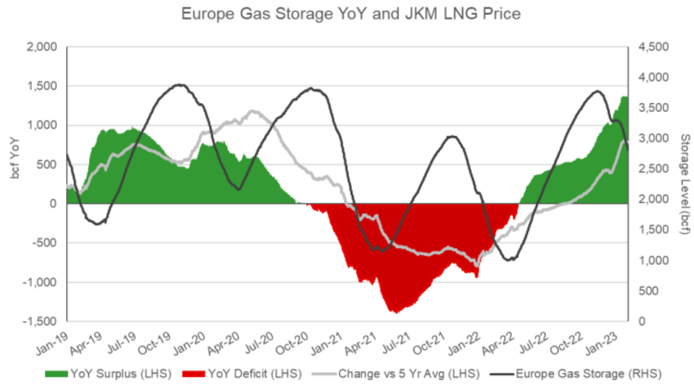
Source: Bloomberg

Natural Gas – Europe storage is now +34.40% YoY ie. 71.16% full vs 36.76%

Europe storage now 71.16% full

It's been a great winter so far for Europe in that, other than for a short period, it has been well above normal for most of continental Europe. Our Jan 8, 2023 Energy Tidbits noted that there has been negligible weather driven demand for natural gas, which along with the continued industrial demand destruction, means storage levels are at very high levels. This winter (Nov 1/22) began with gas storage at 94.94% capacity, up 17.86% YoY and is now a YoY surplus of 34.40%. Thanks to the warm weather and US LNG, storage as of Feb 2 is at 71.16%, which is +34.40% greater than last year levels of 36.76% and is +19.71% above the 5-year average of 51.45%. Below is our graph of Europe Gas Storage Level.

Figure 23: Europe Gas Storage Level



Source: Bloomberg

Oil – US oil rigs down -10 rigs to 599 oil rigs on Feb 3

US oil rigs down -10 WoW

Baker Hughes released its weekly North American drilling activity data on Friday. Last week's rigs were -4 and we thought that was likely due to HH pricing moving down closer to $3 and WTI falling below $80. This week, total US oil rigs were down -10 to 599 rigs as of Feb 3, with further rig declines at seen at basins such as the Granite Wash, Permian and Others. This past week saw HH prices fall even further to below $2.50 and WTI being pushed down closer to $70. We believe that the expectations of HH prices remaining low are negatively impacting oil rig counts, particularly as the key oil plays produce associated natural gas. The total US oil rig count is now at 599 rigs, up +102 YoY, +118 from the 2022 low of 481 rigs in January and +427 since the 2020 low of 172 rigs on Aug 14. US gas rigs were down -2 WoW to a total of 158 rigs, an increase of +42 rigs YoY. Below is our graph of total US rigs.

Figure 24: Baker Hughes Total US Oil Rigs

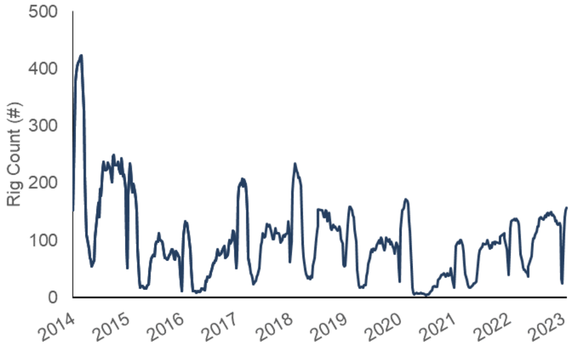
Source: Baker Hughes

Oil – Total Cdn rigs up +2 WoW to 249 total rigs, +31 rigs YoY

Cdn rigs +2 WoW

There has been the traditional big ramp up in Cdn rigs in Jan post Xmas/New Years holiday, but that ramp up is over and we approach the end of peak winter drilling period sometime later in Feb. Total Cdn rigs were +2 WoW to 249 rigs as of Feb 3. As noted in last weeks memo, the modest increase in rig count is no surprise as the holiday season officially wrapped up. However, we do not expect the Cdn rig count to increase much further as the end of winter drilling is now only a few weeks away. Notably, the week of Feb 3 saw a +5 rig increase in AB, while SK saw a decline of -3 rigs. There is now a total of 249 rigs, +78 vs the comparable Covid low period of 171 rigs on Feb 5, 2021. Cdn oil drilling rigs have increased to 159, up +23 YoY from 136 rigs a year ago and Cdn gas rigs were flat WoW at 90 rigs. Below is our graph of total Cdn oil rigs.

Figure 25: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

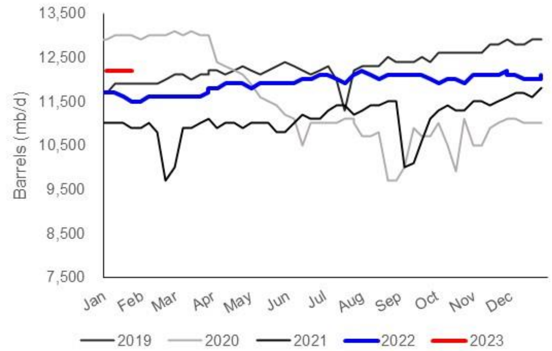
Oil – US weekly oil production flat at 12.2 mmb/d with all North Dakota still not back on
It sounds like North Dakota still had not fully restored oil production as of Jan 27 based on comments from North Dakota last week that there was still approx. 0.1 mmb/d of offline production. This means that the Lower 48 production would be higher if all of North Dakota oil had been restored. The EIA estimates US oil production was flat WoW to 12.2 mmb/d for the week ended Jan 20 with a both lower 48 production and Alaska production flat WoW. US oil production, based on the weekly estimates, has been mostly range bound between 11.9 to 12.1 mmb/d since the 2nd week of May. But broke above 12.1 mmb/d to 12.2 mmb/d for the week ended Jan 6 as well as five weeks ago, the first time since it touched 12.2 mmb/d in the 1st week of August. Lower 48 production was flat WoW at 11.7 mmb/d this week and Alaska was flat at 0.5 mmb/d WoW. US oil production is up +0.700 mmb/d YoY at 12.2 mmb/d but is still down significantly at -0.900 mmb/d since the 2020 peak of 13.1 mmb/d on March 13.

Figure 26: EIA's Estimated Weekly US Oil Production

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-Month	End Date	Value	End Date	Value	End Date	Value	End Date	Value	End Date	Value
2021-Jan	01/01	11,000	01/08	11,000	01/15	11,000	01/22	10,900	01/29	10,900
2021-Feb	02/05	11,000	02/12	10,800	02/19	9,700	02/26	10,000		
2021-Mar	03/05	10,900	03/12	10,900	03/19	11,000	03/26	11,100		
2021-Apr	04/02	10,900	04/09	11,000	04/16	11,000	04/23	10,900	04/30	10,900
2021-May	05/07	11,000	05/14	11,000	05/21	11,000	05/28	10,800		
2021-Jun	06/04	11,000	06/11	11,200	06/18	11,100	06/25	11,100		
2021-Jul	07/02	11,300	07/09	11,400	07/16	11,400	07/23	11,200	07/30	11,200
2021-Aug	08/06	11,300	08/13	11,400	08/20	11,400	08/27	11,500		
2021-Sep	09/03	10,000	09/10	10,100	09/17	10,600	09/24	11,100		
2021-Oct	10/01	11,300	10/08	11,400	10/15	11,300	10/22	11,300	10/29	11,500
2021-Nov	11/05	11,500	11/12	11,400	11/19	11,500	11/26	11,600		
2021-Dec	12/03	11,700	12/10	11,700	12/17	11,600	12/24	11,800	12/31	11,800
2022-Jan	01/07	11,700	01/14	11,700	01/21	11,600	01/28	11,500		
2022-Feb	02/04	11,600	02/11	11,600	02/18	11,600	02/25	11,600		
2022-Mar	03/04	11,600	03/11	11,600	03/18	11,600	03/25	11,700		
2022-Apr	04/01	11,800	04/08	11,800	04/15	11,900	04/22	11,900	04/29	11,900
2022-May	05/06	11,800	05/13	11,900	05/20	11,900	05/27	11,900		
2022-Jun	06/03	11,900	06/10	12,000	06/17	12,000	06/24	12,100		
2022-Jul	07/01	12,100	07/08	12,000	07/15	11,900	07/22	12,100	07/29	12,100
2022-Aug	08/05	12,200	08/12	12,100	08/19	12,000	08/26	12,100		
2022-Sep	09/02	12,100	09/09	12,100	09/16	12,100	09/23	12,000	09/30	12,000
2022-Oct	10/07	11,900	10/14	12,000	10/21	12,000	10/28	11,900		
2022-Nov	11/04	12,100	11/11	12,100	11/18	12,100	11/25	12,100		
2022-Dec	12/02	12,200	12/09	12,100	12/16	12,100	12/23	12,000	12/30	12,100
2023-Jan	01/06	12,200	01/13	12,200	01/20	12,200	01/27	12,200		

Source: EIA

Figure 27: US Weekly Oil Production



Source: EIA, SAF

Oil – EIA Form 914: Oct oil prod +0.747 mmb/d YTD, +431,000 b/d vs weekly estimates

EIA Form 914 October

There were two key takeaways from the EIA's weekly US oil production data for Sept – the actuals were 431,000 b/d more than the weekly estimates, and Sept is now +747,000 mmb/d YTD. There was a big MoM increase in US oil production in Oct. The EIA released its Form 914 data [LINK] on Friday, which is the EIA's "actuals" for October US oil and natural gas production. (i) Form 914 estimates total US oil production is up +69,000 b/d MoM to 12.381 mmb/d in October. The actuals for October were 431,000 b/d higher than the EIA's weekly estimates that worked out to just over 11.950 mmb/d. September actuals were adjusted higher to 12.268 mmb/d from 12.312 mmb/d in last months Form 914. (ii) One of the growing questions has been how much US oil will grow in 2022. October actuals are 12.381 mmb/d or +747,000 b/d more than Dec 2021; this is higher than September actuals were +678,000 b/d more than the year end Dec 2021 average of 11.634 mmb/d.

Figure 28: EIA Form 914 US Oil Production

State	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2022	11,369	11,316	11,701	11,668	11,629	11,797	11,844	12,002	12,337	12,410	12,375	
2021	11,124	9,925	11,326	11,305	11,356	11,356	11,347	11,277	10,918	11,569	11,790	11,634
2020	12,852	12,842	12,797	11,914	9,713	10,442	11,006	10,577	10,921	10,457	11,196	11,168
2019	11,869	11,673	11,913	12,149	12,154	12,218	11,902	12,486	12,590	12,809	13,000	12,978
2018	10,001	10,281	10,467	10,500	10,435	10,641	10,897	11,392	11,443	11,509	11,886	11,945
2017	8,875	9,110	9,166	9,101	9,185	9,111	9,247	9,250	9,517	9,669	10,085	9,983
2016	9,202	9,066	9,101	8,874	8,835	8,676	8,662	8,690	8,544	8,804	8,903	8,816

Source: EIA

Figure 29: EIA Form 914 US Oil Production vs Weekly Estimate

Source: EIA

Oil – Helmerich & Payne warns that could see near term choppy rig moves

H&P warns on choppy near term rigs

Helmerich & Payne held its Q4 call on Tuesday and highlighted two 2023 rig trends – an industry moderation and some near-term choppiness. In their intro comments mgmt. said "*we laid-out our expectation for a moderation and activity growth for both H&P and the industry rig count. During the December quarter relative to what we have seen over the last two years. That expectation is being realized and is largely attributable to the capital discipline exhibited by our customers and their desire to drive more consistent and sustainable shareholder returns. We've seen time and again, that in a highly cyclical industry like oil and gas, losing size of the long run can be fatal, so we believe that capital discipline contributes to the overall economic health of our company, as well as our industry. Most of our large public customer budgets appear to be moderately higher in 2023, and we are planning ahead to manage this potential growth in an optimal fashion."* Then in the Q&A, mgmt. said *"I think the other thing that I would mentioned about and address a little bit of it in my prepared remarks as it relates to up cycles. I can't - look as I think back and I look back on rig activity through the upcycle. It tends to be choppy. We've gone through, I just, if you just look at the last couple of decades, look at the activity coming out of the financial crisis and the pick up an activity and then the choppiness and actually having a 100 regular* [think should have been rigs] *more go down offcourse we had quite a bit more reach running there but on a percentage basis it's very similar. And so I think as long as the rig choppiness, if the rig releases our moderate and 20, 30, 40, 50 rigs, I mean it's a very small percentage of the overall working fleet, even if you're just looking at the super spectrally."*

Oil – Core Labs also says need increased spend to offset declines/grow US oil

Increased spend needed to grow US oil

Core Labs wasn't as fulsome in its Q4 call Wednesday as Halliburton last week, but had the same overview comments as another big oilfield services company on US oil growth – there will need to be an increased spend to replace oil and any demand growth. We remind of our view that a maturing basin doesn't mean oil production can't grow. Raither, it means that oil growth costs more and more and ore per barrel. On Wednesday, we tweeted [LINK] "*Positive for #Oil, maturing US production. $CLB Q4 "Turning to the U.S., Core sees similar challenges with crude-oil supply which should require increased spending by operators to grow and replace production" Same view as 👇01/24 tweet $HAL CEO.* #OOTT." Core Labs made the same comment in their Q4 release and Q4 call. Core Labs wrote "*Turning to the*

U.S., Core sees similar challenges with crude-oil supply which should require increased spending by operators to grow and replace production. While operators remain focused on capital discipline, 2023 forecasts indicate their U.S. upstream spending will increase approximately 15% year-over-year."

Halliburton "increased spend required to grow & replace production" in US

Our Core Labs tweet forwarded our tweet on the Halliburton Q4 call. Here is what we wrote in last week's (Jan 29, 2023) Energy Tidbits memo. "*Please note when we call the US shale/tight oil production plays "maturing", it doesn't mean that production won't grow, but that any growth is costs more and more per barrel. A big part of this is due to the high initial decline rates of shale/tight plays. But the best sign of a maturing basin is when an increasing spend is required and that was Halliburton's message this week. Halliburton reported Q4 on Tuesday and didn't speak as bullish on the US oil and also highlighted the increasing cost and activity needed for growth. (i) As soon as the results came out and before the call, we tweeted [LINK] "Is $HAL backing away from hugely bullish outlook for US #Oil #NatGas drilling activity? $HAL Q4 omits bullish US & smallest to largest international view from Q3. Different than $SLB 👇01/20 bullish but more international, deepwater, offshore, etc. call at 7am MT. #OOTT." We always compare the CEO outlooks from the current vs prior releases and our tweet included the Q4 and Q3 CEO outlooks and highlighted what wasn't in the Q4 CEO message. No question the CEO excluded his very bullish outlooks from Q3. Excluded this time was "In North America, I see continued revenue growth – the inbounds for calendar slots are stronger than I have ever seen at this point in the year… Looking forward, we see activity increasing around the world – from the smallest to the largest countries and producers". But in listening to the Q4 call, it is clear that Halliburton is still positive on the outlook, but they also seemed to say, without saying, that the US is a maturing basin. (ii) Post the call, we tweeted [LINK] "Positive for #Oil, maturing US production. $HAL CEO, strong US activity as "increased spend required to grow & replace production" "on the supply side, in the US, an increased spend of almost 50% and activity growth of nearly 30% yielded a production increase of about 5%". #OOTT". The CEO made a point of highlighting that there is an increased spend needed for the US to grow and replace production. He didn't specifically say decline rates, but decline rates are the key to math."*

SAF GROUP

Oil – Exxon's 2022 Permian oil growth also helped by working down of DUCs

Exxon worked down DUCs

One of the key reasons for why we should expect lower Permian oil growth in 2023 is that industry's 2022 Permian oil growth was helped by the working down of Drilled UnCompleted (DUC) wells. Last week's (Jan 29, 2023) Energy Tidbits memo highlighted Chevron's Q4 call comments and how they are calling for a little lower Permian oil growth in 2023 and what looks to be higher cost growth. One of the reasons was Chevron saying their 2022 Permian growth"*in '22, we had the benefit of a lot of prior DUCs that had been sitting that came online and it boost early production in '22, a little bit more*." Exxon held its Q4 call on Tuesday and also highlighted that their 2022 Permian oil production growth was boosted by their working down their DUCs (Drilled UnCompleted wells inventory). And that they will have to rebuild that DUC inventory n 2023. Exxon said "*If you look at 2021, we added about 90,000 barrels a day of production. 2022, a very similar number, 90,000 barrels a day. And that in part was what I'd call the organic development and the drilling and the production, as well as clearing our DUCs inventory. So as we were in the pandemic, obviously, not a lot of incentive to bring production on and so we concentrated our spend on drilling. And then as we got into higher-priced environments, we concentrated on clearing that inventory and bringing those wells to production. And so we were bringing our DUC inventory down. As we go into next year, we're going to rebuild that inventory, get to an optimum level that we can then use and maintain as we go through the next several years. So that's kind of a strategy of how we're working there."*

Oil – Enterprise Permian "oil" wells have increasing gas/oil ratio as the wells produce

Gas/oil ratios in the Permian

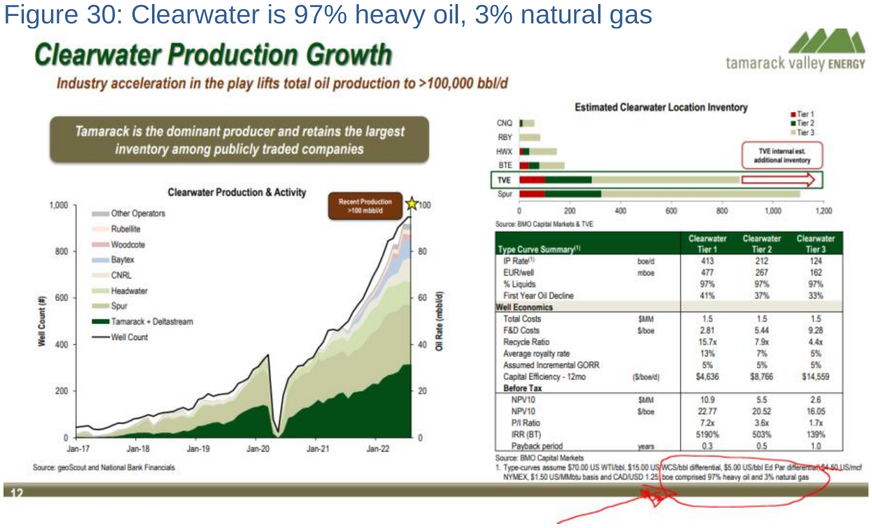
This should not surprise anyone as it is a basic concept that we have highlighted for years – oil wells that produce associated natural gas see the gas/oil ratio increase with more production as the oil declines faster than the natural gas. And all of the key US "oil" plays are oil wells that produce oil with associated natural gas and NGLs. So the natural gas portion of the well "boe" become higher as the well produces. Enterprise Products confirmed thatthey are seeing higher gas/oil ratios in the Permian. Enterprise Products had its Q4 call on Wed. In the Q&A, mgmt. was asked "*We continue here discussions on higher GOR in the Permian along with just continued discussion on parent-child interactions. Curious, if you could just discuss, if you're seeing how GORs and higher parent child interactions are perhaps changing your view to the upside on the associated gas production in the Permian going forward?*" Mgmt replied "Y*eah. The answer is we are continuing to see hired GORs. It's not surprising look, putting it simplistically, oil declines faster than natural gas in Shale basins. So we modeled it in and we projected in our projections. Relative to parent-child, I'll tell you how we feel about it as a midstream company and watching all the rhetoric around it. We think parent-child is a good thing, not a bad thing. And producers are learning more and more every day about it. And obviously, producers are getting larger in scale. We think when we read the different rags that parent-child is a bad thing. It absolutely is a good thing, it's how you get the most out of the reservoir. So frankly, we don't sit up at night and we the producers and we see a lot of them and have a lot of talks with them and their conference room for things that we're doing with them. I have to tell you, I don't think any of the major producers are losing any sleep over it either."*

Oil – Cdn "oil" plays advantage vs US 'oil" plays produce more associated natural gas

US "oil" plays produce associated natural gas

The big North American oil and gas story in 2023 has been the crashing Henry Hub natural gas price down to ~$2.50. HH prices closed over $7 on Dec 23. The crashing HH price has to be causing companies to rethink 2023 programs and not just for natural gas. The reason is that the US "oil" plays are all generally oil wells that produce associated natural gas and NGLs. The plays will vary with plays like the Permian "oil" wells producing way more natural gas than a Bakken "oil" well. This differs from the Cdn "oil" plays that generally produce zero or very little natural gas. We compared the hottest "oil" plays in the US, the Permian and in Canada, the Clearwater. On Wednesday, we tweeted [LINK] "*Advantage of Cdn "oil" plays vs US "oil" plays with HH #NatGas crash <$3. Permian "oil" wells produce oil + associated #NatGas & #NGLs. ie. Chevron 2021: 47% oil, 24% NGLs, 29% #NatGas. Vs Clearwater "oil" play is >95% heavy oil, <5% #NatGas. Also should hurt US oil rigs. #OOTT".* Chevron's 2021 Annual Report provided a split of its Permian unconventional production split by oil, natural gas and NGLs. The Clearwater data is based on the below Tamarack Valley Clearwater slide that notes its Clearwater is 97% heavy oil and 3% natural gas.

Figure 30: Clearwater is 97% heavy oil, 3% natural gas



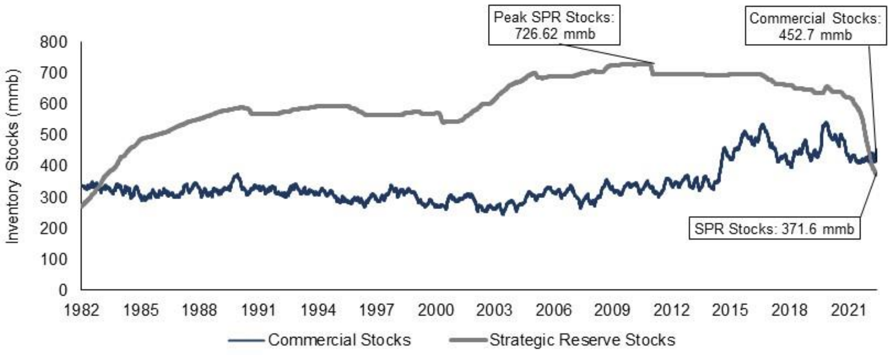
Source: Tamarack Valley

Oil – US SPR reserves now -81.1 mmb lower than commercial crude oil reserves

SPR reserves remain lower than commercial

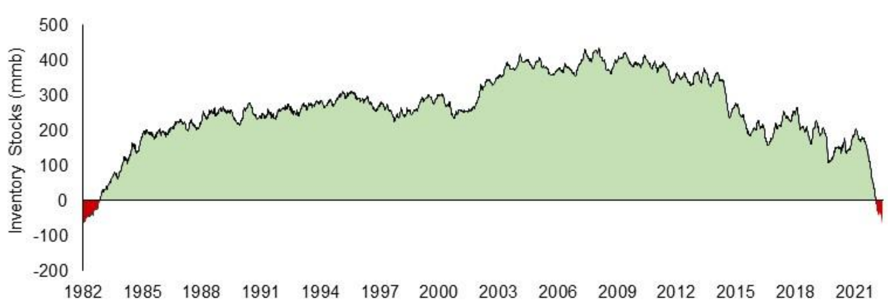
Oil in US Strategic Petroleum Reserves (SPR) moved below total US commercial crude oil reserves in the Sept 16 week for the first time since 1983, with the deficit widening again this week due to the big build in commercial oil stocks that was primarily driven by a drop in US oil exports during the cold weather in the Gulf Coast. The EIA's new weekly oil data for Jan 27 has SPR reserves at 371.6 mmb vs commercial crude oil reserves at 452.7 mmb. The below graphs highlight the difference between commercial and SPR stockpiles.

Figure 31: US Oil Inventories: Commercial & SPR



Source: EIA

Figure 32: US Oil Inventories: SPR less commercial



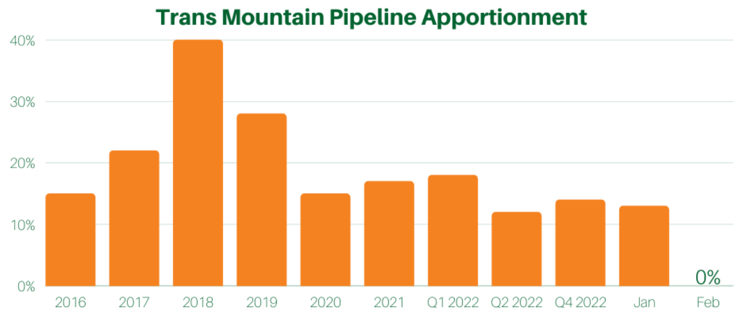
Source: EIA

Oil – Trans Mountain apportioned by 0% for February

Trans Mountain apportionment

On Wed, Trans Mountain released an update [LINK] on its capacity for the month of February. Total system nominations are apportioned by 0% for Feb (Jan was 13%, Dec was 17%), meaning that total upstream throughput demand is less than or equal to available pipeline capacity for the current month. Despite a 0% apportionment, Trans Mountain noted that its system will be operating at maximum capacity (best case scenario for 0% apportionment). The Company also noted that it has been running at full capacity with regular monthly apportionment for over a decade i.e., a clear sign expansion is needed. Trans Mountain touched on its business case for expansion "*There is a strong and clear business case supporting the Trans Mountain Expansion Project. Our shippers have made long-term contract commitments ranging from 15 to 20 years that will underpin the cost of construction and the operating costs. The additional capacity offered by the expansion will be used to supply more crude oil and refined products markets in British Columbia and Washington State and to offshore markets in the Asia Pacific.*" Below is a chart which shows the average apportionment since 2016. Our Supplemental Documents package includes the Trans Mountain release.

Figure 33: Trans Mountain Pipeline Apportionment



Source: Trans Mountain Pipeline

Oil – Cdn oil differentials down to $22.50 at close on Feb 3

Note that we would expect to see a narrowing of Cdn oil differentials as normally happens every spring. Four weeks ago, the WCS-WTI differential was $26.60 on Jan 6, but narrowed to $23.00 on Jan 13, bounced up and down to close at $2375 on Jan 27, and then down this week to close at $22.50 on Feb 3. For perspective, a year ago, the WCS-WTI differential was $13.60 on Feb 3, 2022. Below is Bloomberg's current WCS–WTI differential as of Feb 3, 2023 close.

WCS less WTI differentials

Figure 34: WCS less WTI oil differentials including Jan 20 close

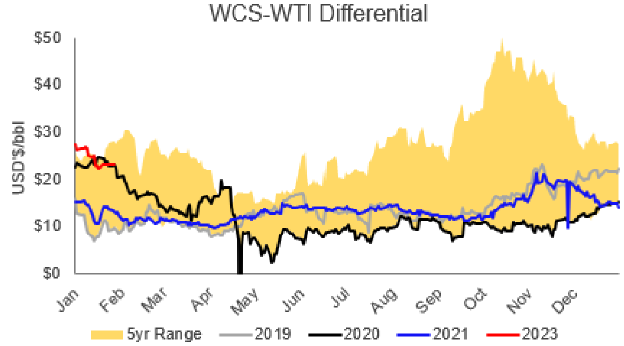
Source: Bloomberg

Oil – Moving into normal season narrowing of Cdn heavy oil differentials

Unfortunately, there are often items like Keystone pipeline outage that impact Cdn heavy oil differentials. 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.

WCS differentials normally narrow in spring

Figure 35: WCS less WTI oil differentials



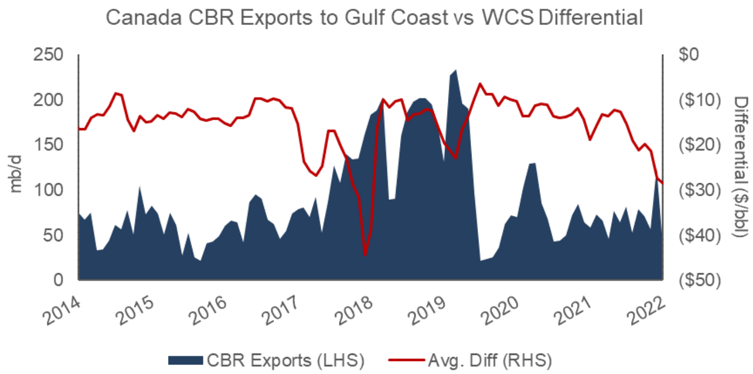
Source: Bloomberg

Oil – Cdn crude by rail imports to Gulf Coast down 34% YoY to 39,000 b/d

Cdn CBR imports to Gulf Coast down 20,000 b/d YoY

The EIA posted its monthly "U.S. Movements of Crude Oil by Rail" [LINK] on Tuesday, which also provided good insight on Canadian crude by rail exports. Canadian CBR volumes to PADD 3 (Gulf Coast) were 39,000 b/d in November, a significant MoM decline of 86,000 b/d from 125,000 b/d in October, and down 20,000 b/d YoY vs 59,000 b/d in November 2021. Note that it wasn't just PADD 3 that saw less CBR flows in November as total Canadian CBR exports to the US fell 51% MoM to 89,000 b/d in November from 184,000 b/d in October. Below is our graph of Cdn CBR exports to the Gulf Coast and WCS differential over time.

Figure 36: Canada CBR exports to US Gulf Coast vs WCS differential



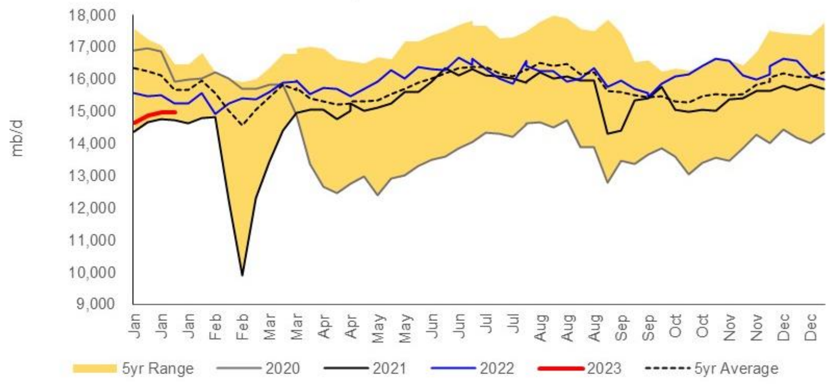
Source: EIA, Bloomberg

Oil – Refinery inputs -0.019 mmb/d WoW to 14.961 mmb/d as weather warms

Refinery inputs down WoW

Refinery crude oil inputs were relatively flat following a partial recovery last week from the cold weather in the Gulf Coast three weeks ago that led to some temporary refinery impacts. On Wednesday, the EIA released its estimated crude oil input to refinery data for the week ended Jan 27. The EIA reported crude oil inputs to refineries were up 0.019 mmb/d WoW to 14.961 mmb/d, which is -0.257 mmb/d YoY from 15.248 mmb/d for the week ended Jan 28, 2022. We should see some further recovery from the cold weather but note that refineries normally move into some seasonal maintenance in Feb/early March for the switch to more summer fuels. This week's refinery utilization was down to 85.7%, which is -1.0% YoY.) Total products supplied (i.e., demand) increased WoW, up +0.659 mmb/d to 20.106 mmb/d, and Motor gasoline was up +0.348 mmb/d to 8.491 mmb/d from 8.142 mmb/d last week. The 4-week average for Motor Gasoline down -0.385 mmb/d YoY to 7.817 mmb/d. The 4-week average of Total demand was down -2.269 mmb/d YoY to 19.374 mmb/d.

Figure 37: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA

Oil – US "net" oil imports up +2.593 mmb/d WoW to 3.791 mmb/d

US "NET" imports were up +2.593 mmb/d to 3.791 mmb/d for the Jan 27 week. US imports were up +1.378 mmb/d to 7.263 mmb/d. US exports were down -1.215 mmb/d to 3.492 mmb/d. The WoW increase in US oil imports was driven mostly by Top 10 with an increase of +1.245 mmb/d. Some items to note on the by country data. (i) Canada was up this week +0.168 mmb/d to 3.587 mmb/d. (ii) Saudi Arabia was up this week at +0.207 mmb/d. (iii) Colombia was relatively flat this week -0.028 mmb/d at 0.216 mmb/d. (iv) Ecuador was up this week +0.174 mmb/d to 0.243 mmb/d. (v) Iraq was up +0.274 mmb/d to 0.469 mmb/d. (vi) Mexico was up -0.247 mmb/d to 0.758 mmb/d.

US "net" oil imports up WoW

Figure 38: US Weekly Preliminary Oil Imports by Major Countries

(thousand b/d)	Nov 11/22	Nov 18/22	Nov 25/22	Dec 2/22	Dec 9/22	Dec 16/22	Dec 23/22	Dec 30/22	Jan 6/23	Jan 13/23	Jan 20/23	Jan 27/23	WoW
Canada	3,076	3,844	3,354	3,423	3,795	3,066	3,504	2,949	3,737	3,707	3,419	3,587	168
Saudi Arabia	211	685	338	274	317	513	473	479	464	453	433	640	207
Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	528	495	300	585	602	632	581	428	668	909	511	758	247
Colombia	143	170	290	292	248	71	353	357	246	245	244	216	-28
Iraq	141	385	363	252	282	227	289	354	150	201	195	469	274
Ecuador	101	42	242	159	157	70	274	87	137	0	69	243	174
Nigeria	181	43	50	159	171	136	66	141	143	211	114	317	203
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	4,381	5,664	4,937	5,144	5,572	4,715	5,540	4,795	5,545	5,726	4,985	6,230	1,245
Others	1,178	1,399	1,100	868	1,295	1,104	712	917	805	1,135	920	1,053	133
Total US	5,559	7,063	6,037	6,012	6,867	5,819	6,252	5,712	6,350	6,861	5,905	7,283	1,378

Source: EIA

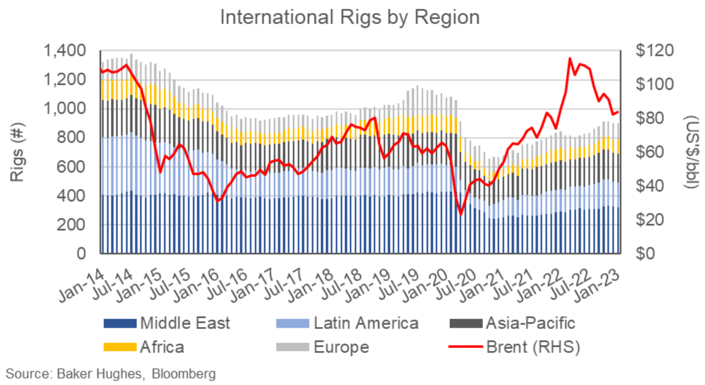
Oil – Baker Hughes International rigs +1 MoM to 901 rigs in January

Baker Hughes posted its monthly update to international rigs on Friday, which showed a small MoM increase in rig counts. January's slight increase marked an end to a two month

International rigs +1 MoM

slide with consecutive MoM declines seen in November and December. Jan's increase is back in-line with the six-month trend of rig net additions seen from May to October. Note International rigs don't normally see a dip during the holiday season like Canada does. (i) Total international rigs increased by +1 rig MoM to 901 rigs in January, and total rigs are now up +95 rigs from the recent low of 806 in April 2022. Jan 2023 is now +60 rigs YoY from 841 in Jan 2022. (ii) Indonesia and Ukraine had the largest MoM increases of +4 rigs each with 36 and 37 active rigs in January, respectively. Indonesia is now up by +17 rigs and Ukraine +32 from the two-year lows of 19 and 5 rigs from 2020 lows, respectively. (iv) January's count of 901 rigs was +7% YoY from 841 in January 2022, but still down 15% vs pre-Covid March 2020 of 1,059 rigs. The YoY rig count is as follows: Asia-Pacific +7, Africa +6, Europe +6, Latin America +12, and the Middle East +29.The North Sea's total count was down -1 rig MoM with the UK flat at 10 rigs and Norway down -1 rig respectively. (v) Rig counts continue to be solid in the major Persian Gulf countries but remain below pre-Covid levels. Since January 2021, the UAE has added +13 rigs YoY to 51 active rigs in January 2022, while Saudi Arabia and Iraq added +9 rigs each over the same period. Africa moderately increased its rig count with Nigeria adding +7 rigs and Angola adding +3 rigs. Below is our graph of international rigs by region and avg monthly Brent price.

Figure 39: Baker Hughes International Rig Count and Brent Price



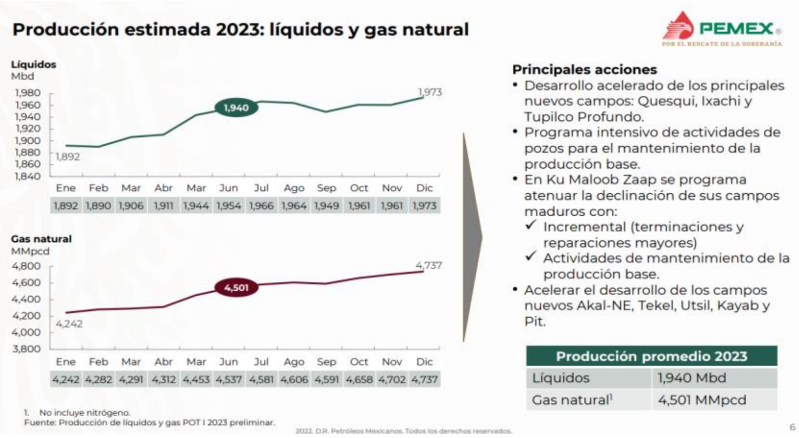
Source: Baker Hughes, Bloomberg

Oil – Pemex says production 1.87 mmb/d in Jan

Last Sunday, Pemex reported preliminary oil production data for January [LINK]. Pemex reported oil production of 1.87 mmb/d, which was up +3% MoM from 1.82 mmb/d in December, +9% from 2020 lows and the highest production rate seen since 2018. Liquids production of 1.87 mmb/d was in line with production guidance of 1.89 mmb/d for January and for the remainder of the year Pemex is forecasting average liquids production to increase, ultimately reaching 1.94 mmb/d by December 2023. However, as mentioned in our Jan 29 report [LINK], Pemex was unable to grow its own oil production in 2022 and failed to hit refining targets for most of the year. Nevertheless, January's data reflects continued positive momentum for production and positions December 2023 guidance within reach. Our Supplemental Documents package includes excerpts from the Pemex December update.

Pemex oil production up ~3% MoM

Figure 40: Pemex 2023 production guidance, Dec 2022 slide deck



Source: Pemex

Oil – Trafigura: Russia's shadow tanker, $80-100 oil, supply inefficiency

Trafigura on Russian oil and products

We didn't get a chance to record the Trafigura co-head of oil trading Ben Luckock on Bloomberg TV on Friday, so had to rely on the Bloomberg reporting. (I) Shadow fleet of tankers moving Russia oil is now ~400 tankers or 20% of the global fleet, and moving Russia products is ~200 tankers or 7 of the world's total. (ii) Russian ban is building a deep inefficiency in the oil market. Bloomberg wrote "*"We are building a deep inefficiency into an oil market that has spent decades becoming incredibly efficient," Luckock said. "This will get worse over time." "The ban will eventually lift crude and products prices as shipping mileages increase and routes take longer, Luckock said."* (iii) See $80 to $100 oil. Bloomberg wrote "*Crude will trade in a range of $80 to $100 barrel, heading above $90 this summer as Chinese demand recovers, though futures may struggle to break triple-digits, Luckock said."* Our Supplemental Documents package includes the Bloomberg report.

Oil – EU's ban on Russian products starts today, Exxon expects short term impacts

EU ban on Russia products

Europe's ban on Russian products starts today. On the Q4 call, Exxon was asked on the EU embargo on Russian products. Exxon expects there to be some short term impacts, as the market "disoptimization" from the most efficient supply chains but doesn't expect any long term impact but just a question on how long it takes the system to rebalance. Here is what CEO Darrin Woods said in the Q&A. "*I think the Russian impact and the ban on products going into Europe could potentially have some short term implications. At the end of the day, that -- those products are going to be needed, so it really is around a logistics, I'll call it disoptimization, to where the market has -- it is pretty efficient and we've got the most efficient supply chains and logistics systems lined out. We're going to disrupt those, and I think it's a question of how does that disruption manifest itself in the market and what kind of disconnects and discontinuities do you see in the short term. And then ultimately, we'll read -- that system will stabilize, re-optimize, and I expect a higher cost just because of you're moving to a less optimal logistics approach, but more stable. I don't -- that's -- I see how that's going to play out. So I don't think there will be a long-term impact. It'll be a short-term one. And then it's just a question how long it takes for the systems to rebalance."*

Oil – OPEC JMMC reaffirms commitment to the DoC extending to year end 2023

To no surprise, it was a quick OPEC+ meeting on Monday during which the JMMC reviewed November/December production data and reiterated their commitment to the DoC extending to year end 2023. The committee also acknowledged the overall conformity of DoC participant countries. On February 1 we tweeted [LINK] *"No change to #OPEC+ quotas. JMMC reaffirmed their commitment to the DoC which extends to the end of 2023 as agreed in the 33rd OPEC and Non-OPEC Ministerial Meeting (ONOMM) on 5th of October 2022. See 👇#OPEC+ quotas agreed at Oct 5 meeting. #OOTT".* It was expected to be a short meeting and that was what happened. Our tweet included the OPEC+ production quotas that were agreed to at the Oct 5 meeting for Nov 2022 thru Dec 2023. Our Supplemental Documents package includes Wednesday's OPEC release [LINK].

Figure 41: Production table excerpt from OPEC Oct 5 meeting

November 2022-December 2023

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

Source: OPEC

Oil – US believes Iran has enough nuclear material for several nuclear weapons

Iran's nuclear material progress

We still believe there is heightened risk to Iran in 2023 given there is no JCPOA, Iran continues to make strong progress towards having nuclear capability and Netanyahu has returned as Israel PM. We were reminded of this risk when US envoy on Iran, Rob Malley, was on BBC Hardtalk. (i). Iran's nuclear progress. On Monday, we tweeted [LINK] "*Big 2023 #Oil wildcard - Israel/Iran nuclear risk. @BBCHARDtalk asks re @rafaelmgrossi that Iran has amassed enough nuclear material for several nuclear weapons, not just one. @Rob_Malley "yeah, i think what he says is accurate. More in this great @stephensackur interview. #OOTT."* Malley said he agreed with the IAEA view that Iran has amassed enough material for several nuclear weapons. This is a big risk factor especially if Israel also believes this status. (ii) Biden has spelled out an option is military option. We also tweeted [LINK] "*Specifics for once, not the normal all options are on the table "as #Biden said if that fails, other options, all options will be on the table. and he spelled out what one of those options* *would be, which was a military option" @Rob_Malley. Great interview @stephensackur #OOTT."* This was not the normal quote from Biden officials. For example, Blinken this week used the standard all options are on the table and not specifically mention military options.

Oil – WSJ says what everyone believes, it was Israel drone that hit Iran last week

Israeli drone on Iran

There was a good example of this heightened Iran risk last weekend with the reported Israel drone attack on Iran. Last week's (Jan 29, 2023) Energy Tidbits noted the breaking news of the drone attack on Iran. Everyone assumed that it was an Israel drone. But on Sunday afternoon, WSJ posted a news exclusive "*Israel Strikes Iran Amid International Push to Contain Tehran. Israeli, American officials discuss new ways to combat Iranian operations. Israel carried out a drone strike targeting a defense compound in Iran, as the U.S. and Israel look for new ways to contain Tehran's nuclear and military ambitions, according to U.S. officials and people familiar with the operation. Iranian officials said that the country's air defenses had fended off an attempted attack by three small quadcopters targeting a munitions factory in the city of Isfahan, right next to a site belonging to the Iran Space Research Center, which has been sanctioned by the U.S. for its work on Iran's ballistic-missile program*." And "*The strike marks the first known attack carried out by Israel under the new far-right coalition government led by Prime Minister Benjamin Netanyahu, who sanctioned a series of bold operations inside Iran when he last served in that role from 2009 to 2021*."

Oil – Exxon: industry not investing enough to offset declines and cover growth

Exxon sees tight oil, natural gas and products markets

Exxon held its Q4 call on Tuesday. In the Q&A, Exxon CEO Darrin Woods highlighted their positive view for oil, natural gas and petroleum products markets because of industry underinvestment that isn't enough to offset declines and cover any demand growth. And oil, natural gas and petroleum products are needed until there are competitive alternatives fuels that address the "*full set of needs for society*". Woods didn't explain but we assume the full set of needs cover the needs to for there to be security of fuels at a reasonable price. We tweeted [LINK] "*1/2. #Oil #NatGas reality checks. @exxonmobil CEO Woods. "we are underinvesting as an industry in this [#Oil] space. And in a depletion business, we are not keeping up with that depletion or not offsetting it and covering the growth, you find yourself in tight markets" #OOTT."* and [LINK] "*2/2. until you have "lower emissions competitive alternatives, that address the full set of needs for society, there is gong to continue to be demand for #Oil and #NatGas and oil products. and so I think you're seeing the potential for continued tight markets" #OOTT."* Our tweet included the transcript we made of Woods full quote "*the point we have made historically is we are underinvesting as an industry in this space. And in a depletion business, we are not keeping up with that depletion or not offsetting it and covering the growth, you find yourself in tight markets. And I think as the broader public narrative has moved in this space and some of our competitors have stepped back from investment there, that does tighten the amount of capacity that is coming on and the supply that gets brought in over time. And until you have competitive alternatives, lower emissions competitive alternatives, that address the full set of needs for society, there is gong to continue to be demand for oil and gas and oil products. and so I think you're seeing the potential for continued tight markets."*

Oil – Key oil call for 2023, is China moving to herd immunity in Q1?

Key oil call for 2023

Here is what we wrote in our Dec 25, 2022 Energy Tidbits. *"Key oil call for 2023, is China moving to herd immunity in Q1?. We believe the key oil call for 2023 is China and is China moving to herd immunity in Q1? Because we would expect that China will be like all other countries on how they will reopen once there is herd immunity. And if China reopens, then we, and probably everyone else, believes there will be a big quick jump up in China oil demand. No two countries were likely identical on exactly the impact on people and economy once their economies reopened after reaching herd immunity, but we aren't aware of any country that didn't see a big jump in mobility, industry and activity post herd immunity. This is why we consider China hitting herd immunity to be the key oil call item for 2023 because we believe a China reopening will be a big boost to China oil demand. On Friday, we tweeted [LINK] "Key #Oil call for 2023 - When will China reach herd immunity? @Pfizer notes herd immunity at 70%-90%. Makes Q1 look likely, @business ~18% in 1st 20 days of Dec & 1st real new year gatherings since Covid. Sets up 👇 @michaelwmuller rebound in CN fuels demand as early as Q2. #OOTT."*

Vitol: J curve recovery in China demand in Q2 if herd immunity in Q1

The reason why we have been highlighting the herd immunity focus is because of the Dec 15 comments from Vitol. Here is what we wrote in our Dec 18, 2022 Energy Tidbits memo. "*Great food for thought on China's Covid relaxation from Mike Muller (Head, Vitol Asia) in his monthly appearance on the Gulf Intelligence Daily Energy Markets podcast on Thursday. [LINK]. (i) China is clearly relaxing its Covid restrictions with the key assumption that Omicron version of Covid is not anymore deadly than the flu. And Muller notes that Covid is spreading quickly. So is China effectively moving to herd immunity strategy near term by letting the less deadly Covid version spread quickly? If so, it means that the next few months should see choppy, up and down non-broad recovery, But if China gets to herd immunity, does it set up "J" shaped recovery in Q2/23? (ii) Early Thursday morning, we tweeted [LINK] "Nike swoosh or J shaped recovery in China demand transportation fuels. See 👇Vitol @michaelwmuller inbound international air travel to China as soon as Q2. Freedom of travel + population less scared of Virus = China move faster to herd immunity. @sean_evers @CrystolEnergy. #OOTT." (iii) Our tweet included the transcript we made of Muller's comments. Items in "italics" are SAF Group created transcript. 14:40 min mark. "Covid headlines out of China have all been rather constructive of late. There are clear signs that public policy has shifted towards no longer Zero tolerance and restrictive measures and a realization, that's probably guided by their chief medical scientists, that this particular variation of Omicron that is running thru the population a lot faster, I think if you just go through the small sample of my own colleagues in China, many of them have it right now, they all know somebody n their family or in their close circle of friends that has it and that's across three different cities. So it looks like China is in the process of becoming self immunized if you like by a more liberal policy of allowing the virus to spread in a way that is reasonably contained." 15:50 min mark. "there is a lot more freedom of movement. There has not yet been an edict from central government that the grand migrations for Chinese New Year, where you can get half a billion people getting on trains, cars, public buses and going to their families at Chinese New year is going to* *be discouraged as was the case for the last two cycles. Chinese New Year falls early and this is going to start around January 7/8. Air travel is up, public transport is being made free of charge in certain cities. China Eastern came out with a headline today they have 1,380 scheduled domestic flights that compares to five hundred and forty odd flights on the first of December. The population of China seems less scared of the Virus than was the case just a few weeks ago, and self-immunizing in a way that might happen a lot faster than we think". 17:15 min mark. ".. and, as such, it stands a reasonable chance of not suffering the same toll that was the case in many other large countries. So with that degree of confidence in the economy, we have colleagues in China suggesting that international inbound air travel in China could be a reality as soon as Q2 next year, which was not in most people's balances in supply demand predictions going forward. So that gives you a bit of a Nike swoosh or "J" shaped sort of view on demand for transportation fuel in China, notably jet fuel which is the big absent portion of the oil demand barrel. And has people getting quite bulled up for the second half of next year, if not somewhat sooner. But in the near term, of course, one has to be cautious because the public has been conditioned to self-isolate themselves and to avoid getting this virus if they can."*

Oil – Bloomberg "Foreign Investors Piling Back into China"

Foreign investors piling into China

We first noted this in our Jan 22, 2023 Energy Tidbits – foreign investors are now going back into China. At that time we saw this when we were watching Bloomberg Markets China Open in the evening on Jan 16 when they put a graph showing Foreign Investors Piling Back into China. That trend continued over the past two weeks. On the evening Jan 30, Bloomberg Markets Asia ran updated graph. So on Monday night, we tweeted [LINK] "*China reopening. Foreign investors piling back into China at an increasing rate vs 👇01/16 tweet. Graph at 9:08pm ET from @RishaadTV @DavidInglesTV on @markets Asia. #OOTT."* The Bloomberg graph shows the increase in foreign funds.

Figure 42: Bloomberg "Foreign Investors Piling Back into China"

Source: Bloomberg

Oil – China accelerating reopening policies post Lunar New Year

China accelerates reopening

Perhaps the only major question on the China reopening was what would happen after the huge case outbreaks in Jan and after the Lunar New Year holiday ended – would China pull back at all on the reopening? It looks they aren't pulling back but continuing to drive ahead with increasing reopening policies. A great example was the breaking news on Thursday night (our time)/Friday morning Beijing time that China was pulling back on the travel restrictions to Hong Kong. We tweeted [LINK] "*China accelerating reopening policies post Lunar New Year. China will cancel pre-arrival PCR test & daily quota for Hong Kong Border, reports @oliviahttam. See 👇 @YvonneManTV @DavidInglesTV chart tonight, visitor arrivals in Hong Kong basically zero vs pre-Covid. #OOTT.*"

Visitors to Hong Kong have been effectively zero

We were watching Bloomberg Markets Asia when the Hong Kong travel news broker. They also had some Hong Kong tourism representatives on the show and showed the below graph that was attached to our tweet. It notes how visitors to Hong Kong have been effectively zero since Covid. It will be interesting to see how fast this ramps up.

Figure 43: Visitor arrivals to Hong Kong

Source: Bloomberg

Oil – Chinese are getting out and spending, record Imax Chinese New Year box office

IMAX box office in China

Our view on China has been that we didn't see why the Chinese would be any different than in any other country when the reached or believed to have reached herd immunity and the restriction were lifted – people would get out and do things and spend money. There was another item on Bloomberg Markets Asia on Thursday night, when the IMAX CEO was interviewed. He referenced their Monday press release where IMAX . On Friday, we tweeted [LINK] "*China reopening. Same as every other country. remove restrictions, people get out & spend some money. @IMAX "stunning turnaround of the Chinese box office in 2023" "with the market still in recovery" See 👇 01/17 tweet @aguzin $2T in excess savings to be reallocated. #OOTT.*" IMAX reported it "*set a new box office record for Chinese New Year with $34 million over the six-day holiday period concluding Friday, January 27. Total grosses for the holiday — historically the peak moviegoing period in this pivotal cinema market — exceeded the Company's previous record set in 2021 by 3% and topped its 2022 results by a whopping 54%. The record-breaking performance underscored the stunning turnaround of the Chinese box office in 2023. The IMAX China network fully reopened less than two months ago following COVID-related closures, with more than a third of IMAX locations in China closed as recently as the first week of December.*" "*"If IMAX is breaking records in China with the market still in 'recovery," it's exciting to think about our potential as* *the year progresses — particularly as more Hollywood blockbusters are released into the market."* Our Supplemental Documents package includes the IMAX release. [LINK]

$2 Trillion in excess China savings to be reallocated in the reopening

Our tweet referenced our Jan 17, 2023 tweet on comments from Hong Kong Exchange CEO Aquzin. Here is what we wrote in our Jan 22, 2023 Energy Tidbits memo. *"We believe there has been an overlooked factor in China's reopening – Chinese have accumulated significant excess savings during Covid much like was seen in the US, and that a reopening will see Chinese spend just like has been spend in the US in an extra stimulus. In China's case, there is $2 Trillion of excess savings waiting to be spent in the reopening. We have been saying that we don't see why people in China won't be responding to China's reopening the same way people in all major countries responded when their countries reopened. On Tuesday night, we were watching Bloomberg Asia open and immediately tweeted on comments by Hong Kong Exchange CEO Aguizin. We tweeted [LINK] "1/2. $2 Trillion in EXCESS savings in China to be allocated in the reopening. @HKEXGroup CEO @aguzin "Something important around Covid also that I want to make sure people know. Over the last 2 yr, savings in China which traditionally size ~20% of disposable income... #OOTT" and [LINK] "2/2 .. It is very very high. But over the last 2 yr, that jumped to >30% so there's ~$2 trillion EXCESS savings in the system in China. $2 trillion. Now with the reopening that will have to be reallocated somewhere. Thx @haslindatv @aguzin #OOTT." We made a transcript of Aguzin's comments "Something important around Covid also that I want to make sure people know. Over the last 2 years, savings in China which traditionally size around 20% of disposable income. It is very very high. But over the last 2 years, that jumped to over 30% so there's about $2 trillion excess savings in the system in China. $2 trillion. Now with the reopening that will have to be reallocated somewhere. To travel, to purchase things, so that is a very significant amount. I hope a good chunk of that comes to the capital markets"*

Blackstone CEO Schwarzman reminds $2.5T US Covid savings drove economy

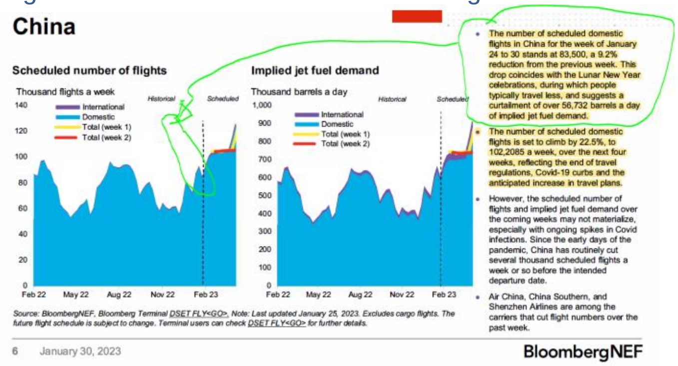
Here is another item from our Jan 22, 2023 Energy Tidbits memo. "*We were reminded of the significance of China $2 Trillion in excess savings waiting to be allocated by comments from Blackstone CEO Schwarzman in his Bloomberg interview from Davos. Schwarzman highlighted how there was $2.5 Trillion in excess savings in the US during Covid, half has been spent, which has been an extra stimulus to the US economic and there is still another half waiting to be spent. On Thursday morning, we tweeted [LINK] "Hmm! Overlooked China extra stimulus? US economy "quite good shape": #Blackstone Schwarzman $2.5T in excess savings during Covid, spent half, "an extra stimulus". China $2T in EXCESS savings to be spent on reopening. see 👇 @aguzin tweet last night. Thx @DavidWestin #OOTT."*

Oil – China domestic flights -9% WoW for Jan 24-30 week due to Lunar New Year

China domestic flights

The WoW increases in China domestic flights came to an end with Lunar New Year. BloombergNEF posted its Aviation Indicators Weekly on Monday. On Tuesday, we tweeted [LINK] "*Lunar New Year celebrations hit on China domestic travel. China domestic flights -9% WoW for Jan 24-30, followed +7% WoW for Jan 17-23 and +20% WoW for Jan 10-16. China* *international flights continue to ramp up. Thx @BloombergNEF Claudio Lubis. #OOTT."* So following a +20% WoW and a +7% WoW increase, China scheduled domestic flights were down -9% WoW for the Jan 24-30- week. BNEF wrote *"this drop coincides with the Lunar New Year celebration, during which people typically travel less*" ie. there should be a bounce back this week.

Figure 44: China scheduled domestic flights.



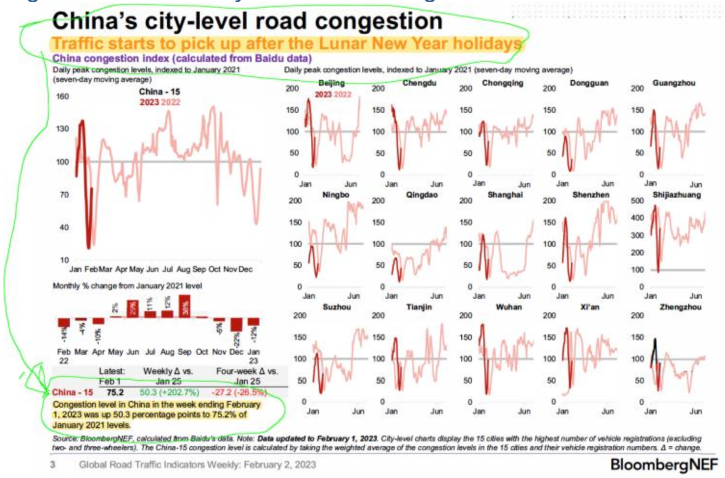
Source: BloombergNEF

Oil – China's city level road congestion recovering after Lunar New Year holidays

China's city road congestion recovering

The long China Lunar New Year holiday season ended this week and so China city level traffic was recovering. Last week's (Jan 29, 2023) Energy Tidbits memo highlighted that China's road congestion indicators had been strongly increasing, but then plunged 87.8% for the week ended Jan 25 (New Year was Jan 22) as China was in the full blown holiday mode. There was a strong, but not full, recovery this week. On Friday, we tweeted [LINK] "*China traffic picks up after Lunar New Year holidays. @BloombergNEF reports Baidu data city level road congestion +50.3% for week ending Feb 1 (New Year was Jan 22) to 75.2% of Jan 2021 levels. #OOTT. "* Our tweet included the below BloombergNEF graphic that shows Baidu data for road congestion in China's major cities.

Figure 45: China city-level road congestion for week ended Feb 1



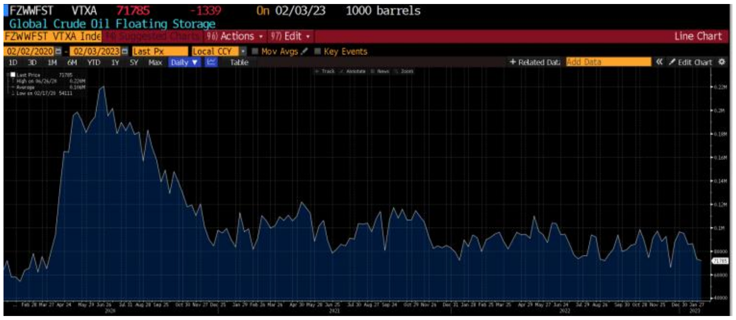
Source: BloombergNEF

Vortexa crude oil floating storage

Oil – Vortexa crude oil floating storage 71.79 mmb, -1.33 mmb WoW

We are referencing the Vortexa global crude oil floating storage data posted on the Bloomberg terminal as of 10am MT yesterday. Note that these estimates get revised over the course of the week and the revisions can go back months. We do not check daily for the revisions, so our comments on the new estimates are compared to the prior week's Vortexa estimates posted on Bloomberg on Jan 28 at 10am MT. (i) As of 10am MTyesterday, Bloomberg posted Vortexa crude oil floating storage estimate for Feb 3 at 71.79 mmb, which is -1.33 mmb WoW vs basically unchanged Jan 27 of 73.12 mmb. Note Jan 27 was immaterially revised vs 73.75 mmb originally posted on Bloomberg as of 10am MT on Jan 28. (ii) Other than the very small –0.63 mmb revision to Jan 27 data. all of the prior six weeks had larger negative revisions. What we don't know is how all the Russian dark tankers is impacting the Vortexa estimates. The revisions from the estimates posted yesterday at 10am MT vs the estimates posted on Bloomberg at 10am on Jan 28 are as follows: Jan 27 revised -0.63 mmb. Jan 20 revised -3.88 mmb. Jan 13 revised -3.090 mmb. Jan 6 revised -3.04 mmb. Dec 30 revised -4.60 mmb. Dec 23 revised -5.09 mmb. Dec 16 revised -3.12 mmb. (iii) There is still a wide range of floating storage for the past several weeks, but a simple average for the past seven weeks is 85.15 mmb, which is down vs last week's 87.68 mmb given the downward revisions to all of the last seven weeks. (iv) Also remember Vortexa revises these weekly storage estimates on a regular basis and we do not track the revisions through the week. (v) Feb 3 estimate of 71.79 mmb is 148.39 mmb vs the post-Covid peak on June 26, 2020 of 220.18 mmb. (vi) The below graph goes back 3 years and not just 2 years as floating oil storage was in the big ramp up period in Q2/20 as Covid started to have a huge impact. Feb 3 estimate of 71.79 mmb is +9.32 mmb vs Pre-Covid of 62.47 mmb as of Feb 3. 2020. Feb 3 estimate of 71.79 mmb is -19.69 mmb YoY vs Feb 4, 2022 of 91.49 mmb. (vii) Below are the last several weeks of estimates posted on Bloomberg as of 10am MT on Feb 4. 10 am on Jan 28, and 10am on Jan 21.

Figure 46: Vortexa Floating Storage posted on Bloomberg Feb 4 at 10am MT



Source: Bloomberg, Vortexa

Figure 47: Vortexa Estimates Posted Feb 4 10am MT, Jan 28 10a MT, Jan 21 10am MT

Posted Feb 4, 10am MT

FZWWFST VTXA Index — 02/02/2020 - 02/03/2023

	Date	FZWWFST VT... Last Px
Fr	02/03/2023	71785
Fr	01/27/2023	73124
Fr	01/20/2023	86316
Fr	01/13/2023	85695
Fr	01/06/2023	94987
Fr	12/30/2022	96385
Fr	12/23/2022	87745
Fr	12/16/2022	66030
Fr	12/09/2022	92413
Fr	12/02/2022	88377
Fr	11/25/2022	96924

Jan 28, 10am MT

FZWWFST VTXA Index — 01/26/2020 - 01/27/2023

	Date	FZWWFST VT... Last Px
Fr	01/27/2023	73748
Fr	01/20/2023	90198
Fr	01/13/2023	88792
Fr	01/06/2023	98027
Fr	12/30/2022	100.992k
Fr	12/23/2022	92842
Fr	12/16/2022	69150
Fr	12/09/2022	96005
Fr	12/02/2022	91605
Fr	11/25/2022	100.796k
Fr	11/18/2022	91078

Jan 21, 10am MT

FZWWFST VTXA Index — 01/19/2020 - 01/20/2023

	Date	FZWWFST VT... Last Px
Fr	01/20/2023	84938
Fr	01/13/2023	88586
Fr	01/06/2023	98477
Fr	12/30/2022	102.061k
Fr	12/23/2022	91396
Fr	12/16/2022	68496
Fr	12/09/2022	95073
Fr	12/02/2022	89287
Fr	11/25/2022	100.762k
Fr	11/18/2022	92227
Fr	11/11/2022	77731

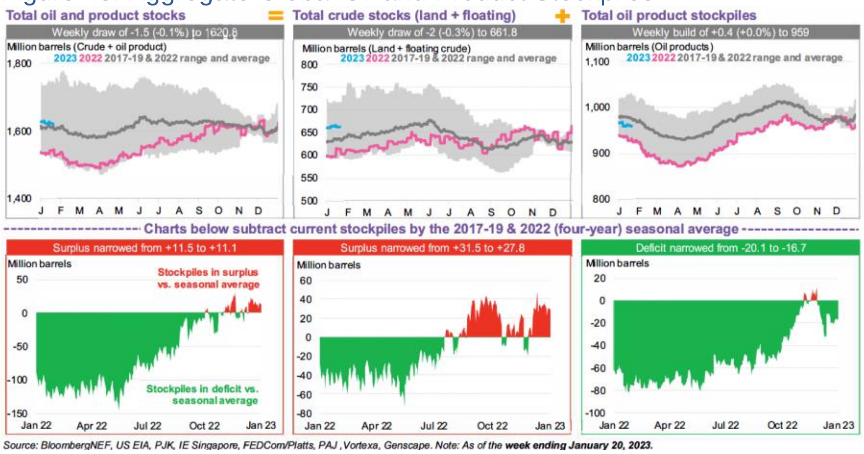
Source: Bloomberg, Vortexa

Oil – BNEF: global oil and product stocks surplus narrows to 11.1 mmb

BNEF's global oil inventories

For those with a Bloomberg terminal we recommend flipping through BloombergNEF's "Oil Price Indicators" weekly that came out on Monday as it provides good charts depicting near-term global oil demand and supply indicators. The global oil and products stockpile surplus for crude and products narrowed slightly to a 11.1 mmb surplus from a 11.5 mmb surplus previously**.** The stockpile deficit against the five-year average (2016-19, 2022) narrowed from 20.1 mmb to 16.7 mmb. Total crude inventories increased by 0.3% to 661.8 mmb, including global floating inventories. Product stocks were flat WoW with the stockpile deficit against the 4-year average narrowing from 20.1 to 16.7 mmb. Gas, oil, and middle distillate stocks have narrowed against their four-year average deficit (2017-2019,2022) from 33.9 mmb to 32.6 mmb. Jet fuel consumption by international departures is set to grow by 2,000 b/d WoW while consumption by domestic passenger departures will increase by 69,800 b/d WoW. Below is a snapshot of aggregate global stockpiles. Our Supplemental Documents package includes excerpts from the BloombergNEF report.

Figure 48: Aggregate Global Oil and Product Stockpiles

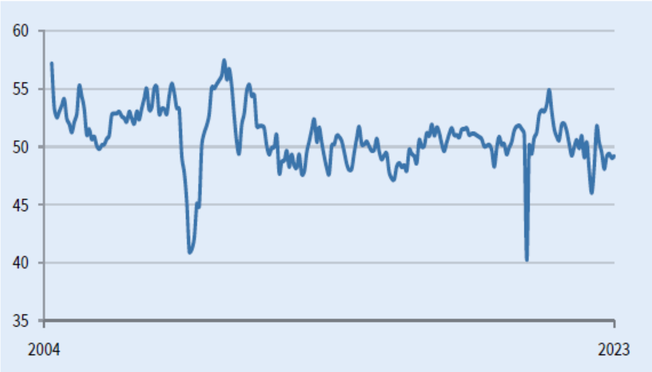


Source: BloombergNEF

Oil – Caixin PMI for Jan increased +0.2 MoM to 49.2, but optimism to end Jan

On Wednesday, IHS Markit released the Caixin China Manufacturing PMI data for January [LINK] and the index showed the sixth consecutive month of below 50 with Jan at 49.2 (vs expectations of 49.8) and up from Dec at 49.0. On January 31 we tweeted [LINK], *"China Caixin PMI for Jan 49.2 v Est 49.8 & Dec 49.0, Nov 49.4, Oct 49.2. 'Optimism continued to improve among businesses in Jan... reading for manufacturers' expectations for future output reached the highest since Apr 2021.' Thx @IHSMarkitPMI. #OOTT."* Although the tone continues to be negative for manufacturers, business confidence rose to its highest level since April 2021. Production declined further MoM, but at a slower rate relative to the end of 2022 with manufacturers taking note of relatively suppressed levels of demand driven by the persisting weakness in global economic conditions. However, the favourable 12-month production outlook, relaxation of Covid-19 containment measures and hopes of an economic rebound are key reasons why optimism is at a new high to start the year. The Caixin Insight Group commented, "*Overall, the pandemic continued to take a toll on the economy in January. Supply and demand weakened, overseas demand was sluggish, employment declined, and logistics hadn't fully recovered, while the quantity of purchases shrank, inventories dropped, and manufacturers faced growing pressure on profitability. But optimism in the sector continued to improve as businesses expected a post-Covid economic recovery."* Our Supplemental Documents package includes the Caixin China PMI for January.

Figure 49: China General Manufacturing PMI



Source: Caixin, S&P Global

Oil – US TomTom mobility indicator shows YoY strength/weakness for US/Europe

US oil indicators weekly

In the BloombergNEF US Oil Indicators Weekly report we continue to see the same signals from the indicators for US gasoline consumption from BloombergNEF US Oil Indicators Weekly. Mobility indicators like TomTom data point to a moderate increase in U.S. driving YoY although cumulative road congestion has yet to recover to 2019 levels. However, following last weeks signs of strength, European road congestion declined and although the data is stronger than the comparable period in 2021/22, it remains below relative levels in 2020 prior to the start of the pandemic. This is likely due to the colder than normal weather specifically seen throughout Northern Europe during the latter half of January. The TomTom mobility data seems logical as MoM U.S. road traffic, although strong, still remains below December levels and is likely a result of the typical lull in activity as the holiday season wraps up coupled with a slight increase in at-the-pump gas prices throughout January. 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 50: Mobility Indicators

	Week-on-week (2019 average = 100)				Year-on-year (same week last year = 100)			
	Latest week: Jan 31	Δ vs. Jan 24	4-week MA	Δ vs. Jan 24	Latest week: Jan 31	Δ vs. Jan 24	4-week MA	Δ vs. Jan 24
Asia Pacific ex-China	79.4	-4.2 (-5.1%)	87.1	+3.0 (3.6%)	108.4	+4.3 (4.1%)	114.3	+1.5 (+1.3%)
Europe	96.1	-1.9 (-2.0%)	92.7	+8.3 (9.8%)	116.4	-9.4 (-7.5%)	123.4	-0.3 (-0.3%)
North America	93.6	+6.5 (7.5%)	85.3	+9.2 (12.1%)	132.0	+0.1 (0.1%)	134.0	+5.6 (+4.4%)

Source: BloombergNEF's calculation based on TomTom data. Note: ***Data up to January 31, 2023.***

Source: BloombergNEF

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

Sector insights from Q4 calls

Q4 calls started to ramp up this week and should be a big ramp up this week. This is our favorite time each time of each quarter as it is quarterly reporting and this is when we get the best insights into a range of oil and gas themes/trends, sectors and plays. As a reminder, our Energy Tidbits memo does not get into the quarterly results, forecasts, or valuation. Rather the purpose of highlighting a company is to note themes/trends and plays that will help shape a reader's investment thesis to the energy sector. In the conference calls, we also tend to find the best insights from the Q&A portion as opposed to the prepared remarks. Plus, we tend to get the best E&P sector insights from services, pipelines, refineries, and utilities

Ran out of time this weekend to write up more Q4 calls

We reviewed a number of other Q4 calls but ran out of time this weekend to write them for today's memo, But next week's (Feb 12, 2023) Energy Tidbits memo should include commentary on Q4 calls this week ie. Siemens Gamesa

Exxon – Expects govts to back off windfall taxes

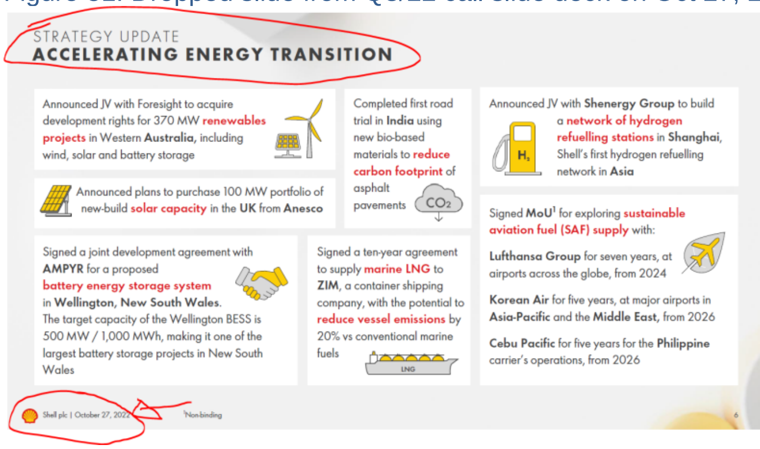
Exxon held its Q4 call on Tues. (i) Earlier in the memo, we noted Exxon's highlighting that its Permian 2022 growth was helped by the drawdown of its DUCs and it would need to rebuild its DUC inventory in 2023. (ii) Earlier in them memo, we noted Exxon's view on Europe ban on Russian products. (iii) Earlier in the memo, we highlighted Exxon's view that industry underinvestment has set up continuing tight markets for oil and gas. (iv) Later in the memo, we highlight Exxon's >10% returns for low carbon and they include potential future govt policy changes. (v) no annual investor day in March, said they laid out their comprehensive plans in Dec. (v) Exxon thinks more governments will back away from windfall taxes as they realize the oil companies will pull back investment. In the Q&A, CEO Woods said "I *think, obviously, we've been engaged with governments throughout Europe. And I do think there is a sensitivity to the impact on future investments and industries appetite to continue to invest in what is a challenging market environment in the first place with respect to Europe becoming more uncertain and less stable. So, I think there was some concern going into this and my suspicion will be, many in industry, this will be yet another reason to pull back on their investments in Europe. I'm not sure you're going to then see that began to propagate around the world just because of the negative impact it has on an industry that requires stable policy and some certainty when you're making the size of investments that the industry makes over the time horizon that we may come in. So, my sense is that there will be a lot of unintended negative consequences that come from this. And as that manifests itself, a lot less appetite for doing this."* (vi) carbon capture is for big companies. In the Q&A, CEO Woods said "*And then finally, low-carbon solutions, there's a lot of activity in this space, a lot of interest, particularly with the IRA here in the U.S., but more generally around the world I think a real focus on the low-carbon opportunities, I think we're very well-positioned there. This is not a game for startups. These are large world-scale projects that require that kind of project expertise that we have, require the kind of size and balance sheet capacity that we have, requires the technology and* *operating experience that we have. So there's a lot of, I'd say skills and capabilities needed in this market that lend themselves and are consistent with our capabilities and advantages. So I think it'll take a while for that to shake out, but I'm convinced that we are very well competitively positioned in the low-carbon solutions business. And if you think about security of supply and counting on your partner to say sequester carbon for 100-plus years, I think you're going to want somebody who's been around for a while and knows how to do that. I think we're the company to do that. If you want somebody who's going to guarantee that when they say they're going to have the barrels available to you, they are there. I think people will look to Exxon Mobil to deliver on that. I feel pretty good about our position there as well"*

Energy Transition – Shell highlights upstream downplays energy transition

Shell highlights upstream

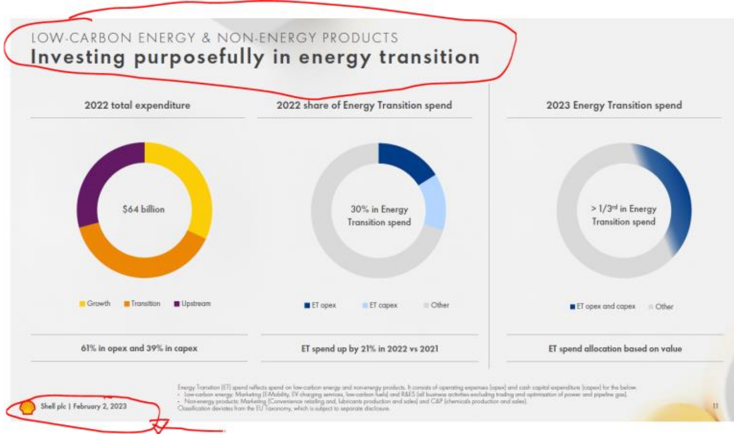
European supermajors went all-in on the energy transition and push to renewables so they can't ever say they are backing away from their energy transition priorities. But, we are seeing is that they are having to down play or slow play the energy transition due to the renewable returns. They just can't say it directly. Shell 's Q4 results and call is a great example. (i) Downplaying renewables. They removed their key slide on accelerating the energy transition and added a new slide on investing purposefully in energy transition. We had hoped some analyst might ask a bit of a cheeky comment in asking how were you investing before? Shell posted the Q4 slides ahead of the Q4 call. No surprise, there were differences vs the Q3 calls slide deck. We tweeted [LINK] " 👇 *@Shell Q3 v Q4 slides point to #EnergyTransition reality check. Q3/22 slide dropped "Accelerating Energy Transition". New Q4/22 slide "Investing purposefully in energy transition". looks like 02/01 tweet on @bp_plc. Positive for #natgas.* #OOTT." (ii) Highlighting oil and gas. It's bad for the climate change side that Shell down plays the energy transition, but then they have to see Shell highlight its "excellent upstream business" and also tell markets they are looking to add more crude oil production. Prior to the Q4 call, CEO Sawan made the media rounds including with CNBC that clearly indicated, without using the word core business" that upstream oil and gas, LNG and marketing were the cornerstones for Shell and these three businesses will provide for Shell's hope to help customers on their "journey" to decarbonize. We tweeted [LINK] "*See 👇transcript why @Shell CEO Sawan thinks they can be the winner in #EnergyTransition. "excellent upstream business, a world leading #LNG business & an unparalleled marketing business. And on the back of that .... " Positive for 2020s #NatGas #LNG Thx @steve_sedgwick #OOTT."* Here is the transcript we created of Sawan's full comment "*as we look ahead, I think we have a unique opportunity to be able to succeed as the winner in the energy transition. We have a portfolio that I think is second to none. We have an excellent upstream business, a world leading LNG business and an unparalleled marketing business. And on the back of that, we hope to be able to support our customers on the journey to decarbonization and towards net zero. My focus will be very much around performance and capital discipline." (*iii) Will be highlighting upstream in the June Capital Markets Day. Sawan's closing comment before the Q&A was "*As we look into the future, longevity of Upstream and our Upstream resource is a key focus area for me and for Sinead, that's going to be something we focus on. More on exactly how that looks, I think is better discussed in our Capital Markets Day in June 2023 but longevity is a core part of our focus.."* (iv) Will add more crude oil production. We think one of the surprises from the Q4 Q&A were Sawan's comments about adding oil production. In the Q&A, Sawan said "A*bsolutely. You've heard me say earlier as well, we will continue to look at how do we have longevity in our oil* *business,"* Then later in the Q&A, Sawan said "*Thanks, Sinead. I'll answer to the question around longevity. We will go after the most attractive projects that's come our way. We don't have any specific restriction where we're not going to go into oil or into gas. Clearly, we think we have more gas opportunities at the moment because we're able to add a lot of value. So yes, we are looking at growing our production and gas and you can see it through our efforts on Integrated Gas, for example, what we did last year. On oil, what we're looking to do is to have a -- just a -- lot -- a much longer period of ability to be able to produce our oil profitably. Simply given where the world is, we continue to believe that oil has a role to play. A big part of what we announced a few years ago was how are we going to be able to move to actually prune the portfolio to high grade what we have as an Upstream business. I think we have done a lot of that, and therefore, what you see right now is a lot more strength and stability in that business, and I'd like to extend that strength and stability into the coming years."*

Figure 51: Dropped slide from Q3/22 call slide deck on Oct 27, 2022



Source: Shell

Figure 52: New slide in Q4/22 call slide deck on Feb 2, 2023



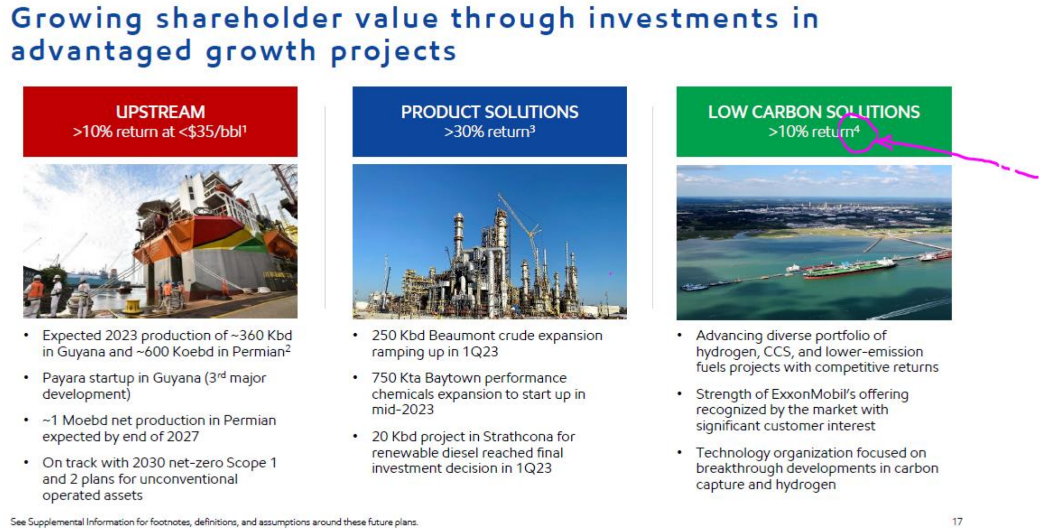
Source: Shell

Energy Transition – Exxon's >10% ROR for low carbon incl potential future policy

Exxon's low carbon IRR

There was a reminder in Exxon's Q4 call slides on the challenge for Exxon or other supermajors in their big increasing capital allocation to low-carbon or renewables – the returns aren't great. But fortunately, their core businesses (upstream and products) their returns and cash flows are strong. In Exxon's case, their focus is low-carbon and not offshore wind. On the Q4 call, Exxon said *"To that end, in December, we shared our plans to invest approximately $17 billion in lower-emission opportunities from 2022 through 2027, up from $15 billion in our prior plan*." They included the below slide showing their returns, and it is important to note the footnotes later in the slide deck. It's why on Tuesday, we tweeted [LINK] "*#Oil #NatGas needed for energy security AND to provide cash flow to fund increased #EnergyTransition investments. #Exxon Q4. Upstream >10% ROR <$35/b. Products >30% ROR. Low Carbon >10% ROR assuming "potential" govt policies. Plus $XOM isn't in lower ROR offshore wind. #OOTT."* The Upstream returns are excellent given their price to get a minimum 10% return is $35/b. So at roughly $80 oil, their returns must be huge. This compares to how they present Low Carbon Solutions with >10% return. However there is a footnote "4" *"~$17 billion lower-emission investment portfolio delivers >10% return on a capital-weighted basis under current and potential future government policies based on ExxonMobil projections."* The >10% return for low carbon is based on potential future government policies.

Figure 53: Exxon returns by business area



Source: Exxon

Energy Transition – WSJ "*BP's CEO plays down renewables push as returns lag*"

BP renewables returns lag

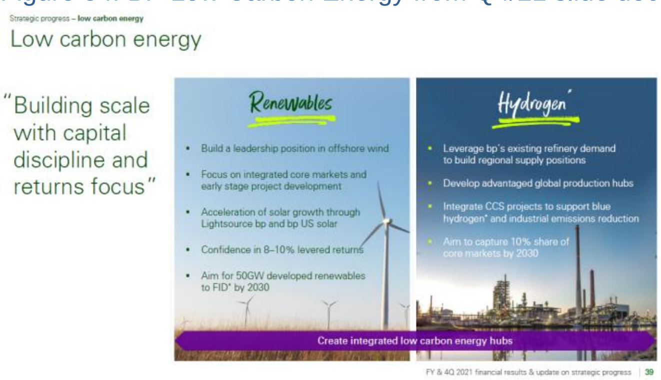
It sounds like BP will be following a similar path as seen in the Shell Q4 call in playing down or slow playing in some way their push on renewables driven by the lack of returns. Shell didn't specifically say the renewable returns can't be attained, but said on multiple times that returns have to meet acceptable levels. The concept is the same. The question will be how do they message this change. These European supermajors can't back away from any climate pledges so will have to say this in an indirect way. These supermajors went into renewables, in particular offshore wind, knowing the expected returns would be much less than oil and gas and refining. Fortunately, they have had the benefit of high oil, natural gas and LNG prices to fund this push into renewables. We expect BP will be taking a similar tact when they release Q4 results on Tuesday morning and we have to believe they will be playing down their renewable push, much like their UK peer Shell did this week. And there should be multiple analyst questions in light of the WSJ's Wednesday exclusive report "*BP's CEO Plays Down Renewables Push as Returns Lag: Bernard Looney seeks to sharpen strategic focus, with less emphasis on environmental goals*." [LINK]. We don't believe the WSJ would go out with this type of exclusive if they didn't have good sources. WSJ wrote "*Chief Executive Bernard Looney plans to dial back elements of the oil giant's high-profile push into renewable energy, according to people familiar with recent discussions. Mr. Looney has said he is disappointed in the returns from some of the oil giant's renewable investments and plans to pursue a narrower green-energy strategy, the people said. He has told some people close to the company that BP needs to do more to convince shareholders of its strategy to maximize profits in areas where it has a competitive advantage, including its legacy oil-and-gas operations. In some of the conversations, Mr. Looney has said he plans to place less emphasis on so-called ESG goals—a catchall term for environmental, social and governance—to help clarify that those aren't distracting the company from its ability to deliver profits, the people said. Mr. Looney, the people said, is casting the moves as a modest short-term course correction rather than a major strategic pivot for the 114-year-old company.*" Our Supplemental Documents package includes the WSJ report.

BP's 8-10% renewable target returns are levered returns &incl trading profits
No one should be surprised by the WSJ reporting that BP isn't seeing acceptable returns from renewables. It's not just BP, but we have been highlighting since Sept 2020 how BP expected to get its 8-10% target for renewable returns. We have been writing on how BP planned to get to its targeted 8-10% returns for its renewable portfolio. It's different than how companies normally evaluate a capital allocation for an individual project. We don't recall ever hearing companies allocate build in some assumed future trading profits to an upfront investment. So when we saw the WSJ report, we tweeted [LINK] "*WOW! @jennystrasburg @bp_plc CEO Looney disappointed in #RenewableEnergy returns, could play down #OffshoreWind #Solar, narrower green energy strategy. No surprise, see 👇09/14/20 tweet how Looney said they get to 8-10% renewable returns. #OOTT".* Our tweet included our Sept 14, 2020 tweet [LINK] "*Many good #Oil #NatGas #EnergyTransition insights $BP Day 1 ie. can get 8-10% #Renewable returns by adding value thru applying our processes, integrate with rest of BP like trading. 8-10% is good, but thought these would be upside items and not part of how to get to base return*." In that Sept 2020 presentation, BP CEO Looney noted they start with 5-6% on an equity basis for a competitive wind auction and then said "*Second, we believe that through our extensive experience in operations and project management – we can add value through applying our processes" … "Third, we'll integrate with the rest of bp. Through trading where have a long record – over 30 years – of delivering close to a 2% return uplift. Or through the application of our digital expertise to drive additional performance. Or by bundling our renewables offer with different forms of energy along with our Natural Climate Solutions and offsets portfolio, to give customers what*

they want – clean, low cost and firm energy. Fourth, we will use leverage which is typical in this industry. The combination of these four areas gets us to 8-10%". Our Supplemental Documents package includes the BP CEO Looney comments from Sept 2020.

Q4/21 call, BP "*confidence in 8-10% levered returns in renewables*"
It will be interesting to see if any analyst asks the specific question on what are the returns and are they achieving their 8-10% target, or will they just let BP message that they are being disciplined and only approving projects that meet targeted returns. Recall that one year ago in their Q4/21 call, BP expressed confidence in achieving their 8-10% renewable returns. Here is what we wrote in the Feb 13, 2022 Energy Tidbits memo. "BP Q4 call was on Tuesday and reiterated its views for expected returns from its renewables, which are primarily, at this time, driven by wind. In the Q4 call, BP said "*and we remain confident in achieving 8% to 10% returns that are levered*" and that was echoed in the slide deck "confidence in 8-10% levered returns" for renewables. We tweeted [LINK] "*Renewables - confidence in 8-10% levered returns" @bp_plc Q4. CEO Looney explained 09/14/20 explained take 5-6% competitive wind bidding & almost double thru adding leverage, farming down, trading & operations/project mgmt. Good thing they have #Oil #LNG for returns. #OOTT."* Our tweet included our Sept 14, 2020 tweet [LINK] "*Many good #Oil #NatGas #EnergyTransition insights $BP Day 1 ie. can get 8-10% #Renewable returns by adding value thru applying our processes, integrate with rest of BP like trading. 8-10% is good, but thought these would be upside items and not part of how to get to base return*".

Figure 54: BP Low Carbon Energy from Q4/21 slide deck



Source: BP

Q1/22 call, BP said being disciplined on wind so pass on uneconomic projects
Recall in their Q1/22 call on May 3, 2022, BP CEO Looney did highlight BP is staying disciplined in approving wind projects and that they will pass if the projects don't meet that criteria. Here is what we wrote in our May 8, 2022 Energy Tidbits memo. "*The renewable space, at least certainly the quality large projects, is getting increasingly competitive. Analysts asked on this increasing competitive space to BP*

mgmt in the Q1 call on Tuesday, mgmt made a point of highlighting they continue to be disciplined in its renewable push to make sure all projects meet their return criteria of 8-10%. In the Q&A, mgmt said "'ll ask Murray to take the question around RMM and I think rules of thumb and guidance. On low carbon, certainly the on offshore wind and particular I think a challenging market place on a number of dimensions, including for suppliers in that sector. A couple of things I would say, number one, we will only do projects that meet our guidance of 8% to 10% returns. We recently bid in a around the license round in the United States and we are unsuccessful. And I hope you take that as a sign of discipline. We've got over 5 gigawatts net of offshore wind in BP today, that's up from zero about 18 months ago. We're comfortable with the portfolio that we have. We obviously want to grow that. But we don't want to grow it at any cost or at all costs. So we are very disciplined and we will look at future rounds in Holland, in Norway, in Japan, you will receive the announcement with Marubeni."

Energy Transition – Any new Saudi power generation will have carbon capture

Saudi Arabia on carbon capture

On Tuesday, Saudi Energy Minister Abdulaziz spoke at the iktva Forum and Exhibition 2023. We forwarded a tweet by @Bacharelhalabi "*#Saudi Minister of Energy Abdulaziz bin Salman at #iktva2023: "we are no longer going to build any future power generation without carbon capture with it".* Our tweet completed the end of Abdulaziz comment [LINK] *""let the world know that we talk the talk, we walk the walk. But show me who is doing it today".*

Energy Transition – Brutal 2022 for Norway wealth fund except for oil & gas

Norway wealth fund

On Tuesday, we tweeted [LINK] "*Bad news - Norway wealth fund has record losses. Good news - they were overweight integrated #Oil stocks. See 👇12/26/21 SAF Group Energy Tidbits, Norway wealth fund changed their stance to keep investing in integrated #Oil stocks. #OOTT.* On Tuesday, Norges Bank Investment Management (manager for Norway's wealth fund) reported the brutal 2022 results, which were a record $164b loss and a -14.1% return. And they highlighted that six of the top ten stocks that most contributed to 2022 absolute return were Exxon, Chevron, TotalEnergies, Shell PLC, BP and Royal Dutch Shell PLC. They They said *""The market was impacted by war in Europe, high inflation, and rising interest rates. This negatively impacted both the equity market and bond market at the same time, which is very unusual*," and "*all the sectors in the equity market had negative returns, with the exception of energy*." Our Supplemental Documents package includes excerpts from the 2022 results.

Figure 55: Norway Wealth Fund equity return in 2022 by sector

Source: Norges Bank Investment Management

Norway wealth fund integrated oil companies "good place to be"

No one should be surprised by Norway highlighting integrated oil companies in its 2022 results. Here is what we wrote in our Jan 22, 2023 Energy Tidbits memo. "*Norway's wealth fund's big shift 13 months ago continues as it keeps investing in oil and gas and he sees the integrated energy companies are a good place to be for the risks of 2023 markets. On Wed, we tweeted [LINK] ""what we do do is to invest in the integrated energy companies. I think that's a good place to be. They play a very, very important role in the energy transition" Norway wealth fund CEO. See 👇12/21/26 tweet on their #Oil #NatGas investing shift. Thx @lisaabramowicz1. #OOTT." Norway's wealth fund CEO Nicolai Tangen was interviewed by Bloomberg at Davos. Our tweet included the recording we made of Tangen's comments on oil and gas. Tangen said that, since the fund is driven by oil and gas revenues, the Norwegian government decided the wealth fund should not be investing in upstream oil and gas. But then he went on for his positive comments on integrated energy companies*."

Norway wealth fund signaled energy transition will take longer

Here is what we wrote in our Dec 11, 2022 Energy Tidbits memo. "*This week, we saw one of the best examples of "careful" drafting from Norges Bank Investment Management, the manager of Norway's massive wealth fund. (i) The backdrop to their new strategy has been the negative returns in 2022 and their initial steps last December that they wouldn't be selling oi and gas integrated stocks. Luckily they did that. (ii) This week, they posted their Strategy 25, which we decided to do a word by word comparison of their relatively short Strategy outlines compare to their prior posted Strategy from Apr 7, 2021. (iii) No surprise, there were some significant changes to their strategy, which we believe were driven by results. (iv) Yesterday, we tweeted [LINK] "OOPS! Note 👇comparison of Norway wealth fund's new 12/22 strategy vs 04/21 strategy. Seems Norway now realizes #EnergyTransition will take longer, cost more, etc. 12/22 new sentence "Managing climate-related risks and opportunities is a key priority. ... 1/2. #OOTT" and [LINK] "2/2. ..."We have a financial interest in an orderly energy transition in line with the Paris Agreement. We will drive* *the companies we invest in towards net zero emissions by 2050." Why not just say it, #Oil #NatGas is needed for longer. #OOTT." (v) There were other changes in the new Strategy that point to the same point – they are changing how they look at the risks/opportunities from climate ie. it seems like the implied message is there is more risk than they thought form the energy transition. (vi) In comparing the two strategies, there are things like making sure people know it's the government that dictates the asset classes they can invest in. They don't say their climate approach has been wrong, but say they will sharpen their expectations on climate change. They also don't say they climate change approach has been wrong but this year they talk about how they "will develop their principles for climate risk management". This year they also highlight how they "have a financial interest in an orderly energy transition" instead of saying the energy transition plan is wrong. And more. Our Supplemental Documents package includes the comparison of key quotes from the new vs last year's strategy and most of the text from the new Strategy 2025.*"

In Dec 2021, Norway wealth fund changed its stance on oil and gas stocks

As noted above, Norway's wealth fund did change their stance a year ago on oil and gas stocks. Our Dec 26, 2021 Energy Tidbits memo was titled "Norway's Wealth Fund is Another Major Investor, Like CPPIB, to Keep Investing in Oil & Gas Stocks." At that time, we wrote "*Energy Transition – Norway's wealth fund is another that isn't selling oil & gas. We believe there is the case for multiple expansion for oil and gas stocks in 2022 as investors realize more significant institutional investors, especially pension funds, won't be selling down oil and gas stocks. The predictable is happening – more long term investors realize that the demise of oil and gas is many years further away than the Net Zero aspirations and that they will need oil and gas stocks for their returns. We expect to see more of these types of announcements/news over the next couple weeks. History has shown that the Xmas period is the time for announcements to be made to get the minimum attention. On Tuesday, we tweeted [LINK] "Multiple expansion for #Oil #NatGas stocks? Norway wealth fund has #MacronMoment & follows @cppib to slow play #EnergyTransition, won't sell, rather be a driving force for their equity investments to "adjust to #NetZero emissions over time". Less sellers is always good. #OOTT." Norway's sovereign wealth fund may be saying it a little differently but has come to a similar conclusion as CPPIB last week – they aren't selling oil and gas. They don't say it specifically but we also believe they won't be hesitating to buy . On Tuesday, Norway outlined its view on capital allocation [LINK] that had a number of key items. (i) High emissions sectors including oil and gas make up 14% of Norway's equity portfolio. These are companies that Norway believes must be restructured significantly to manage transition risk. (ii) "But that is not our approach, nor is it the expert group's proposal. Instead of selling ourselves out, we will through active ownership be a driving force for the companies to adapt. In order to influence, we must actually be owners." (iii) They want to be invested in all sectors. "If we are to achieve the best balance between expected return and risk, we must spread the investments widely and own a little of everything in the market. There is a solid professional basis for this approach." (iv) Priority to those that have the largest emissions ie. where they can effect change. "Going forward, we will increase ownership activity on climate, both in scope and depth. We will give particular priority to ownership activity towards the* *companies that have the largest emissions, towards those that have not published their own climate plans or have inadequate climate reporting." Our Supplemental Documents package includes the speech.*"

Energy Transition – Coincidence? Whale deaths as offshore wind farms ramp up

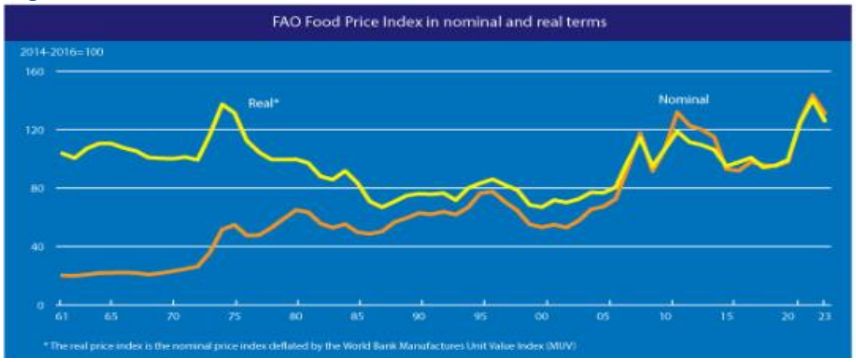
Whale deaths

We don't expect this will lead to Biden shutting down offshore wind off the cost of New Jersey and New York. It would probably be a shut down if this whale death story had happened around any offshore oil rigs or else . But on Monday, we tweeted [LINK] "*hard to believe #Biden would shut down a big offshore wind project. "no evidence the wind work and whale deaths are linked.. Clean Ocean Action, a 40-yr-old nonprofit, believes the two things happening at once may be more than just a fluke. #OOTT #NatGas."* Politico's report "*Why whale deaths are dividing environmentalists — and firing up Tucker Carlson. Since December, at least nine whales have been stranded on beaches in New Jersey and New York."* Politico wrote "*Dead whales are usually a sure-fire way to unite environmentalists — but not in New Jersey. Instead, a recent spate of beached whales in the Northeast is exposing rifts among activists, energizing Republicans and threatening to complicate one of President Joe Biden's top energy goals. Since December, at least nine whales have been stranded on beaches in New Jersey and New York. The deaths are happening as pre-construction work ramps up on offshore wind farms, which are a key part of the nation and New Jersey's climate change strategy. There is no evidence the wind work and whale deaths are linked. But Clean Ocean Action, a 40-year-old nonprofit, believes the two things happening at once may be more than just a fluke. Real or rhetorical, the claim is stirring a new political debate."* Our Supplemental Documents package includes the Politico report.

Capital Markets – UN FAO Food Price Index dropped in January and is down YoY

We recognize the UN FAO Food Price Index isn't a measure of what people pay when they go to the grocery store. We know this because grocery prices aren't going down. The UN global food price index for January 2023 was down for the 10th consecutive month. The UN wrote, *"The drop in the index in January was driven by declines in the price indices of vegetable oils, dairy and sugar, while those of cereals and meat remained largely stable."* It was -3.3% YoY, and that is down huge from the record high YoY increase of +33.6% seen in March 2022. On Feb 3, the UN posted its monthly update of its FAO Food Price Index [LINK] titled "*FAO Food Price Index continues to decline"* Note that the index is calculated on a Real price basis. The FFPI averaged 131.2 points for January 2023, which was a decline of -0.8% MoM and down -3.3% YoY. January's decline has the FFPI currently sitting -17.9% below the all-time high of 159.8 seen in March 2020. The FFPI also reported MoM declines for most of its sub-indices in January. The Vegetable oil index was down -2.9% MoM, after nine months of decline. The Sugar Price Index was down -1.1% MoM and the Dairy Price Index was down -1.4% MoM though still +2.7% YoY. The cereal price index was +0.1% MoM, still up +4.8% YoY. Finally, the Meat Price Index was down -0.1% MoM and remains +1.3% YoY. Below is the all time FFPI graph. Our Supplemental Documents package includes the UN FAO Food Price Index update.

Figure 56: UN FAO Food Price Index



Source: UN

Capital Markets – US inflation data is only based on urban areas, excludes rural areas

US inflation data

This may be basic common knowledge for economists, but we didn't realize that US inflation data was only based on urban areas and excludes rural areas. Last Saturday, Naked Capitalism posted a report [LINK] "*Rural Americans Aren't Included in Inflation Figures – and for Them, the Cost of Living May Be Rising Faster.*" They noted that the US inflation data surveys only urban populations for their consumer price indexes and excludes rural America. They wrote that "*As economists who study rural America, we believe this poses a problem: People living outside America's cities represent 14% of the U.S. population, or around 46 million people. They are likely to face different financial pressures and have different consumption habits than urbanites.*" They note various cost areas such as home, heating, groceries, cars, etc and conclude "*While there is no conclusive official quantitative data that shows an urban-rural inflation gap, a review of rural life and consumption habits suggests that rural Americans suffer more as the cost of living goes up. Indeed, rural inflation may be more pernicious than urban inflation, with price increases likely lingering longer than in cities.*" Our Supplemental Documents package includes the Naked Capitalism 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

Look for energy items on LinkedIn

I can also be reached on Linkedin and plan to use it as another forum to pass on energy items in addition to our weekly Energy Tidbits memo and our blogs that are posted on the SAF Energy website [LINK].

Misc Facts and Figures.

During our weekly review of items for Energy Tidbits, we come across a number of miscellaneous facts and figures that are more general in nature and often comment on sports and Calgary items.

Did Punxsutawney Phil call the Eagle to win the Super Bowl?

The most well known of the rodent spring forecasters is Punxsutawney Phil, who, on Thursday, saw is shadow thereby forecasting that there would be six more weeks of winter. Punxsutawney is in NW Pennsylvania, close to the New York border. NFL Network ha the first of its two weeks on Super Bowl coverage so it means two weeks of trivia. One this week was NFC teams won the Super Bowl in 5 of the last 6 times Punxsutawney Phil called for six more weeks of winter.

White jerseys have won 15 of the last Super Bowls

ESPN's Adam Schefter tweeted another Super Bowl trivia *""For Super Bowl LVII, the Chief will wear their white jerseys and the Eagles their green. FWIW, the team wearing white jerseys has won 15 of the past 18 Super Bowls*."

Bobby Hull, the Golden Jet passed way at the age of 84

The Golden Jet, Bobby Hull, passed away on Monday at the age of 84. Hull was a hockey player that many kids in the 60s/70s wanted to emulate because of his booming slap shot. Hull wasn't the first with the slap shot, but he was probably the one who made it the most famous. He also did something that doesn't happen often in that he changed his number with the Chicago Blackhawks twice. He started with #16, switched to #7 and then finally to #9 as he was an admirer of Gordie Howe. Hull was also the biggest name to jump to the WHA, when he signed with the Winnipeg Jets on a 10-year deal that would pay $175,000 a season and also a $1 million bonus. He was also part of two famous hockey lines. Chicago's Million Dollar Line with Murray Balfour and Bill Hay. Winnipeg's Hot Line with Anders Hedberg and Ulf Nilsson.