Energy Tidbits

Oct 27, 2024

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Will Markets Take Near-Term Fear of Regional Escalation Out of Oil Following Iran's Downplaying of Israel's Friday Night Attack?

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 1998 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. My 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 the review of investor days, conferences and earnings calls focusing on sector developments that are relevant to the sector. My target is to write on 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. Iran seems to be downplaying Israel's Friday night attack that didn't directly target Iran oil and nuclear facilities. [click here]

2. Wood Mackenzie's new "energy transition scenario" raises peak oil demand from 108 mmbd in 2030 to 114 mmbd in 2033. Seems like it's a prelude to this becoming a base case. [click here]

3. Q3 reporting is starting for Cdn oil and gas companies with two key themes: really low AECO gas prices and big win for Cdn oil prices with narrow WCS less WTI differentials. [click here]

4. Good reminder from NextEra on the limitations for ramping up US nuclear power. [click here]

5. Equinor and Repsol are latest to highlight green hydrogen is nowhere near commercialization. [click here]

6. Please follow us on Twitter at [LINK] for breaking news that ultimately ends up in the weekly Energy Tidbits memo that doesn't get posted until Sunday noon MT.

7. For new readers to our Energy Tidbits and our blogs, you will need to sign up at our blog sign up to receive future Energy Tidbits memos. The sign up is available at [LINK]

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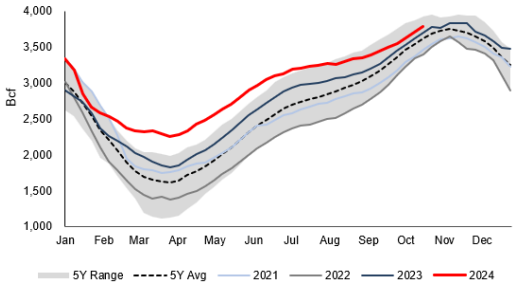
Natural Gas: Expect higher YoY but not full US gas storage to start the winter

Higher YoY but not full gas storage

There are only two storage weeks to go to Nov 1 storage. So the hot summer and some hurricane supply interruptions meant that the real risk for storage to be full early isn't going to happen. Rather it's just points to storage being higher YoY going into the winter. The concern coming into the summer was that storage was +444 bcf YoY storage on May 3 with a real fear that storage would be full well before winter and that would cause producers to shut-in production. But that big early YoY surplus is now down to +106 bcf YoY so it's just the reality of higher YoY gas storage to start the winter. And, as noted below, storage could be a lot worse.

Figure 1: US Natural Gas Storage



Source: EIA

Natural Gas: Storage would be way worse if EQT, Coterra etc. didn't curtail production

Storage could be worse

The big holdback to Henry Hub prices over the past four months is much like oil in that there has been 1-2 bcf/d of voluntary shut-ins due to low price i.e. higher YoY storage would be way worse if producers didn't shut-in production or hold back on planned completions. On Aug 20, 2024, we tweeted [LINK] "*Risk continues HH #NatGas is stuck in show-me state until Nov & theoretical start to winter withdraw from gas storage season. Hold back remains 👇@NOAA Nov/Dec still looking warmer than normal. Especially with EQT ~0.5 bcf/d and Coterra 0.275 bcf/d shut-in production. #OOTT."* We reminded that gas storage would be a lot worse than it is if key producers hadn't shut-in natural gas production due to low prices. We highlighted US natural gas production leader, EQT, and their Q2 report disclosure of continuing to shut-in production due to prices, which is about 90 bcf for H2/24. Note for our tweet, we wrote ~0.5 bcf/d, which is the 90 bcf over the last six months but we would assume EQT is assuming it could restore the natural gas before Dec 31. Our tweet also noted Coterra's announced shut-in of 0.275 bcf/d for H2/24. There are others like Chesapeake and Apache who have shut-in natural gas due to low natural gas prices. Below is last an excerpt from our Sept 29, 2024 Energy Tidbits memo; we noted that EQT is to start restoring natural gas production that they previously shut-in.

> **EQT to start restoring its ~1 bcf/d shut-in natural gas production in Oct**
>
> EQT said they would be restoring some of their shut-in production. Here is what we wrote in our Sept 29, 2024, Energy Tidbits memo. "*EQT to start restoring its ~1 bcf/d shut-in natural gas production in Oct. Last Thursday, we tweeted [LINK] "EQT to start to add back shut-in #NatGas production. Gas storage +159 bcf YoY would have been worse if EQT, Coterra, etc hadn't shut-in production due to low prices. EQT*

curtailed ~1 bcfd in spring. "We're watching to see that come back in October and November ... We will ease curtailments in October" EQT CEO Rice. Thx @scottdisavino #OOTT [LINK] ." As we have been highlighting, natural gas storage would be way worse if EQT, Coterra, Chesapeake, etc hadn't shut in natural gas due to low prices. Don't forget HH was around $2 up until the last couple weeks. EQT had indicated they were shutting in 90 bcf over H2/24 but hadn't specifically said when they would start to restore production. But, on Wednesday, EQT CEO said they would start to bring the shut-in production on in October. On Wednesday, Reuters reported [LINK] "U.S. energy company EQT (EQT.N), opens new tab plans to reverse some natural gas production curtailments in October and November as demand for the fuel and prices increase, CEO Toby Rice told Reuters on Wednesday. EQT, the biggest U.S. gas producer, has along with other U.S. drillers curtailed output in 2024 after prices collapsed to multi-year lows in the spring following a mild winter that left a tremendous oversupply of fuel in storage. "Production curtailments will be a normal part of our strategy when prices are low," Rice said, noting the company has already curtailed about 1 billion cubic feet per day (bcfd) of production in the spring. "We're watching to see that come back in October and November ... We will ease curtailments in October," Rice said, noting total curtailments were around 2 bcfd across the entire industry."

Natural Gas: +80 bcf build in US gas storage; now +106 bcf YoY

+80 bcf build in US gas storage

For the week ending October 18, the EIA reported a +80 bcf build [LINK]. Total storage is now 3.785 tcf, representing a surplus of +106 bcf YoY compared to a surplus of +107 bcf last week. Since February, total storage had remained above the top end of the 5-yr range, until 1 month ago when storage dipped into the 5-yr range but this week's data shows that storage remains below the range at -92 bcf below the 5-yr maximum of 3.877 tcf. Total storage is now +167 bcf above the 5-year average, above last week's +163 bcf surplus. Below is the EIA's storage table from its Weekly Natural Gas Storage report and a table showing the US gas storage over the last 8 weeks.

Figure 2: US Natural Gas Storage

	Stocks billion cubic feet (Bcf)				Historical Comparisons: Year ago (10/18/23)		5-year average (2019-23)	
Region	10/18/24	10/11/24	net change	implied flow	Bcf	% change	Bcf	% change
East	901	893	8	8	905	-0.4	884	1.9
Midwest	1,088	1,067	21	21	1,068	1.9	1,056	3.0
Mountain	291	287	4	4	251	15.9	223	30.5
Pacific	300	293	7	7	282	6.4	281	6.8
South Central	1,205	1,166	39	39	1,173	2.7	1,174	2.6
Salt	314	293	21	21	295	6.4	298	5.4
Nonsalt	891	872	19	19	879	1.4	876	1.7
Total	3,785	3,705	80	80	3,679	2.9	3,618	4.6

Totals may not equal sum of components because of independent rounding.

Source: EIA

Figure 3: Previous US Natural Gas Storage

Previous 8 weeks (Bcf)				
Week Ended	Gas in Storage	Weekly Change	Y/Y Diff	Diff to 5 yr Avg
Aug/30	3,347	13	208	323
Sep/06	3,387	40	198	296
Sep/13	3,445	58	194	274
Sep/20	3,492	47	159	233
Sep/27	3,547	55	127	190
Oct/04	3,629	82	124	176
Oct/11	3,705	76	107	163
Oct/18	3,785	80	106	167

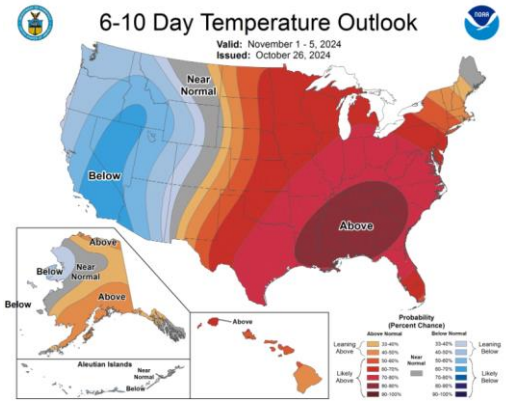
Source: EIA

Natural Gas: NOAA forecasts warmer-than normal temps to start Nov

NOAA updated 6-10 and 8-14 day temp outlook

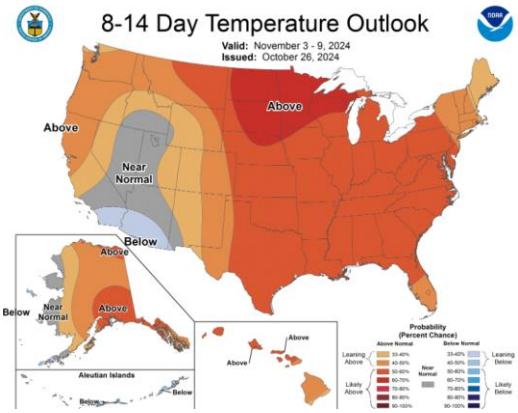
It's now the Fall and that generally means daytime temperatures are perfect to leave the windows open and not too much cranking on the furnaces at night ie. no major weather driven natural gas demand. Yesterday, we tweeted [LINK] "*It's Fall so that is mostly leave the windows open temps during daytime and turn on the furnaces only a little bit at night. @NOAA updated 6-10 & 8-14 day temp outlook for NOv 1-9 calls for warmer than normal temps across most of Lower 48. #OOTT #NatGas."* Our reminder is that warmer than normal in early Nov temperatures generally don't drive any significant weather driven natural gas demand. Below are NOAA's updated, as of yesterday, 6-10 day and 8-14 day temperature outlook maps covering Nov 1-90.

Figure 4: NOAA 6-10 day temperature outlook for Nov 1-5



Source: NOAA

Figure 5: NOAA 8-14 day temperature outlook for Nov 3-9



Source: NOAA

Natural Gas: Tough for HH prices to catch up from a warm start to winter

Risk to HH prices going into winter

For years, we have warned on the risk to HH gas prices unless it's cold to start winter ie. in Nov/Dec. Here is what we wrote in last week's (Oct 20, 2024) Energy Tidbits memo. "*Yesterday we tweeted [LINK] "Caution unless it gets cold in Nov? Other than 2022 where global #NatGas markets were driven up post Russia 02/24/22 invasion of Ukraine, HH prices have weakened in Nov/Dec with warm or even normal temps in Nov/Dec. #OOTT." Our tweet included the below graph showing the seasonal HH price moves. Russian invaded Ukraine on Feb 24, 2022 and that drove up global natural gas and LNG prices with Europe cutting off cheap Russia natural gas pipeline gas. So putting 2022 aside, all the other years have seen HH gas prices weaken in Nov even when temperatures were normal. And our weekly memos have been highlighting US gas storage will be up YoY and would have been full if producers hadn't shut in natural gas production due to low prices. And weather forecasts continue to call for a warmer than normal start to winter. Our concern is that the graphs reminds it is touch for HH gas prices to catch up with a weak start to winter. So there is risk going into the winter unless it starts off cold."*

Figure 6: HH gas prices seasonal comparison to Oct 18, 2024 close

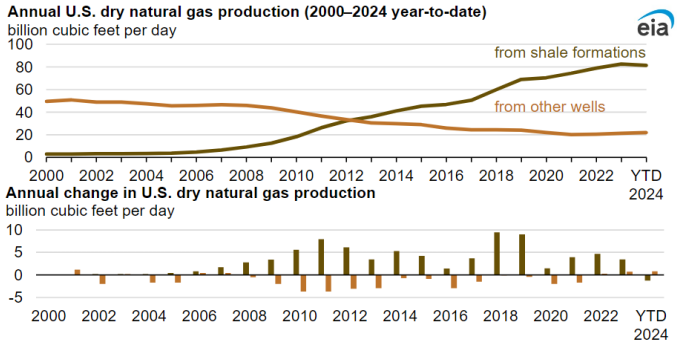
Source: NOAA

Natural Gas: US shale natural gas production has fallen YTD in 2024

YTD shale natural gas production falls

On Thursday, October 24, the EIA posted a blog on the lower YoY US shale natural gas production [LINK]. US natural gas production from shale and tight formations fell YTD compared to same period in 2023; if US production continues to fall during the remainder of 2024, it would mark a reversal of a production growth trend for the first time since the EIA began recording the data in 2000. The primary drivers of the YoY decrease stem from declines in production at Haynesville (-12.0% YTD YoY), and the Utica (-10.0% YTD YoY), however, this was slightly offset by rising production in the Permian (+10.0% YoY). The EIA highlighted "*Several operators in the Haynesville and the Appalachian Basin shut in natural gas production in reaction to historically low prices and intend to continue curtailments in the second half of 2024"* ie. the key reason for the lower 2024 is shut-in natural gas production from low natural gas prices. The fall in production is presumed to be due to to soft commodity pricing, as well as high costs due to well depth in the Haynesville and Utica plays. Our Supplemental Documents package includes the EIA blog.

Figure 7: Annual US dry natural gas production:



Source: DOE, SAF

Natural Gas: US natural gas pipeline exports to Mexico up +0.1 bcf/d MoM, flat YoY

US to Mexico August natural gas exports

On Thursday, October 24, the Department of Energy (DOE) posted its Natural Gas Imports and Exports Monthly [LINK], which includes its estimate for August natural gas exports via pipeline to Mexico. These are the same data points that will come out in the more referenced EIA Natural Gas Monthly on Thursday. Natural gas exports to Mexico were up +0.1 bcf/d to 6.9 bcf/d in August from 6.8 bcf/d in July, and was flat YoY at 6.9 bcf/d from August 2023. This means the figures are flat with the all-time high for pipeline exports of 6.9 bcf/d in August 2023. US natural gas pipeline exports to Mexico are now in line with Q3/23 exports of ~6.8 bcf/d. The DOE doesn't provide a split but for pipeline vs LNG or CNG exports to Mexico but we believe essentially 100% of the exports are via pipeline, without any CNG/LNG in the mix. Please note that we will note if we ever believe there are any notable CNG/LNG exports to Mexico. Below is a summary of natural gas via pipeline exports to Mexico from the US. Our Supplemental Documents package includes excerpts from the DOE US Natural Gas Imports and Exports Monthly.

Figure 8: US Natural Gas Pipeline Exports to Mexico

(bcf/d)	2019	2020	2021	2022	2023	2024
January	5.3	5.4	5.6	5.7	5.5	6.0
February	5.1	5.3	5.4	5.5	5.5	5.8
March	5.1	5.6	5.9	5.5	5.8	5.9
April	5.0	4.6	6.1	5.9	5.6	6.3
May	5.6	4.7	6.2	6.0	6.2	6.8
June	5.8	5.4	6.6	6.2	6.8	6.8
July	6.2	5.8	6.4	6.1	6.8	6.8
August	5.9	6.1	6.3	5.9	6.9	6.9
September	5.8	6.2	6.0	5.6	6.7	
October	5.7	6.2	6.0	5.5	6.5	
November	5.4	5.6	5.5	5.4	6.0	
December	5.2	5.3	5.4	5.1	5.6	
Average	5.5	5.5	5.9	5.7	6.2	

Source: DOE, SAF

Natural Gas: US LNG exports up +1.3 bcf/d MoM to 11.7 bcf/d in August

US August LNG exports

The DOE normally posts the US LNG export data before the more commonly referenced US LNG exports from the EIA's Natural Gas Monthly that is to be released on Thursday. The EIA is a group within the DOE so the data for LNG exports is either identical or just a rounding issue. On Thursday, we tweeted [LINK] "*US #LNG exports: Aug 2024: 11.7 bcfd July 2024: 10.4 Aug 2023: 11.4 July was hit by Freeport down ~8 days re air cooler damage from Beryl & Cheniere planned maintenance. DOE actuals are same as EIA #NatGas Monthly actuals on Oct 31. #OOTT #natgas".* US LNG exports were up +1.3 bcf/d MoM in August from 10.4 bcf/d in July, and up +0.3 bcf/d YoY from 11.4 bcf/d in August 2023. As we highlighted in our tweet, one of the reasons for the MoM increase, was lower US LNG exports in July due to the 2.1 bcf/d Freeport LNG being shut for ~7 days from Hurricane Beryl. The top five countries destinations for US LNG in August were South Korea 1.4 bcf/d, Netherlands 1.2 bcf/d, Japan 1.0 bcf/d, China 0.8 bcf/d and India 0.8 bcf/d. The DOE did not comment on the MoM or YoY changes.

Figure 9: US Monthly LNG Exports

(bcf/d)	2019	2020	2021	2022	2023	2024
January	4.1	8.1	9.8	11.4	10.9	12.8
February	3.7	8.1	7.4	11.3	11.7	12.4
March	4.2	7.9	10.4	11.7	11.8	11.9
April	4.2	7.0	10.2	11.0	12.5	10.1
May	4.7	5.9	10.2	11.3	11.8	11.9
June	4.7	3.6	9.0	10.0	10.9	11.9
July	5.1	3.1	9.7	9.7	11.3	10.4
August	4.5	3.6	9.6	9.7	11.4	11.7
September	5.3	5.0	9.5	9.8	11.6	
October	5.7	7.2	9.7	10.0	12.4	
November	6.4	9.4	10.2	10.1	12.9	
December	7.1	9.8	11.1	11.0	13.6	
Average	5.0	6.6	9.7	10.6	11.9	

Source: EIA, DOE

Natural Gas: Mexico's natural gas production stuck below 5 bcf/d

Mexico natural gas production

This week, Mexico's National Commission of Hydrocarbons posted its natural gas production data for September [LINK]. The story for Mexico natural gas production is unchanged for the last several years – it is stuck right around 5 bcf/d. The Commission reported September 2024 natural gas production of 4.531 bcf/d, which is down is down -9.2% YoY from 4.990 bcf/d in September 2023 and down -0.3% MoM from 4.545 bcf/d in August 2024. The big picture story for Mexico natural gas for the past six years has been that Mexico natural gas

production has been stuck at or below 5 bcf/d, and that means any increased domestic natural gas consumption has been met by US natural gas imports. Below is our ongoing table of Pemex (2017-2022) and CNH (2023-2024) reported monthly natural gas production.

Figure 10: Mexico Natural Gas Production

Natural Gas Production bcf/d	2017	2018	2019	2020	2021	2022	2023	2024	24/23
Jan	5.326	4.910	4.648	5.005	4.848	4.713	4.984	4.802	-3.7%
Feb	5.299	4.853	4.869	4.942	4.854	4.646	5.004	4.798	-4.1%
Mar	5.383	4.646	4.857	4.946	4.839	4.766	5.057	4.783	-5.4%
Apr	5.334	4.869	4.816	4.827	4.671	4.740	5.116	4.513	-11.8%
May	5.299	4.827	4.841	4.460	4.730	4.702	5.062	4.617	-8.8%
June	5.253	4.840	4.843	4.754	4.727	4.744	5.066	4.576	-9.7%
July	5.216	4.856	4.892	4.902	4.725	4.815	4.971	4.545	-8.6%
Aug	5.035	4.898	4.939	4.920	4.656	4.796	4.990	4.531	-9.2%
Sept	4.302	4.913	5.017	4.926	4.746	4.798	5.012		
Oct	4.759	4.895	4.971	4.928	4.718	4.795	4.972		
Nov	4.803	4.776	5.015	4.769	4.751	4.845	4.908		
Dec	4.811	4.881	5.024	4.846	4.697	4.845	4.806		

Source: CNH, Pemex

Natural Gas: ConocoPhillips commences 0.09 bcf/d 10-year LT LNG deal with SEFE

ConocoPhillips / SEFE sign 10-yr LNG supply deal

On Thursday, SEFE announced that the company has it finalized a long-term 10-year LNG deal with ConocoPhillips for the "*Over the next ten years, ConocoPhillips will deliver up to nine billion cubic metres of natural gas from their European portfolio to SEFE at various trading hubs across Europe*". For the purposes of our writeup we have assumed the 9 bcm is permitted delivery equally across the 10 years; this would represent 0.09 bcf/d [LINK]. SEFE CCO, Frederic Barnaud said "*The long-term partnership between SEFE and ConocoPhillips is an important milestone in pursuing our ambition to diversify our natural gas portfolio, It demonstrates our commitment to securing energy supply for Europe*". Our Supplemental Documents Package includes the SEFE press release.

There have been 26.40 bcf/d of long-term LNG supply deals since July 1, 2021

The abrupt big wave of LNG deals started in July 2021, and we highlighted this 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 continue to update that table, which now shows 26.40 bcf/d of long-term LNG deals since July 1, 2021. 63% 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 (i.e. Chevron, Shell, etc.) buying for their LNG portfolio supply. China has been particularly active in this space, accounting for 42% of all Asian LNG buyers in long term contracts since July 1, 2021. Below is our updated table of Asian and European LNG buyers new long-term supply deals since July 1, 2021.

Figure 11: Long-Term LNG Buyer 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.
Feb 7, 2023	Exxon Asia Pacific	Mexico Pacific Ltd	Singapore / Mexico	0.26	20.0	n.a.	n.a.
Feb 23, 2023	China Gas Holdings	Venture Global LNG	China / US	0.26	20.0	n.a.	n.a.
Mar 6, 2023	Gunvor Singapore Pte	Chesapeake Energy	Singapore / US	0.26	15.0	2027	2042
Apr 28, 2023	JERA	Venture Global LNG	Japan / US	0.13	20.0	n.a.	n.a.
May 16, 2023	KOSPO	Cheniere	Korea / US	0.05	19.0	2027	2046
Jun 1, 2023	Bangladesh Oil	QatarEnergy	Bangladesh / Qatar	0.24	15.0	2026	2031
Jun 21, 2023	Petro Bangle	Oman	Bangledesh / Oman	0.20	10.0	2026	2036
Jun 21, 2023	CNPC	QatarEnergy	China / Qatar	0.53	27.0	2027	2054
Jun 26, 2023	ENN LNG	Cheniere	Singapore / US	0.24	20.0	2026	2046
Jul 5, 2023	Zhejiang Energy	Mexico Pacific Ltd	China / Mexico	0.13	20.0	2027	2047
Aug 8, 2023	LNG Japan	Woodside	Japan / Australia	0.12	10.0	2026	2036
Sep 7, 2023	Petrochina	ADNOC	China / UAE	n.a.	n.a.	n.a.	n.a.
Nov 2, 2023	Foran	Cheniere	China / US	0.12	20.0	n.a.	n.a.
Nov 4, 2023	Sinopec	QatarEnergy	China / Qatar	0.39	27.0	2026	2053
Nov 27, 2023	Gunvor Singapore Pte	Delfin Midstream	Singapore / US	0.10	15.0	n.a.	n.a.
Dec 20, 2023	ENN	ADNOC	Singapore / UAE	0.13	15.0	2028	2043
Jan 5, 2024	GAIL	Vitol	India / Singapore	0.13	10.0	2026	2036
Jan 8, 2024	Shell	Ksi Lisims LNG	Singapore / Canada	0.26	20.0	2027	2047
Jan 16, 2024	ExxonMobil	Mexico Pacific Ltd	Singapore / Mexico	0.16	20.0	2024	2044
Jan 29, 2024	Excelerate	QatarEnergy	Bangladesh / Qatar	0.13	15.0	2026	2041
Jan 30, 2024	ADNOC	GAIL India	UAE / India	0.07	10.0	2024	2034
Feb 6, 2024	Petronet LNG	QatarEnergy	India / Qatar	0.99	20.0	2028	2048
Feb 19,2024	Deepak Fertilisers	Equinor	India / Norway	0.09	15.0	2026	2041
Feb 28, 2024	Kogas	Woodside	Korea / Australia	0.07	10.5	2026	2037
Feb 29, 2024	Sembcorp	TotalEnergies	Singapore / France	0.11	16.0	2027	2043
Apr 29, 2024	Kogas	BP	Korea / Singapore	0.12	11.0	2026	2037
May 26, 2024	AMNS	Shell	India / Canada	0.05	10.0	2027	2037
May 28, 2024	Hokkaido	Santos	Japan / Australia	0.05	10.0	2027	2037
Jun 4, 2024	IOCL	TotalEnergies	India / France	0.11	10.0	2026	2036
Jun 5, 2024	CPC	QatarEnergy	Taiwan / Qatar	0.53	27.0	2025	2052
Jul 11, 2024	CPC	Woodside	Taiwan / Australia	0.79	10.0	2024	2034
Aug 6, 2024	Osaka Gas	ADNOC	Japan / UAE	0.11	10.0	2028	2038
Aug 26, 2024	KPC	QatarEnergy	Kuwait / Qatar	0.39	15.0	2025	2040
Aug 26, 2024	POSCO International	Mexico Pacific Ltd	Korea / Mexico	0.09	20.0	2027	2047
Sep 2, 2024	BOTAS	Shell	Turkey / UAE	0.39	10.0	2027	2037
Sep 2, 2024	Indian Oil	ADNOC	India / UAE	0.13	15.0	2028	2043
Sep 17, 2024	JERA	Woodside Energy	JERA / Woodside	0.05	10.0	2026	2036
Sep 18, 2024	BOTAS	TotalEnergies	Turkey / France	0.15	10.0	2027	2037
Total Asian LNG Buyers New Long Term Contracts Since Jul/21				**16.71**			

Long-Term LNG Buyer Deals Since July 1, 2021							
Date	Buyer	Seller	Country	Volume	Duration	Start	End
			Buyer / US	(bcf/d)	Years		
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	PKN ORLEN	Sempra Infrastructure	EU//US	0.13	20.0	2027	2047
Jan 30, 2023	BOTAS	Oman	Turkey / Oman	0.13	10.0	2025	2035
Mar 27, 2023	Shell	Mexico Pacific Ltd	UK / Mexico	0.15	20.0	2026	2046
Apr 24, 2023	Hartree Partners LP	Delfin Midstream	US / US	0.08	20.0	n.a.	n.a.
Jun 21, 2023	Equinor	Cheniere	Norway / US	0.23	15.0	2027	2042
Jun 22, 2023	SEFE	Venture Global LNG	EU//US	0.30	20.0	2026	2046
Jul 14, 2023	ONEE (Morocco)	Shell	Africa/US	0.05	12.0	2024	2036
Jul 18, 2023	IOCL	Adnoc	India/UAE	0.16	14.0	2026	2040
Jul 28, 2023	OMV	BP	Austira/UK	0.13	10.0	2026	2036
Aug 4, 2023	ConocoPhillips	Mexico Pacific Ltd	US/Mexico	0.29	20.0	2025	2045
Aug 22, 2023	BASF	Cheniere	Germany / US	0.10	17.0	2026	2043
Aug 30, 2023	Shell	Oman LNG	US / Oman	0.11	10.0	2025	2035
Oct 11, 2023	TotalEnergies	QatarEnergy	France / Qatar	0.46	27.0	2026	2053
Oct 18, 2023	Shell	QatarEnergy	Netherlands / Qata	0.46	27.0	2026	2053
Oct 23, 2023	ENI	QatarEnergy	Italy / Qatar	0.13	27.0	2026	2053
Oct 31, 2023	Vitol	Chesapeake Energy	Sweden / US	0.13	15.0	2028	2043
Nov 29, 2023	OMV	Cheniere	Netherlands / US	0.11	15.0	2029	2044
Dec 5, 2023	Woodside Energy	Mexico Pacific Ltd	Australia / Mexico	0.17	20.0	2024	2044
Mar 18, 2024	SEFE	ADNOC	Germany / UAE	0.13	20.0	2024	2044
Apr 17, 2024	Shell	Oman LNG	US / Oman	0.21	10.0	2025	2035
Apr 22, 2024	TotalEnergies	Oman LNG	France / Oman	0.11	10.0	2025	2035
May 8, 2024	EnBW	ADNOC	Germany / UAE	0.08	15.0	2028	2043
June 13, 2024	Saudi Aramco	NextDecade	Saudi Arabia / US	0.16	20.0	2028	2048
June 26, 2024	Saudi Aramco	Sempra Infrastructure	Saudi Arabia / US	0.66	20.0	2029	2049
July 23, 2024	Fluxys	ConocoPhillips	Belgium / US	0.10	18.0	2027	2045
Aug 5 2024	Galp	Cheniere	Portugal / US	0.07	20.0	2030	2050
Sep 19 2024	Uniper	ConocoPhillips	Germany / US	0.10	10.0	2026	2036
Sep 19 2024	Glencore	Commonwealth LNG	Switzerland / US	0.26	20.0	2026	2046
Sep 23 2024	SEFE	ConocoPhillips	US / European	0.09	10.0	2025	2035
Total Non-Asian LNG Buyers New Long Term Contracts Since Jul/21				**9.69**			

Total New Long Term LNG Contracts since Jul/21	**26.40**

*Excludes Asian short term/spot deals
*ton Dec 20, 2021 CNOOC 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: SAF

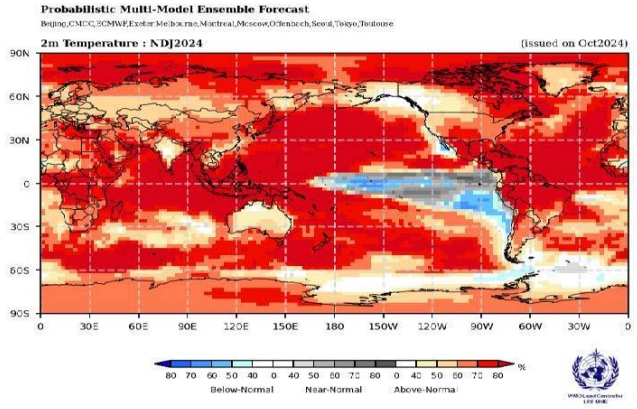
Natural Gas: WMO forecast warmer than normal start to winter almost everywhere

A warm start to winter

We have been highlighting the likely holdback to near-term natural gas and LNG prices is the expectations for a warm start to winter in all key natural gas consuming regions. Our primary concern for natural gas prices is always winter, if it's a warm winter, it typically leads to a weak year for natural gas pricing. The other aspect about winter is that if it's hot to start winter, it's hard to catch up; it's why we always focus on both winter and the start to winter. On Thursday, we tweeted [LINK] "*Holdback to near-term global #LNG & #NatGas prices.*

"there is prediction of above-normal temperatures over almost all land areas" of the globe. per @WMO temperature forecast for start of winter Nov/Dec/Jan Supply risks aside, warm winters are never good for prices. #OOTT" Last week, the World Meteorological Organization posted its monthly update "*Global Seasonal Climate Update for November-December-January 2024-25*". [LINK] The WMO is calling for "*Extensive areas of large increases in probabilities for above-normal temperatures include almost the entire South America, the Caribbean, Central America, southwest and extreme northeast parts of North America, between 15°S – 10°N over Africa, parts of Arabian Peninsula, northeast region of the Indian subcontinent, the Maritime continent, New Zealand, and the Arctic regions north of 60°N. Regions with moderate to weaker increase in probabilities for above-normal temperatures include Australia, Europe, between 40° – 60°N over Asia, Greenland, and narrow belt along 15°N in Africa. In coastal areas of southern South America and extending north along the west coast to just north of the equator and into the eastern Pacific, consistent with the predicted emergence of weak La Niña, below- or near-normal temperatures are expected."* Our Supplemental Documents package includes the WMO outlook.

Figure 12: WMO Probabilistic Temperature for Nov/Dec/Jan 2024



Source: WMO

Natural Gas: Demonstrations post Frelimo easily winning Mozambique election

Demonstrations post Mozambique election

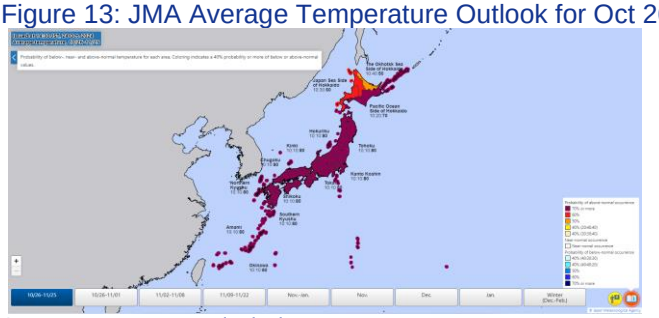
As of our 7am MT news cut off, we haven't seen any report that the demonstrations post the Mozambique election have added violence risk to the LNG areas around TotalEnergies and ExxonMobil. On Thursday, Mozambique's ruling party candidate, Daniel Chapo, was declared as receiving 70.67% of the vole and his ruling party won 195 of the 250 seats in parliament. The ruling part, the Front for the Liberation of Mozambique (Frelimo), have been in charge since Mozambique got its independence from Portugal in 1975. Frelimo has been in power for the 49 years of Mozambique being a country. The existing President is Filipe Nyusi but he couldn't run as he has served his maximum two terms. Daniel Chapo was Frelimo's candidate for President. But even though Frelimo won by a big margin, it is worth keeping Mozambique on a watch given the demonstrations following the election that have see over 10 killed, dozens injured and over 500 people arrested. The demonstrations haven't been around the LNG areas.

Natural Gas: Japan expects warmer than normal temps for first 3 weeks of November

JMA temperature forecast for the next 30 days

It was a hot summer in Japan and the warmer than normal temperatures are continuing through to October and are expected to continue through the first three weeks of November. On Thursday, the Japan Meteorological Agency updated its forecast for the next 30 days, Oct 26 thru Nov 25, in Japan [LINK]. There is no JMA commentary on the forecast. JMA is calling for above normal temperatures for the end of October and for the first three weeks of November. There is a +70% probability of above normal temperature occurrence everywhere except the Japan Sea Side of Hokkaido which has a 60% probability of above normal temperature occurrence, and the Okhotsk Sea Side of Hokkaido which has a 50% probability of above normal temperature occurrence. We checked AccuWeather for Tokyo and, for the first 3-weeks of November, there are forecasted daily highs in the 18-21C range and overnight lows from 11-13C. This will be pleasant daytime weather but potentially a little bit of electricity heating demand at night. Below is the JMA temperature forecast for the next 30 days.

Figure 13: JMA Average Temperature Outlook for Oct 26– Nov 25



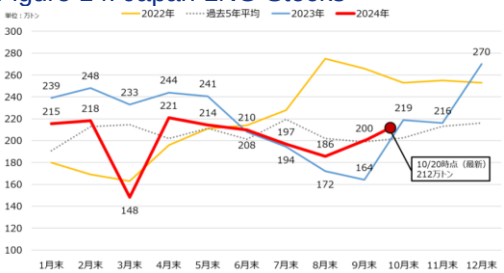
Source: Japan Meteorological Agency

Natural Gas: Japan LNG stocks up WoW, down YoY, and up compared to 5-yr average

Japan LNG stocks up WoW

It's been a warm fall in Japan, which means no real weather driven electricity demand. Japan's LNG stocks are up WoW, are down YoY, and are up when compared to the 5-year average. On Wednesdays, Japan's METI releases its weekly LNG stocks data [LINK]. LNG stocks on October 20 were 10.2 bcf, up +1.9% WoW from October 13 of 99.9 bcf, and down -3.2% from 105.2 bcf from a year ago. Stocks are up compared to the 5-year average of 97.0 bcf. Below is the Japanese LNG stocks graph from the METI weekly report.

Figure 14: Japan LNG Stocks



Source: METI

Natural Gas: Russia continues to ship NatGas despite Ukraine control of Sudzha

Ukraine captures key Russian gas infrastructure

It's now been almost three months since Ukraine invaded the Russian region of Kursk and took over control of the Sudzha natural gas intake station in Russia for transport on the last remaining open natural gas intake station in Russia for transport on the last remaining open natural gas pipeline allowed to export Russian natural gas to central European countries. Europe TTF gas prices were up 5% when Ukraine took over Sudzha on fears of supply interruption. However, since then Gazprom has confirmed almost daily, if not daily, that there has been no interruption in natural gas supplies. The latest confirmation we saw the Bloomberg Oct 25 report that Gazprom continues to ship the same volume of natural gas of 1.50 bcf/d via Sudzha. That shouldn't surprise because if Gazprom stops natural gas from entering the pipeline at Sudzha, they will be forsaking any export natural gas revenues and Russia needs every dollar it can get. And, at the same time, Ukraine continues to take the transit fees revenue. So, for now at least, it looks like a reminder from Ukraine to Russia that they can cut off Russian natural gas at any time. Below is a 2018 map from Oxford Institute for Energy Studies showing Sudzha.

Figure 15: The Ukrainian pipeline system

Source: Oxford Institute for Energy Studies

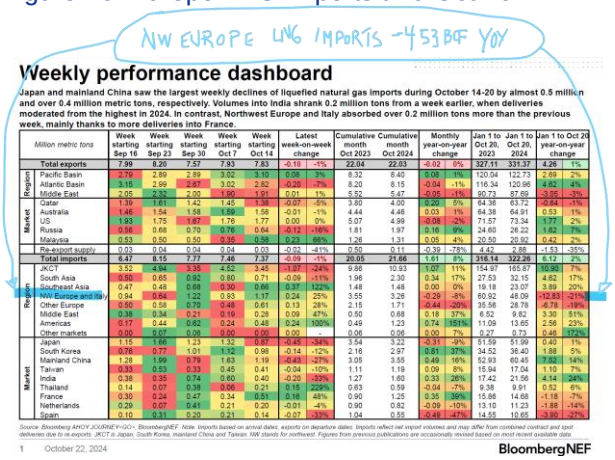
Natural Gas: NW Europe LNG imports down big YoY, down ~453 bcf, 1.54 bcf/d YTD

Europe LNG imports down big in 2024

Yesterday, we tweeted [LINK] "*NW Europe #LNG imports +1.2 bcf/d WoW to 5.90 bcf/d in Oct 14-20 week. Storage would be full if NW EU hadn't cut back LNG imports in Q2/Q3. YTD Oct 20, NW EU #LNG imports down ~453 bcf or ~1.54 bcfd YoY to 5.78 bcfd.If not for Israel/Iran risk, EU #NatGas prices would be lower going into winter.Thx @BloombergNEF #OOTT.*" The LNG market story is also the risk to LNG market if an Israel/Iran escalates impacts LNG and oil tanker traffic thru the Straight of Hormuz or Israel's Mediterranean Sea natural gas production was impacted. But, if not for this escalation risk, we have been highlighting that there is a big holdback to Europe natural gas prices; that being, Europe's gas storage would be way worse if it hadn't significantly reduced LNG imports over Q2 and Q3 due to the possibility of storage being full early. LNG imports into NW Europe are down big YoY in 2024. On Tuesday, BloombergNEF posted its LNG Trade Weekly. BloombergNEF estimates NW Europe LNG imports were up 1.2 bcf/d WoW to 5.90 bcf/d for the Oct 14-20-week. But following last week's increase in WoW imports, NW Europe LNG imports that are

still down -453 bcf or -1.54 bcf/d YTD Oct 20. Our tweet included the below BloombergNEF chart.

Figure 16: Europe LNG Imports thru Oct 20



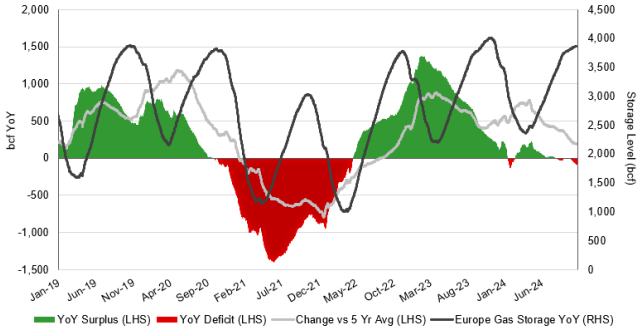
Source: BloombergNEF

Natural Gas: Europe storage up +0.1% WoW to 95.2% full, down -3.4% YoY

Europe gas storage

As noted above, Europe gas storage would be effectively full if they hadn't cut back on LNG imports in Q2 and Q3. We have been highlighting that a big LNG theme in Q2 and Q3 was how NW Europe reduced LNG imports because storage was very high YoY leaving winter 2023/24. Europe gas storage is now 95.2% full. We remind that we don't necessarily expect Europe gas to get to 100% full. It's not like going to a gas station where you fill up your car to the limit. Rather, getting to mid 90%'s would be considered full. This week, Europe storage was up +0.1% WoW to 95.2% vs 95.1% on October 17. Storage is now down -3.4% from last year's levels of 98.7% on October 24, 2023, but up huge against the 5-year average of 92.0%. Below is our graph of European Gas Storage Level.

Figure 17: European Gas Storage Level



Source: Bloomberg, SAF

Ukraine storage is currently ~8% of total Europe gas storage volume

We have been breaking out Ukraine gas storage levels since the Mar/Apr Russian

bombing of the Ukraine natural gas storage, which only impacted some above ground natural gas infrastructure. But it also reminded that of the risk to Europe gas storage from Russia attacks. We broke out the Ukraine storage data from the above Europe data we monitor weekly from the GIE AGSI website [LINK], and, on October 16, natural gas in Ukraine storage was at 27.2% of its total capacity, up from 27.1% of its total capacity on October 16. Last year, Ukraine storage started the winter on Nov 1, 2023, at 39.38%. Right now, Ukraine makes up ~8% of Europe's natural gas in storage and, at the beginning of winter 2023/24, it was ~10% of Europe's natural gas in storage. Below is a map of Ukraine's major gas storage facilities.

Figure 18: Ukraine Gas Storage Facilities as of June 2023

Source: Bloomberg

Oil: U.S. oil rigs down -2 WoW and down -24 rigs YoY to 480 oil rigs

US oil rigs down -2 YoY

On Friday, Baker Hughes released its weekly North American drilling rig data. (i) Note Baker Hughes no longer breaks out the basin changes by oil vs gas rig type. (ii) Total U.S. oil rigs were -2 rigs WoW to 480 oil rigs as of October 25. US oil rigs are now only down -24 oil rigs YoY. The smaller YoY difference is because, in 2023, US oil rigs went below 520 rigs on Aug 25, 2023 and then were lower in the 490-510 rigs for several months. But then dropped down to 477 on July 19, 2024, which was the lowest oil rig count since December 2021. (iii) Note we can see the basin changes but not by type of rig; the WoW basin changes were Cana Woodford down -1 rig WoW to 20 rigs, and Marcellus down -1 rig WoW to 22 rigs. (iv) The overlooked U.S. rig theme is the YoY declines, which have begun to taper as Q4 2023 saw activity leveling off. Total U.S. gas and oil rigs are down -40 rigs YoY to 581 rigs including US oil rigs -24 oil rigs YoY to 480 oil rigs. And for the key basins, the Permian is -9 rigs YoY, Haynesville is -6 rigs YoY, DJ Niobrara is -6 rigs YoY, Marcellus -7 rigs YoY, Williston up +1 rig YoY, Arkoma Woodford up +2 YoY, and Cana Woodford +6 rigs YoY. (v) US gas rigs were up +2 rigs this week to 101 gas rigs. It is important to note that U.S. gas rigs must increase over the next several months as more U.S. LNG capacity comes onstream in 2025. Lastly, U.S. miscellaneous rigs are flat WoW, and flat YoY.

Figure 19: Baker Hughes Total US Oil Rigs

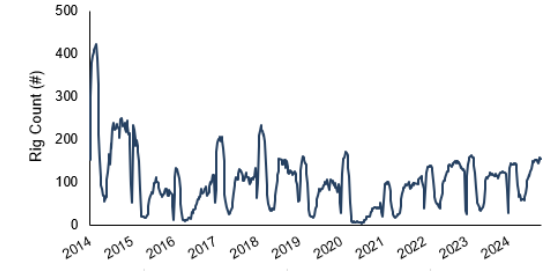
Source: Baker Hughes

Oil: Total Cdn oil rigs down -1 WoW on Friday, with gas rigs +2 WoW

Cdn rigs -1 WoW

On Friday, Baker Hughes released its weekly North American drilling rig data. This week's total oil and gas rig count was down -1 rig WoW from 217 rigs on October 18. Every year, Canadian rigs typically increase until mid-October, where they remain relatively flat until late November when they begin ramping up until the end of December. This week is on par with that theme, as we have seen ups and downs prior to kicking off the December ramp up. Cdn oil rigs were down -3 rigs WoW this week to 150 rigs and are up +28 rigs YoY. Gas rigs are up +2 rigs WoW to 66 rigs and are down -8 rigs YoY, and miscellaneous rigs are flat WoW and YoY at 0 rigs total. As a reminder Baker Hughes changed their reporting format which does not allow us to see the provincial breakouts.

Figure 20: Baker Hughes Total Cdn Oil Rigs



Source: Baker Hughes

Oil: US weekly oil production flat WoW at 13.500 mmb/d

US weekly oil production

We don't place as much emphasis on the EIA weekly oil supply estimates as others do because we recognize the near impossibility for anyone to post an accurate estimate on a Wednesday for the totality of US oil production for the week ended the prior Friday [LINK]. We have to give the EIA credit for putting out weekly oil supply estimates for the prior week. That can't be easy so no one should be surprised that the EIA weekly oil supply estimates, based on the Form 914 actuals, will regularly require re-benchmarking; sometimes the re-benchmarking can be significant and other times, it is relatively small. The EIA's weekly oil supply estimates had been essentially unchanged for the last nine months ranging from 13.100 to 13.300 mmb/d with the weekly estimates in July all at 13.300 mmb/d. This week's estimate came is slightly above the previous range, flat WoW at 13.500 mmb/d for the week ending October 18. On Tuesday October 8, the EIA released its October STEO and the EIA provides the backup monthly estimates for US oil production, and they are more or less in

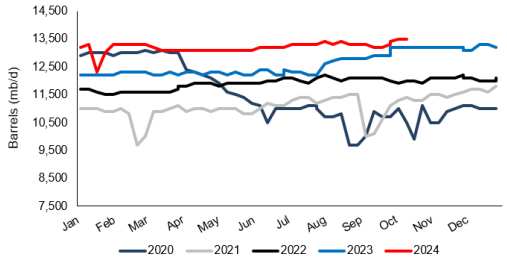
line with July at 13.200 mmb/d, August at 13.360 mmb/d, and September at 13.250 mmb/d. This week, the EIA's production estimates were flat WoW at 13.500 mmb/d for the week ended October 18. Alaska was down -0.005 WoW to 0.426 mmb/d, compared to 0.431 mmb/d last week. Below is a table of the EIA's weekly oil production estimates.

Figure 21: EIA's Estimated Weekly US Field Oil Production (mb/d)

	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
2023 Jan	01/06	12,200	01/13	12,200	01/20	12,200	01/27	12,200		
2023 Feb	02/03	12,300	02/10	12,300	02/17	12,300	02/24	12,300		
2023 Mar	03/03	12,200	03/10	12,200	03/17	12,300	03/24	12,200	03/31	12,200
2023 Apr	04/07	12,300	04/14	12,300	04/21	12,200	04/28	12,300		
2023 May	05/05	12,300	05/12	12,200	05/19	12,300	05/26	12,200		
2023 Jun	06/02	12,400	06/09	12,400	06/16	12,200	06/23	12,200	06/30	12,400
2023 Jul	07/07	12,300	07/14	12,300	07/21	12,200	07/28	12,200		
2023 Aug	08/04	12,600	08/11	12,700	08/18	12,800	08/25	12,800		
2023 Sep	09/01	12,800	09/08	12,900	09/15	12,900	09/22	12,900	09/29	12,900
2023 Oct	10/06	13,200	10/13	13,200	10/20	13,200	10/27	13,200		
2023 Nov	11/03	13,200	11/10	13,200	11/17	13,200	11/24	13,200		
2023 Dec	12/01	13,100	12/08	13,100	12/15	13,300	12/22	13,300	12/29	13,200
2024 Jan	01/05	13,200	01/12	13,300	01/19	12,300	01/26	13,000		
2024 Feb	02/02	13,300	02/09	13,300	02/16	13,300	02/23	13,300		
2024 Mar	03/01	13,200	03/08	13,100	03/15	13,100	03/22	13,100	03/29	13,100
2024 Apr	04/05	13,100	04/12	13,100	04/19	13,100	04/26	13,100		
2024 May	05/03	13,100	05/10	13,100	05/17	13,100	05/24	13,100	05/31	13,100
2024 Jun	06/07	13,200	06/14	13,200	06/21	13,200	06/28	13,200		
2024 Jul	07/05	13,300	07/12	13,300	07/19	13,300	07/26	13,300		
2024 Aug	08/02	13,400	08/09	13,300	08/16	13,400	08/23	13,300	08/30	13,300
2024 Sep	09/06	13,300	09/13	13,200	09/20	13,200	09/27	13,300		
2024 Oct	10/04	13,400	10/11	13,500	10/18	13,500				

Source: EIA

Figure 22: EIA's Estimated Weekly US Oil Production



Source: EIA

Oil: Nabers: more 4-mile wells are being drilled in multiple plays

4-mile horizontal wells

We continue to see indications that support increased well efficiency on US shale/tight plays. What we don't know is how the increased well efficiency translates into impact on the mid and long term growth potential for US shale/tight plays ie. how much sustainable growth is added. For example, drilling 3-mile and 4-mile wells may provide an economic lift to drill Tier 2 and 3 lands but we would assume those wells will have a higher decline rate. But longer wells should open up more shale/tight rock for economic drilling. On Tuesday, Nabors held its Q3 call and we tweeted [LINK] "*Longer horizontal wells = higher IRRs on shale/tight plays especially on Tier 2 or 3 rock.Nabors Q3: Drilled 4-mile horizontals in Permian, Eagle Ford & Bakken. Lower 48 rigs down marginally QoQ in Q3, to be flat in Q4 & should be up in 2025. Q3 call 10am MT #OOTT."* Baker Hughes wrote "*Lower 48 rigs once again set notable performance milestones. A major operator in the Delaware Basin drilled three wells, each with four-mile laterals, utilizing a Nabors PACE®-X rig equipped with a Canrig® Sigma*

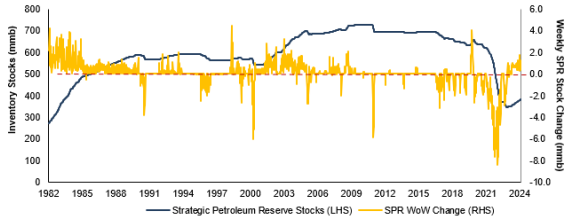
topdrive. Sigma's rated torque is the industry's highest and is ideal for the larger-diameter drill pipe run on these wells. The rig also employed an NDS technology package. A large operator in the Eagle Ford drilled its longest well in the basin, incorporating a lateral length of more than four miles. The lateral was drilled in a single run without the use of rotary steerable systems. The rig was a Nabors PACE®-M1000, utilizing larger-diameter drill pipe.
A large operator in the Bakken completed a four-mile lateral in a single run in under 12 days, utilizing a Nabors PACE®-X rig. This well is the operator's first four-mile lateral, and the operator believes it is the quickest in the Bakken. The rig was equipped with a comprehensive package of NDS Smart technology"

US SPR reserves

Oil: US SPR less commercial reserve deficit widens, now -41.382 mmb

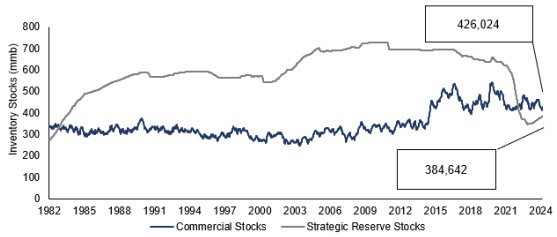
The US Strategic Petroleum Reserves (SPR) continues to be much lower than total US commercial crude oil reserves. The SPR went back below commercial for the first time since 1983 in the Sep 16, 2022, week. This week, we saw a build on the SPR side as well as a build on the commercial side. The EIA's weekly oil data for October 18, [LINK] saw the SPR reserves increase +0.760 mmb WoW to 384.642 mmb, while commercial crude oil reserves increased +5.474 mmb to 426.024 mmb. There is now a -41.382 mmb difference between SPR reserves and commercial crude oil reserves. The below graphs highlight the difference between commercial and SPR stockpiles, along with the weekly changes to SPR stockpiles.

Figure 23: Strategic Petroleum Reserve Stocks and SPR WoW Change



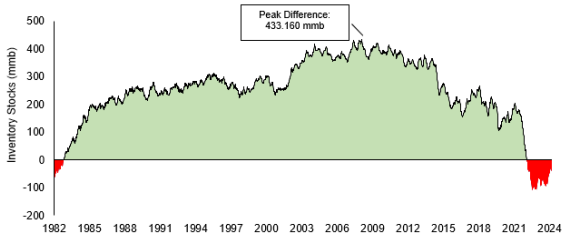
Source: EIA

Figure 24: US Oil Inventories: Commercial & SPR



Source: EIA

Figure 25: US Oil Inventories: SPR Less Commercial



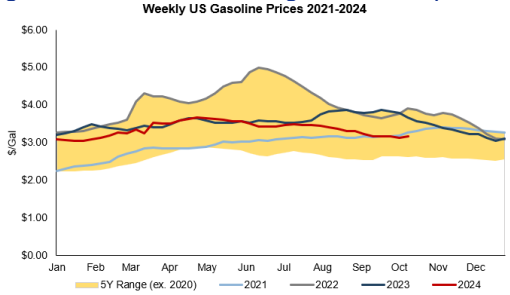
Source: EIA

Oil: AAA reports US national average gasoline price -$0.04 WoW to $3.14 on Oct 26

US gasoline prices

Yesterday, we tweeted [LINK] "*AAA National average prices +$0.04 WoW to $3.14 on Oct 26, -$0.08 MoM & -$0.39 YoY. US election is Nov 5. National average prices were ~$3.80 at time of 2022 mid-terms. Florida average prices +$0.07 WoW after not really increasing post Helene & Milton. Thx @AAAnews #OOTT."* Yesterday, AAA reported that US national average prices were $3.14 on Oct 26, which was -$0.04 WoW, -$0.08 MoM, and -$0.39 YoY. Yesterday, AAA also reported California average gasoline prices were $4.60 on Oct 26, which was -$0.05 WoW, -$0.12 MoM and -$0.76 YoY. Florida gasoline prices didn't really move up in in the first couple weeks following Hurricanes Helene and Milton. But this week, Florida average gasoline prices were +$0.07 WoW. Yesterday, AAA reported Florida average gasoline prices were $3.16 on Oct 26, which was +$0.07 WoW, -$0.02 MoM and -$0.16 YoY. Note Helene hit on Sept 26 and the MoM comparisons are to Sept 19. Below is our graph of Bloomberg's National Average weekly gasoline prices.

Figure 26: National Average Gasoline prices



Source: Bloomberg

Oil: Crack spreads -$0.01 WoW to $16.91, WTI +$2.56 WoW to $71.78

Crack spreads closed at $16.91

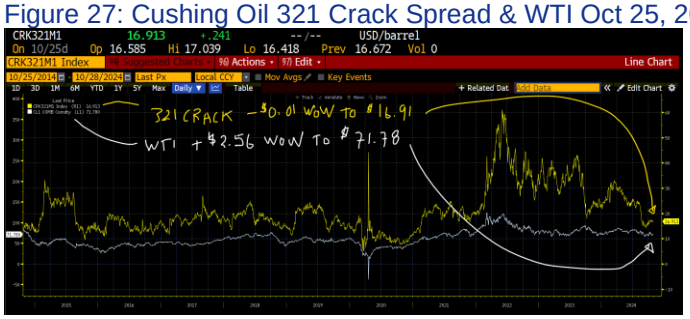
On Friday, we tweeted [LINK] "*321 crack spreads -$0.01 WoW to $16.91. WTI +$2.56 WoW to $71.78. WTI's +$2.56 with crack spreads flat reinforces WTI is impacted more by global markets than by crack spreads. Note the WTI is prior to the breaking news just now Israel started retaliatory attack on Iran. Thx @business. #OOTT."* Cracks spreads were -$0.01 WoW to $16.91 and WTI was +$2.56 WoW to $71.78. Our tweet highlighted how WTI is more impacted by global events than crack spreads, whether it be WTI underperforming or, in this week's case, outperforming crack spreads. Please note that WTI at $71.78 is the market close as of Friday afternoon and prior to Israel's retaliatory attack on Iran on Friday around

dinner time in North America. Over the past month, WTI has been driven more, both up and down, by China economy views in response to the stimulus and Israel/Iran risk. Our tweet a week ago on Oct 18 note that WTI seemed to have given up the premium for those factors. Crack spreads at $16.91 are in line with the middle of the pre-Covid $15-$20 range, and generally not high enough to incentivize refineries to take any more crude than necessary. Crack spreads of $16.91 on Oct 25, followed $16.92 on Oct 18, $17.42 on Oct 11, $16.65 on Oct 4, $15.82 on Sept 27, $15.57 on Sept 20, $14.30 on Sept 13, $14.79 on Sept 6, $17.06 on Aug 30, $17.10 on Aug 23, $20.75 on Aug 16, $22.92 on Aug 9, $23.77 on Aug 2, and $24.91 on July 26.

Crack spreads normally point to near term oil moves, explaining 321 cracks

Thie last four weeks are a good example that global oil and market items impact WTI more than crack spreads. As noted above, WTI as of the Friday close and before the Israel retaliatory attack on Iran on Friday night, was +$2.56 WoW when crack spreads were essentially flat is a good example of global oil items impacting WTI more than crack spreads. But, broad market factors aside, we have focused on crack spreads for since the 90s as they are an unchanged fundamental of refineries – wide/high crack spreads provide incentives for refineries to buy more crude because there are big profit margins to be made. We track US crack spreads but there is also an influence on global refining capacity on US crack spreads as the increasing global refining capacity has also tended to have downward pressure on US crack spreads especially with demand being less than most expect. Plus, this year, as noted below, we have less US refinery turnarounds to there is less refinery capacity offline this fall than prior years. So if crack spreads are wide/high, it is normally a positive for the very near term look ahead to WTI. Conversely, if crack spreads are narrow/low, it doesn't give refineries any real incentive to take more crude, which is normally softness for the very near term look ahead to WTI. People often just say "cracks", which refers to the 321 crack spread. This is the spread or margin that refiners make from buying crude at a certain price and then selling the finished petroleum products at their respective prices. The 321 crack spread is meant to represent what a typical US refinery produces. It assumes that for every three barrels of crude oil, the refinery will produce two barrels of gasoline and one barrel of distillates. So the crack spread is based on that formula and worked back to a crack spread per barrel. Below is the current 321 crack spread vs WTI that we put in our tweet where we marked the gaps where the crack spread normally drags up oil prices. 321 Crack spread closed at $16.91 on Friday Oct 25.

Figure 27: Cushing Oil 321 Crack Spread & WTI Oct 25, 2014 to Oct 25, 2024



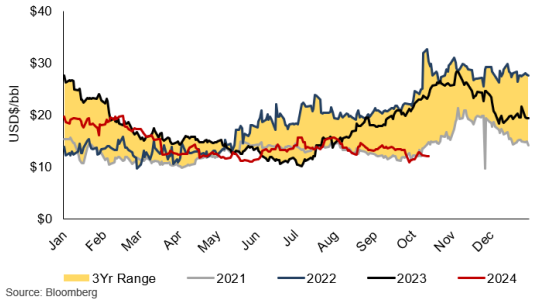
Source: Bloomberg

Oil: Cdn heavy oil differential narrows -$0.85 WoW to close at $11.90 on Oct 25

WCS differential narrows

WCS less WTI differentials narrowed this week -$0.85 WoW to close at $11.90 on October 25. As noted in the following item, we have been saying that the real test for WCS less WTI differentials will be in Sept/Oct as to how much the startup of the 590,000 b/d TMX expansion will impact WCS less WTI differentials. And it looks like TMX is working as hoped, if not better, in keeping WCS less WTI differentials way lower than would be expected at this time of year. The end of August/beginning of September is when we normally see a widening of the WCS less WTI differentials. And WCS less WTI differentials has remained much lower and has not really widened this fall. But even with the TMX startup, there will always be the unexpected impact on WCS less WTI differentials from other items like refineries up and downs, wildfires, etc. Below is graph showing WCS-WTI differentials that shows this normal seasonal trend of narrowing WCS-WTI differentials that normally widens into or through October. The WCS less WTI differential closed on October 25 at $11.90 which was a narrowing of -$0.85 WoW vs $12.75 on October 18.

Figure 28: WCS less WTI oil differentials to October 25 close



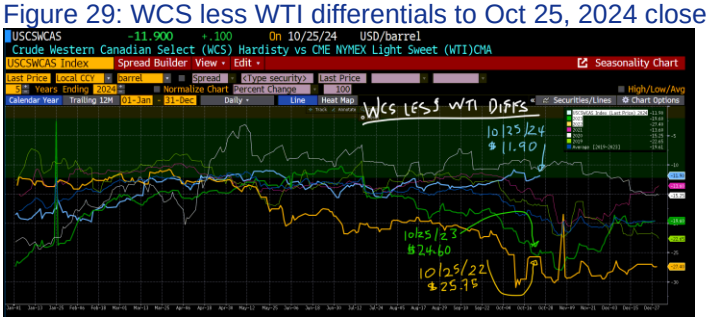
Source: Bloomberg

TMX impact: WCS less WTI diffs not seasonally widening as in 2022 & 2023

It looks like TMX is having, at least so far, the expected big impact of keeping WCS less WTI differentials a lot narrower than what is normally seen in the normal seasonal widening in Sept/Oct. WCS less WTI differentials are approx. $10 narrower vs a year ago and approx. $13 narrower than two years ago. That is a big win for Cdn oil producers. For the past few months, we have been saying that the big test

for the impact of the start of the 590,000 b/d TMX expansion on WCS less WTI differentials will be in late Aug, Sept and Oct when differentials normally start to widen with seasonal refinery turnarounds. On Friday, we tweeted [LINK] "*Continued positive to Cdn #Oil in H2/24. Looks like ramp up of volumes on new 590,000 b/d TMX has, at least so far, kept WCS less WTI differentials from the normal Sept/Oct widening. WCS less WTI diffs: 10/18/24: $12.75. 10/18/23: $23.00. 10/18/22: $26.10, Thx @garquake #OOTT."* Our tweet included the below chart that shows how WCS less WTI differential have been stronger this summer, been fairly flat in Aug/Sept/Oct and how differentials were widening at this time of year in 2022 and 2023.

Figure 29: WCS less WTI differentials to Oct 25, 2024 close



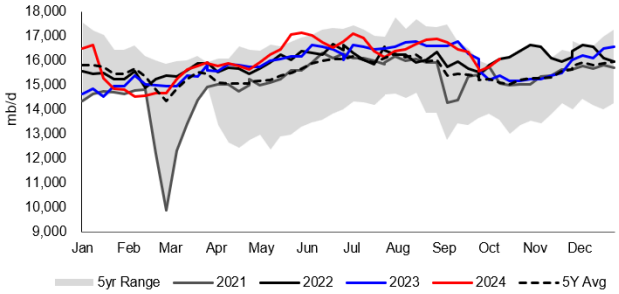
Source: Bloomberg

Oil: Refinery Inputs up +0.329 mmb/d WoW to 16.084 mmb/d

Refinery inputs +0.329 mmb/d WoW

There are always unplanned refinery items that impact crude oil inputs into refineries. And there is always different timing for refinery turnarounds; generally late October is when refineries have come out of fall turnarounds and are ramping up crude oil inputs as they change from summer to winter fuel blends. However, as noted in our Sept 22, 2024 Energy Tidbits memo, US refinery maintenance is expected to be less this year, which means that, on average, turnarounds will be shorter than normal i.e. less extra maintenance. Although there are more refineries available to receive crude, we may see refineries reduce runs given the low crack spreads. On Wednesday, the EIA released its estimated crude oil input to refinery data for the week ended October 18 [LINK]. The EIA reported crude inputs to refineries were up +0.329 mmb/d this week to 16.084 mmb/d and are up +0.894 mmb/d YoY. Refinery utilization was up +1.8% WoW to 89.5% and was up +3.9% YoY.

Figure 30: US Refinery Crude Oil Inputs

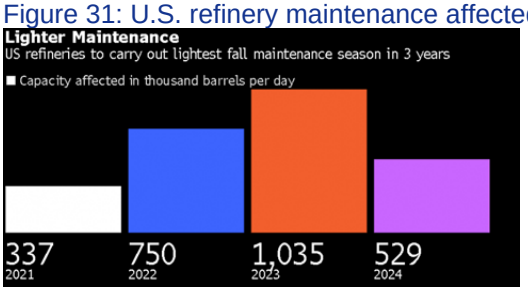


Source: EIA, SAF

US refinery preventative maintenance in fall 2024 was less YoY

US refinery crude oil inputs continue to be at or near the high of the 5-year range. Here is what we wrote in September 22, 2024, Energy Tidbits memo. "*On Thursday, Bloomberg posted a good reminder that US refineries are expected to have a light preventative maintenance season this fall according to IIR Energy data. Note they focused on "preventative maintenance" and didn't use the word turnarounds. Refineries have turnarounds to allow the refinery to switch from summer blend to winter blend fuel mix. Normally refineries schedule preventative maintenance at the same time as a turnaround. If preventative maintenance is less than normal, it means that the downtime for refineries will be less. They forecast that only 0.529 mmb/d of crude-processing capability is estimated to go offline during the fall, which is -0.506 mmb/d less than the fall of 2023, which saw 1.035 mmb/d go offline during the same period. However, this fall's capacity reduction of 0.529 mmb/d, is still +0.192 mmb/d when compared to the fall 2021 capacity that went offline of 0.337 mmb/d. If 321 crack spreads were high, we would expect to see the refineries run at high utilization rates to make the big profits. But with 321 crack spreads low, we would expect refineries to not run at high utilizations rates. Below is the Bloomberg chart.*"

Figure 31: U.S. refinery maintenance affected capacity



Source: Bloomberg, IIR Energy

Oil: US net oil imports up +0.913 mmb/d WoW as oil exports down -0.011 mmb/d

US net imports up +0.913 mmb/d WoW

The EIA reported US "NET" imports were up +0.913 mmb/d to 2.319 mmb/d for the week of October 18. US imports were up +0.902 mmb/d to 6.431 mmb/d, while exports were down -0.011 mmb/d to 4.112 mmb/d. Top 10 were up +0.640 mmb/d. (i) Previously we have noted that the EIA did not report weekly Venezuela imports, however, this month the EIA resumed reporting imports from Venezuela. Give the EIA credit for putting out weekly oil import estimates, but it's a reminder that we must be careful about using the weekly oil import estimates. Rather we need to make sure we go to the monthly data for oil imports. (ii) Canada was up +0.182 mmb/d to 3.719 mmb/d, which is likely due to seasonal US Midwest refinery turnarounds ending. Weekly imports have been higher of late with the increased Cdn crude coming off TMX and hitting west coast US refineries. (iii) Saudi Arabia was down -0.164 mmb/d to 0.150 mmb/d (iv) Mexico was down -0.148 mmb/d to 0.258 mmb/d. Oil imports from Mexico lately have been significantly lower than prior year's levels with the new Olmeca (Dos Bocas) refinery ramping up and Pemex's other refineries increasing crude oil processing. (v) Colombia was up +0.142 mmb/d to 0.365 mmb/d. (v) Iraq was up +0.167

mmb/d to 0.237 mmb/d. (vi) Ecuador was up +0.103 mmb/d to 0.138 mmb/d. (vii) Nigeria was down -0.009 mmb/d to 0.125 mmb/d. (iix) Venezuela was up +0.155 mmb/d to 0.289 mmb/d.

Figure 32: US Weekly Preliminary Imports by Major Country

	Aug 30/24	Sep 6/24	Sep 13/24	Sep 20/24	Sep 27/24	Oct 4/24	Oct 11/24	Oct 18/24	WoW
Canada	3,516	4,026	4,155	3,912	3,799	3,499	3,537	3,719	182
Saudi Arabia	204	326	210	291	145	285	314	150	-164
Venezuela	0	0	0	0	297	315	134	289	155
Mexico	374	510	420	499	448	382	406	258	-148
Colombia	179	229	121	295	347	149	223	365	142
Iraq	201	222	155	265	152	241	70	237	167
Ecuador	104	103	54	4	253	228	35	138	103
Nigeria	32	175	264	135	84	44	134	125	-9
Brazil	180	113	306	0	186	134	154	285	131
Libya	86	83	0	0	77	28	0	81	81
Top 10	4,876	5,787	5,685	5,401	5,788	5,305	5,007	5,647	640
Others	916	1,080	637	1,055	840	934	522	784	262
Total US	**5,792**	**6,867**	**6,322**	**6,456**	**6,628**	**6,239**	**5,529**	**6,431**	**902**

Source: EIA, SAF

Oil: Mexico oil production according to CNH down MoM to 1.561 mmb/d

CNH September oil production

This week, Mexico's National Commission of Hydrocarbons posted its natural gas production data for September [LINK]. The commission reported September oil production was 1.561 mmb/d, which was down -6.3% YoY and down -0.6% MoM from 1.570 mmb/d in August. Mexico oil production has been stuck below 1.7 mmb/d for the last three years. Pemex has been unable to grow Mexico oil production, which means that any increase in Pemex Mexico refineries crude oil input will result in less Mexico oil for export including to the US Gulf Coast. And it also means that if Mexico has refinery issues in a month, there will be more Mexico oil for export in a month. Below is our table tracking Pemex oil production.

Figure 33: Pemex (Incl Partners) Mexico Oil Production

Oil Production (thousand b/d)	2016	2017	2018	2019	2020	2021	2022	2023	2024	24/23
Jan	2,259	2,020	1,909	1,623	1,724	1,651	1,649	1,647	1,602	-2.7%
Feb	2,214	2,016	1,876	1,701	1,729	1,669	1,619	1,643	1,597	-2.8%
Mar	2,217	2,018	1,846	1,691	1,745	1,697	1,620	1,655	1,595	-3.6%
Apr	2,177	2,012	1,868	1,675	1,703	1,693	1,586	1,667	1,559	-6.4%
May	2,174	2,020	1,850	1,663	1,633	1,688	1,588	1,677	1,564	-6.7%
June	2,178	2,008	1,828	1,671	1,605	1,698	1,570	1,675	1,571	-6.2%
July	2,157	1,986	1,823	1,671	1,595	1,701	1,583	1,642	1,565	-4.7%
Aug	2,144	1,930	1,798	1,683	1,632	1,657	1,604	1,673	1,570	-6.2%
Sept	2,113	1,730	1,808	1,705	1,643	1,709	1,594	1,665	1,561	-6.3%
Oct	2,103	1,902	1,747	1,655	1,627	1,692	1,592	1,639		
Nov	2,072	1,867	1,697	1,696	1,633	1,691	1,582	1,630		
Dec	2,035	1,873	1,710	1,706	1,650	1,694	1,561	1,625		

Source: Pemex, SAF

Oil: Look for Pemex Mexico oil production to decline in H1/25

Look for Mexico oil production to decline

Here is what we wrote in last week's (Oct 20, 2024) Energy Tidbits memo on why we expect Pemex Mexico oil production to decline in 2025. "*On Thursday, we tweeted [LINK] "Look for Pemex Mexico #Oil production to decline in H1/25. Must read 👇@edgarsigler thread. New E&P head to cut 20% or $1.38b from Q4 capex incl some level of well maintenance capex. Pemex reportedly thinks only hit production by ~6,000 b/d on 1.73 mmb/d in Aug. Any level of cut to capex to maintain well production on a 1.73 mmb/d has to hit by way more than 6,000 b/d. Thx @edgarsigler @ArgusMedia." The Edgar Sigler (Argus media) thread was based on an internal Pemex document that outlined the new E&P head was making a 20% or $1.38b*

cut to Pemex Q4/24 capex. Argus did not have the split by category but highlighted the cuts included item such as "major well repairs". If this is right and there is any cut to Pemex's well maintenance capex, then we think we should expect Pemex oil production to decline in H1/25. Well maintenance capex is the first priority for any E&P company. It is the capex to maintain existing production base. So if you cut capex that is to maintain production, then it is inevitable that production will decline. The Pemex document reportedly says impact on production is only 6,000 b/d on its current production of 1.73 mmb/d. We have trouble believing cutting any well maintenance capex wouldn't have a much larger impact on production given Pemex has been working hard to try to get production flat or growing small. We don't know the capex so it's hard to estimate the near term impact but our guess would be ~100,000 b/d. Our Supplemental Documents package includes the Argus report. [LINK]"

Fits new Mexico President Sheinbaum plan to limit oil production to 1.8 mmb/d

The new Pemex President Victor Rodriguez Padilla's bio says he is a40-yr oil and gas engineer so he must understand the basics of decline rates and that cutting well maintenance capex has to impact production. It's not like he doesn't know. Rather, he is executing a program that is consistent with his boss, the new Mexico President Sheinbaum. We are waiting on details for her new energy plan but in her Oct 1 inaugural address to congress. But she made it clear that Mexico will limit its oil production to 1.8 mmb/d to minimize the impact on the environment. Previously, Mexico had a 3 mmb/d limit. Sheinbaum said "*The fundamental objective of oil production with Pemex will continue to be national consumption and this will be limited to a production of 1.8 million barrels per day. We will promote energy efficiency and the transition to renewable energy sources to absorb the growth in energy demand through these sources. Remember that the energy reform proposed a production of three million barrels per day that is environmentally impossible. It is better to promote efficiency and renewable sources*." Our Supplemental Documents package includes the Sheinbaum Oct 1 address.

Oil: Norway Sept oil production of 1.591 mmb/d is down -10.6% MoM down -5.1% YoY

Norway September oil production

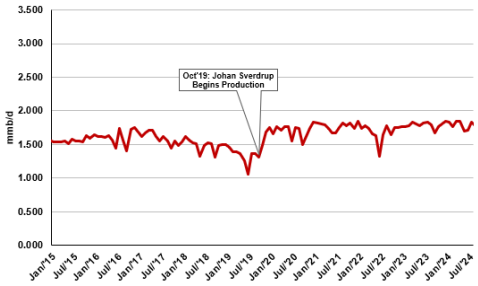
On Monday, the Norwegian Offshore Directorate released it's September production figures [LINK]. It reported oil production of 1.591 mmb/d, down -10.6% from revised August figures of 1.780 mmb/d and down -5.1% YoY from 1.677 mmb/d in September 2023. September's production actuals came in -10.6% (-0.189 mmb/d) over the forecast volumes of 1.780 mmb/d. The NOD does not provide any explanation for any MoM changes so we don't know if the MoM increases are temporary. But, as we have been highlighting since early 2024, Norway oil production is expected to peak in early 2025 with the start of decline at Norway's biggest oilfield, Johan Sverdrup. IN the following item, we note Equinor mgmt confirming their expectation for Johan Sverdrup to start to decline in early 2025. Note that, prior to 2024, the Norwegian Offshore Directorate was called the Norwegian Petroleum Directorate.

Figure 34: Norway September 2024 Production

		Oil mill bbl/day	Sum liquid mill bbl/day	Gas MSm³/day	Total MSm³ o.e/day
Production	**September 2024**	**1.591**	**1.724**	**241.3**	**0.515**
Forecast for	September 2024	1.568	1.730	249.3	0.524
Deviation from forecast		0.023	-0.006	-8	-0.009
Deviation from forecaset in %		1.5 %	-0.3 %	-3.2 %	-1.7 %
Production	August 2024	1.780	2.000	349	0.667
Deviation from	August 2024	-0.189	-0.276	-107.8	-0.152
Deviation in % from	August 2024	-10.6 %	-13.8 %	-30.9 %	-22.8 %
Production	September 2023	1.677	1.853	201.3	0.496
Deviation from	September 2023	-0.086	-0.129	40	0.019
Deviation in % from	September 2023	-5.1 %	-7 %	19.9 %	3.8 %

Source: Norwegian Offshore Directorate

Figure 35: Norway Monthly Oil Production 2015-2024



Source: Norwegian Offshore Directorate

Oil: Equinor, Norway's 755,000 b/d Johan Sverdrup to begin to decline in early 2025

Norway's 755,000 b/d Johan Sverdrup to decline in 2025

Johan Sverdrup is Norway's biggest oilfield and it is currently at ~755,000 b/d, which is approx. half of Norway's total oil production. On Feb 8, 2024, we first tweeted how Aker BP, a partner in Johan Sverdrup, was the first to note that Johan Sverdrup was moving from plateau to decline in late 24/early 25 as water was starting to hit some wells. That view hasn't changed all year. Our view is simple – when a country's giant oilfield that accounts for half of a country's production, it normally means the country's total oil production will start to decline. It is why, since Feb, we have warned that Norway oil production is about to start to decline. On Thursday, Equinor held its Q3 call and it also reminded how the best insights come from the Q&A portion of conference calls. Equinor confirmed that they see the 755,000 b/d Johan Sverdrup oilfield will come off plateau in early 2025, which is the way to say Johan Sverdrup oil production will begin to decline in early 2025. On Thursday, we tweeted [LINK] "*Norway on track for peak #Oil production in 2025 & then decline. @Equinor CEO confirms Norway's 755,000 b/d field "will be on plateau until early 2025" ie. after plateau is decline. Fits 👇08/21, 03/11 & 02/08 tweets, Norway sees its oil production peaking in 2025. #OOTT.*" In the Q&A, mgmt replied "*Your second question, Henri, on Johan Sverdrup. Yes. So far, so good. We see that we are now in a position where we can say that the plateau, we will be on plateau until early 2025. I think it's very important for me to say that we are not surprised at all that we will come off plateau in 2025. It is a function of that we have invested in higher capaciy, the 755,000 barrels per day pushing cash flow and net present value higher. And that leads to that we will get off plateau earlier.*

Norway still forecasts reaching peak oil production in 2025, then declining

Equinor's confirming the 755,000 b/d Johan Sverdrup oilfield will begin to decline in early 2025 is in line with Norway's forecasts that its total country oil production will reach peak oil production in 2025 and then decline. Here is what we wrote in our Aug 25, 2024 Energy Tidbits memo. "*Norway still forecasts reaching peak oil production in 2025, then declining. On Wednesday, Norway posted its "Resource report 2024", which is a report encouraging an increase in exploration. And it starts with their unchanged long-term oil production forecast from March that forecasts Norway' s peak oil production is in 2025 and then decline under current levels of exploration ie. include ongoing new field discoveries. Early Wednesday morning, we tweeted [LINK]: "Norway still forecasts peak #Oil production in 2025 & then decline. EVEN WITH "multiple discoveries are made and brought on stream, accompanied by investments aimed at increasing recovery from existing fields. Despite this, resource growth will not be sufficient to offset the overall gradual decline, due to diminishing production from the major, mature fields." See 👇 03/11/24 & 02/08/24 tweet, can't make up for giant Johan Sverdrup hitting peak oil in six mths. #OOTT" Norway is warning that, even with new discoveries and production enhancement, peak oil supply is in 2025. Norway wrote that even with ""multiple discoveries are made and brought on stream, accompanied by investments aimed at increasing recovery from existing fields. Despite this, resource growth will not be sufficient to offset the overall gradual decline, due to diminishing production from the major, mature fields." Despite this, resource growth will not be sufficient to offset the overall gradual decline, due to diminishing production from the major, mature fields." Norway is highlighting the reality that has been seen in other global basins that have a giant oil field – when the giant oilfield starts to decline, it normally points to decline in a country production. And that is the case in Norway with the giant Joahn Sverdrup expected to start to decline in late 2024 or early 2025. Norway does says that a big increase in exploration and oil and gas spending could lead to some modest growth and push back in oil decline. Our Supplemental Documents package includes excerpts from the Norway resource report."*

Figure 36: Norway forecast long term Norway oil production

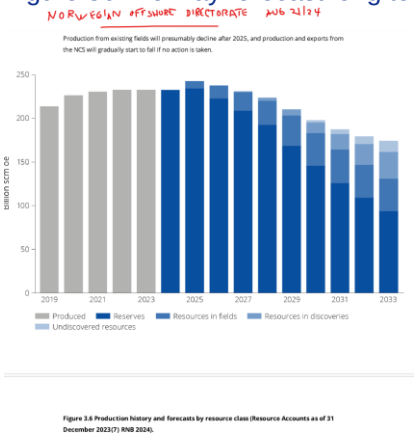


Figure 3.6 Production history and forecasts by resource class (Resource Accounts as of 31 December 2023(?) RNB 2024).

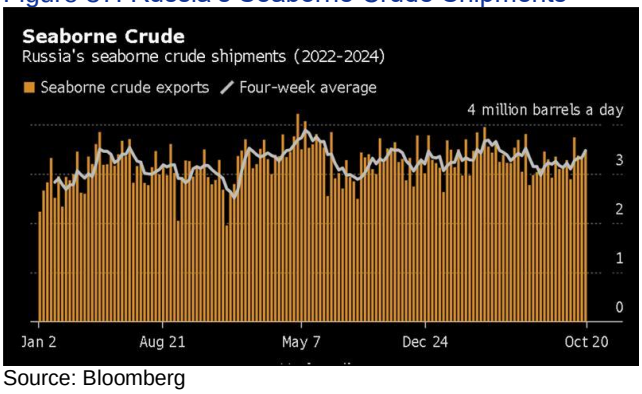
Source: Norwegian Offshore Directorate

Oil: Russia's seaborne crude oil exports rise for fourth week; highest since late June

Russia's seaborne crude exports

This week, the four-week average for Russia's seaborne crude exports rose to the highest figures since late June, marking the fourth week of WoW increases. It's hard to know exactly how much Russian refining capacity is on or off and how much extra oil is freed up for export, however, as seasonal turnarounds and maintenance were up, there has been more oil available for export; in line with the seasonal trend, the beginning of the month saw Russian refining fall to the lowest since mid-March which has allowed for more exports. Generally, when Russian refining capacity gets hit, it allows for more oil for export. The four-week average reached 3.47 mmb/d for the week to October 20. Bloomberg reported "*Four-week average cargoes jumped by 140,000 barrels a day in the week to Oct. 20 to reach 3.47 million. Refining is on course to slump to the lowest since May 2022, leaving more crude available for export*". Russia made significant output cuts in May, June, and July; however they were still slightly above their promised targets. Notably, in last OPEC JMMC, the committee confirmed the cooperation of Russia in complying with these cuts going forward. Our Supplemental Documents package includes the Bloomberg report.

Figure 37: Russia's Seaborne Crude Shipments



Source: Bloomberg

Russia oil exports to China flat compared to April levels

It's been about five months where Russia's oil exports to China have been down. Russia oil shipments to China averaged 1.360 mmb/d for the first half of April. But they were down thereafter with the reports that Russia had cut its discounts to China, meaning China was taking less Russian oil. Bloomberg's above report this week highlighted the four-week average of Russia oil shipments to China were up +0.120 mmb/d to 1.360 mmb/d for the week ending October 20, 2024, up from last week's 1.240 mmb/d for the week of October 13, 2024. The week up to September 15 was the first figure to come in above 1.300 mmb/d in months. We have not seen any reports of pricing discount, but we have to believe Russia has given some sort of discount to China. We have been highlighting that the warning that China oil imports from Russia were being hit on April 22 by one of our favorite commentators on the Gulf Intelligence Daily Energy Podcasts is Victor Yang, Senior Analyst JLC Network Technology. He is based in China, so we like to hear his on-the-ground views on oil, natural gas and markets in China. Here is what we wrote in our April 28, 2024 Energy

Tidbits memo referencing Yang's comments from our April 22, 2024 tweet [LINK] that included a transcript we made of Yang's comments. "*And for the second quarter, we see a lot of refinery maintenance, is imports will actually come down. And for now, the premium for Russian cargoes have strengthened this year, from -0.5 barrels to -0.3 barrels. And now it's flat to Brent, meaning 0 now. So, this has dampened refiners, particularly independents, interest in Russian crude. Their margins for imported crude, including Russian crude, actually turned negative late last month and the beginning of this month. So, it's now kind of [inaudible] slightly above the breakeven point. So, the interest in this has been dampened too. So, we are not expecting imports to grow much in the second quarter, yes."* Below is the table from Bloomberg's Russia oil exports report this week.

Figure 38: Russian Crude Exports to Asia

Crude Shipments to Asia
Shipments of Russian crude to Asian buyers in million barrels a day

4 weeks ending	China	India	Other	Unknown Asia	Other Unknown	Total
September 15, 2024	1.39	1.67	0.00	0.00	0.00	3.06
September 22, 2024	1.27	1.67	0.00	0.00	0.00	2.94
September 29, 2024	1.40	1.68	0.00	0.03	0.00	3.11
October 6, 2024	1.34	1.72	0.00	0.08	0.00	3.14
October 13, 2024	1.24	1.78	0.00	0.08	0.00	3.09
October 20, 2024	1.36	1.60	0.00	0.16	0.06	3.18

Source: Vessel tracking data compiled by Bloomberg — Bloomberg

Source: Bloomberg

Oil: Russia refinery maintenance ending means less oil exports in Nov

Russia western ports exports expected to fall

On Thursday, Reuters reported that crude exports from Russia's western ports to fall MoM in November as refinery maintenance ends [LINK]. As we approach the end of fall turnarounds and maintenance for refineries, Russian oil exports from western ports are expected to fall -13.0% MoM to 1.95 mmb/d; this is because as more refineries come back online, there will be less crude for export. Reuters reported "*Exports from Russia's western ports of Primorsk, Ust-Luga and Novorossiisk are closely watched by market participants including the Organization of the Petroleum Exporting Countries (OPEC) members because they are the most volatile flows and heavily affected by the domestic refinery intake.*" Another factor to watch out for which may affect refining rates in November, is the weak refinery margins, which if deemed unprofitable will drive further exports.

Oil: Will Israel attack and Iran's response so far send oil down on Monday?

Israel attack

We have a 7am MT news cut off for our memo. So, as of our cut off, it seems like the consensus tone from Israel's attack on Friday night and Iran's comments so far are being received as reducing the risk for a broader regional escalation. Almost all the reporting has Isreal only hitting military and strategic sites and not targeting oil and nuclear facilities, which is being viewed as being in line with Biden's request. All the reporting on Iran is that they are downplaying the attack as having limited impact and not threatening any missile attack retaliation. Unless this interpretation changes over today, it would point to less worry about

an escalation and more likely to be negative to oil prices on the open.

Oil: Israel showed Iran it could hit its oil facilities if it wanted to do so

Israel hits air defense around Iran oil facilities

One key item on the Israel attack on Iran that didn't get as much attention was that Israel's attack also showed Iran that it could hit its oil facilities if it wanted to do so. Israel reportedly hit the Iran air defense systems that protect key oil and petrochemical facilities as wells as its major natural gas fields. This seemed like a clear warning. Late last night, we tweeted [LINK] "*Israel may not have targeted & hit any Iran #Oil #NatGas infra or production. But hitting air defense systems that protect oil & gas is a stark warning that It can take out Iran's oil & gas. See 👇 @ronenbergman @farnazfassihi report. #OOTT"* The NY Times reported "*Israel's attacks on Iran early Saturday destroyed air-defense systems set up to protect several critical oil and petrochemical refineries, as well as systems guarding a large gas field and a major port in southern Iran, according to three Iranian officials and three senior Israeli defense officials. The sites targeted by Israel, according to the officials, included defenses at the sprawling Bandar Imam Khomeini petrochemical complex, in Khuzestan Province; at the major economic port Bandar Imam Khomeini, adjacent to it; and at the Abadan oil refinery. Air-defense systems were also struck in Ilam Province, at the refinery for the gas field, called Tange Bijar, said the officials, one of them with Iran's oil ministry."*

Oil: Iran Supreme Leader first comments seem to support no escalation

Khomenei's first comments on Israel attack

We emphasize that our news cut off is 7am MT, so there will be lots to come on weighing in on Iran Supreme Leader's first comments this morning on the attack. Khomenei's message seemed consistent with Iran downplaying the Israel attack and not pointing to an Iran missile retaliation against Israel. That has been the tweets and headlines so far. We always try to read the Iranian reporting ourselves and not rely on what others highlight. We agree with the headline interpretation. However, there was one Khomenei statement that makes us wonder what Khomenei means. Earlier this morning, we tweeted [LINK] "*Hmmm! Khamenei: Israel attack should "neither be exaggerated nor downplayed", didn't say Iran should hit back, rather up to officials to determine what is in the best interest should be done. What is his warning about? "They (the Israelis) need to understand the power, determination, and innovation of the Iranian nation and its youth". If he is inferring cyber, Israel cyber can hurt Iran #Oil? #OOTT."* We can't help wonder what Khomenei is referring to with respect to this warning on Iranian nation and its youth. The only thing that came to mind was cyber if there is something in the near term. But surely Iran knows Israel could hit Iran's industrial sector, including oil, natural gas and petrochemical facilities in cyber attacks. Or is it simply Khomenei trying to convince older Iranians that Israel is creating a generation of young people who will grow up anti-Israel. Our Supplemental Documents package include the PressTV report attached to our tweet.

Oil: Maersk increases 2024 guidance with "*continuing Red Sea situation*"

Maersk keeps reroute via Cape of Good Hope

It's been a relatively quiet last two weeks for Houthis attacks on ships and tankers in the Red Sea or south of Yemen. But, it will take a lot longer for shipping companies to change their view on security risk to their ships and tankers via the Red Sea. However, the shipping companies are at least winning on the financial side. On Monday, we tweeted [LINK] "*No surprise.Surely no one was surprised by Maersk raising guidance ...."combined with strong container market demand and the continuation of the Red Sea situation." See 👇10/09/24*

tweet on Maersk continuing Red Sea situation continuing into 2025. #OOTT [LINK].”

Hapag-Lloyd increases guidance despite increased costs re Red Sea diversion
On Thursday, Hapag-Lloyd also released that it was increasing its 2024 guidance. [LINK]. It was interesting drafting as it they made it sound like the increased 2024 guidance was despite having to re-route away from the Red Sea to via the Cape of Good Hope. As opposed to Maersk’s above release that made it clear this was the reason for increasing guidance. Hapag-Lloyd wrote “*Given the current course of business, characterised by stronger than expected demand and improved freight rates, and despite increased expenses related to the necessary diversion of vessels around the Cape of Good Hope, the Executive Board of Hapag-Lloyd AG is raising its earnings outlook for the financial year 2024* “ The stronger demand and improved freight rates were driven by the Red Sea diversion but Hapag-Lloyd didn’t specifically link to that, whereas they highlight the increased guidance was despite the added costs from the Red Sea diversion. For our purposes, we are assuming it was just poor drafting.

10/09/24; Maersk/Hapag-Lloyd to reroute via Cape of Good Hope into 2025
Our Maersk tweet noted the Maersk/Hapag-Lloyd notice on Oct 9, 2024 that they were going to keep rerouting via Cape of Good Hope. Here is what we wrote in our Oct 13, 2024 Energy Tidbits memo. “*The Houthis hitting tankers may not be adding any risk premium to oil prices but it continues to make the major shipping companies continue rerouting away from the Red Sea to via the Cape of Good Hope. On Wednesday, we tweeted [LINK] “#Houthis attacks causing ships to reroute from Red Sea to Cape of Good Hope expected to continue at least into 2025. 👇"There is currently no indication that we can expect the situation in the Red Sea to get better or resolved in the short term." Maersk & Hapag-Lloyd. #OOTT.” Our tweet included the Maersk/Hapag-Lloyd release that said “There is currently no indication that we can expect the situation in the Red Sea to get better or resolved in the short term. However, there is also still some time until the phase in of the Network of the Future in February 2025, and the situation remains highly dynamic.” Our Supplemental Documents package includes the Maersk release.”*

Oil: China home prices continue to lose value, 16 mths for new & 17 mths for old

China home prices fall

We continue to believe the a key to China recovery will be when Chinese consumers can see their home values not gong down in value every month and see their value return to some growth, even if only modest. Here is what we wrote in last week’s (Oct 20, 2024) Energy Tidbits memo on Chinese consumer’s most important asset – their home values. “*One of the most important priorities for China in their stimulus is to stop home values from declining. On Thursday we tweeted [LINK] “Chinese consumer's most important asset, their home values keep going lower. New home prices: 16th straight MoM % drop. Sept -0.71%. Aug -0.73%. July -0.65%. 2nd hand home prices: 17th straight MoM % drop. Sept -0.93%. Aug -0.95%. July -0.80%. Can China stimulus change this? Thx @business #OOTT”. China home prices continue to lose value – new home prices fell for the 16th straight month, and second-hand home prices fell for the 17th straight month. One of the most significant drivers of negative sentiment among Chinese consumers, is that they keep losing value in their homes, which means their biggest asset value keeps decreasing month after month. Just like in North*

America, the home is the most important asset for most Chinese people, and they have seen the value of their homes decline month after month with no end in sight. In September, Chinese new home and 2nd home prices were down MoM vs August. China new home prices were down -0.71% MoM and that is the 16th consecutive month of MoM declines. China second hand home -0.93% MoM and that is the 17th consecutive MoM decline in prices. The November release, which will be data for the month of October, will be much anticipated to see if the recent stimulus has supported home values through boosting consumer sentiment. Below are the Bloomberg graphs with the August data."

Figure 37: China new home prices MoM % change incl Sept 2024

Source: Bloomberg, National Bureau of Statistics

Figure 38: China 2nd hand home prices MoM % change incl Sept 2024

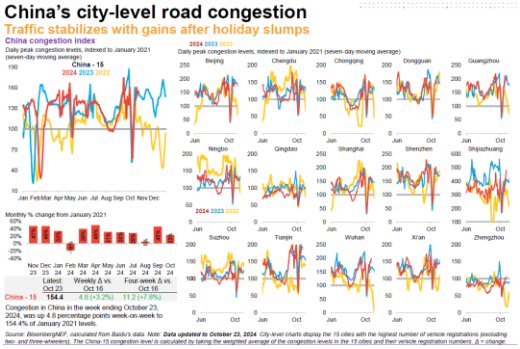
Source: Bloomberg, National Bureau of Statistics

Oil: Baidu China city-level congestion continues after the holiday season

China city-level road congestion increases

On Friday, BloombergNEF posted its China Road Traffic Indicators Weekly Oct 24 report, which includes the Baidu city-level road congestion for the week ended Oct 23. Golden Week was Oct 1 thru Oct 7 and we saw a significant fall in congestion during the period, which was followed by a big rebound last week as people returned to work, and the congestion continued this week after the early October national holidays. BloombergNEF reported Baidu city-level road congestion was up by +3.2% WoW to 154.4% of Jan 2021 levels. The WoW increase follows last week's 80.6% WoW increase following Golden Week. October MTD saw average daily peak congestion down -5.8% YoY when compared to October 2023. Note that this report was formerly titled Road Traffic indicators, and is now China Road Traffic Indicators, but the content of the report is unchanged. BloombergNEF's report was titled "*Congestion shows steady recovery post-holidays"*. Below are the BloombergNEF key figures.

Figure 39: China city-level road congestion for the week ended October 23, 2024



Source: Bloomberg

Figure 40: China city-level road congestion for the week ended October 23, 2024

Indexed to January 2021 = 100

	Oct 23	Nov	Dec	Jan 24	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
China-15	130	146	146	133	81	138	148	130	129	127	104	144	122
Beijing	159	167	161	145	73	151	169	143	141	146	123	171	140
Chengdu	121	123	116	120	68	134	140	125	119	126	98	135	109
Chongqing	112	122	116	111	80	112	138	122	129	119	75	119	117
Dongguan	130	141	144	121	52	129	138	138	138	126	103	141	116
Guangzhou	160	178	181	161	76	171	195	174	170	162	158	179	151
Ningbo	118	146	142	127	79	144	146	120	128	121	94	140	110
Qingdao	92	99	103	78	51	71	78	72	75	91	80	87	78
Shanghai	127	155	150	115	79	146	152	130	132	119	93	151	114
Shenzhen	151	169	170	149	68	160	164	172	163	162	155	184	150
Shijiazhuang	343	491	461	494	350	400	390	311	329	334	308	364	323
Suzhou	108	127	136	118	79	134	137	113	112	105	96	115	102
Tianjin	150	169	190	133	85	160	165	145	132	106	98	186	149
Wuhan	143	159	159	167	105	174	171	146	144	141	117	168	148
Xi'an	135	156	155	152	98	141	147	129	123	135	107	145	122
Zhengzhou	80	97	108	110	85	95	96	80	78	86	66	91	81

Indexed to the same month in previous year = 100

	Oct 23	Nov	Dec	Jan 24	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
China-15	126	155	187	151	55	100	114	110	96	104	87	94	94
Beijing	149	214	275	135	42	92	113	103	93	106	90	95	88
Chengdu	117	131	124	144	51	106	107	115	91	116	85	104	90
Chongqing	130	396	224	136	64	101	125	125	112	113	85	94	104
Dongguan	108	104	156	258	41	99	127	120	108	108	101	96	89
Guangzhou	146	317	307	199	45	99	127	127	107	107	106	98	95
Ningbo	95	101	127	203	59	115	140	121	112	106	81	110	94
Qingdao	96	124	195	175	62	94	97	98	87	95	76	82	84
Shanghai	115	93	172	156	54	98	117	105	101	98	76	93	90
Shenzhen	108	97	156	189	41	96	120	132	99	113	106	102	99
Shijiazhuang	120	459	258	156	69	93	85	81	77	89	70	75	94
Suzhou	91	88	157	171	60	111	130	117	97	99	88	86	95
Tianjin	109	137	244	136	60	114	121	119	100	96	86	107	99
Wuhan	199	192	187	151	55	94	100	97	85	95	86	88	104
Xi'an	149	139	152	132	66	110	112	105	91	110	97	96	91
Zhengzhou	171	294	164	119	76	98	102	90	82	98	72	86	101

Source: BloombergNEF calculations based on Baidu data. Note: Data updated to ***October 23, 2024. Values for the latest month are month-to-date.*** *The China-15 congestion level is calculated by taking the weighted average of the congestion levels in the 15 cities and their vehicle registration numbers.*

Source: Bloomberg

Oil: China visitors to Hong Kong up YoY in August, but still short of pre-covid levels

Chinese visitors to Hong Kong

Recently, the Hong Kong Tourism Board released their August statistics for total arrivals and visitors from mainland China. We are looking specifically at visitors from mainland China to gauge how much appetite there is to travel and spend money from the Chinese consumer (and businessman). In August, there were 3.660 million mainland Chinese visitors to Hong Kong, which is up +16.5% MoM. There were 3.141 million visitors from mainland China in July, and 2.342 million visitors from mainland China in June. On a YoY basis, August's figures are +6.6% higher than August 2023. This is still nowhere near pre-Covid April 2019 of 5.577 million visitors. Our Supplemental Documents package contains the press release from the Hong Kong Tourism Board.

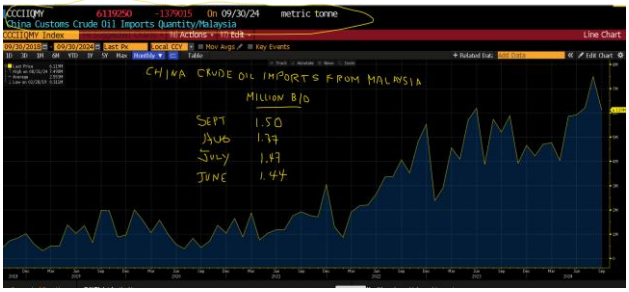
Oil: China keeps importing more Iran oil rebranded as Malaysian oil

China imports of "Malaysian" oil

Last Sunday night, we tweeted [LINK] "*Iran #Oil keeps getting rebranded as Malaysia oil. China customs official data is zero oil imports from Iran since June 2022. BUT China oil imports from Malaysia in Sept was 1.50 mmb/d vs OPEC Secondary Sources total Malaysia production of 0.348 mmb/d. #OOTT.* Bloomberg had just posted the China customs data of crude oil imports by country for Sept. We checked Iran and there was no changes to China customs not showing any oil imports from Iran since June 2022. But then we looked as usual at Malaysia and the China customs data shows China crude oil imports from Malaysia were 1.50 mmb/d in Sept, which followed 1.77 mmb/d in Aug, 1.47 mmb/d in July and 1.44 mmb/d in June. Our tweet also included the OPEC Monthly Oil Market Report October 2024, which

included Secondary Sources estimate that Malaysia only produced 0.348 mmb/d in Sept ie. China is importing oil from Malaysia that is equal to over four times Malaysia total country production. Below is the Bloomberg graph of China oil imports from Malaysia that was attached to our tweet.

Figure 41: China crude oil imports from Malaysia



Source: Bloomberg

05/09/24: Malaysia recognizes UN, not individual country sanctions

Here is what we wrote in our May 12, 2024 Energy Tidbits memo. "*One of the oil trade themes in the past year is how we see Iran oil rebranded as Malaysia oil and then shipped to China and likely other markets. That will be continuing as Malaysia has said they don't follow individual country sanctions like US on Iran but follow all UN sanctions. The Straits Times reported [LINK] "Malaysia rebuffs US on Iran oil sales, says it recognises only UN sanctions. Malaysia will recognise sanctions imposed by the United Nations only and not by individual countries, said Home Minister Saifuddin Nasution Ismail on May 9, following claims by a top US official that Iran has relied on Malaysian service providers to sell US-sanctioned oil in the region. "I emphasised that we will only recognise sanctions if they are imposed by the United Nations Security Council. "The delegation from the US respected our stance," Datuk Seri Saifuddin told reporters following a meeting with the US Treasury Department's top sanctions official Brian Nelson, who was visiting Kuala Lumpur." We hadn't realized the trade level between Malaysia and the US. The Straits Times closed their report "Still, the "US would also not want to lose the support of Malaysia, which is one of its key Asean partners, as the country will assume the role of Asean chair next year", he said. Malaysia is among the US' top 20 trading partners, with bilateral trade between the two nations amounting to US$78.3 billion (S$106 billion) in 2022." Our Supplemental Documents package includes the Straits Times report*.'

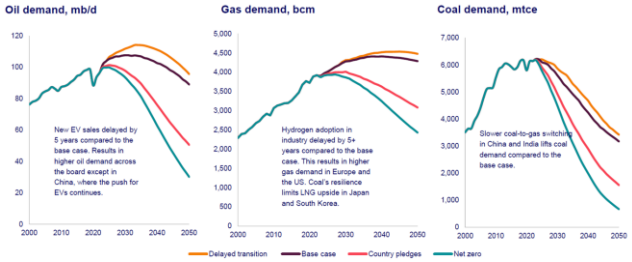
Oil: WoodMac's Delayed Transition Scenario see peak oil demand in 2033 at 114 mmbd

WoodMac's new peak oil scenario

Even if the IEA reinforced its view that peak oil demand will happen by 2030, we haven't changed our longstanding expectation for peak oil demand by 2030 forecasters to push back the timing of peak oil demand and that means they also then have to increase how much oil is consumed at that pushed out peak oil demand date. (i) We raise this issue as we expect to see any increase peak oil demand forecasts are most likely to come out in the next two months. The other timing reality is that it is the end of October. And major research shops and agencies will soon be posting their 2025 outlooks, which will be based on a recap of 2024. So that puts the time window for these type of changes to peak oil demand will be

over the next two months or so. (ii) On Thursday, we tweeted [LINK] "*Will moving peak #Oil demand higher & later be the craze in 2025 outlooks? Wood Mackenzie "energy transition scenario" raises peak oil demand from 108 mmbd in 2030 to 114 mmbd in 2033. Vs base case, this scenario assumes slower penetration rates on EVs, green hydrogen, etc. Sounds like what is happening in 2024? #Oil #NatGas #Coal will be needed for longer. #OOTT."* (iii) On Thursday, Wood Mackenzie distributed its new Delayed Transition Scenario that started "*The energy transition isn't moving anything like fast enough. Achieving global net zero by 2050 looks increasingly in doubt. To reflect the uncertainty, we added a Delayed Energy Transition Scenario to our existing range of potential outcomes which is quite positive for fossil fuels. With slower displacement by EVs, oil demand continues to increase year-on-year, reaching a peak of 114 million b/d in 2033 (compared with a 108-million b/d peak in 2030 in the base case). Gas demand carries on growing until 2045. There are significant implications for the development of new supply, price and the strategic positioning of the industry at large."* Wood Mackenzie clear states this is a scenario and not their base case. But they are clearly showing how this "scenario" would have a huge impact on oil demand over the next eight years. (iv) Our tweet highlighted how the assumptions for this delayed energy transition scenario sound like what is happening today. They are really the items we track and why we have been saying for years that peak oil demand will be pushed back and at higher oil demand levels. Wood Mackenzie writes "*On the other hand, it'll take longer for low-carbon technologies to be scaled. The penetration rate of nascent technologies that require government support, such as EVs, green hydrogen and CCUS, lag the base case by five years. Renewables, already competitive with alternative sources of power generation, will continue to grow, albeit at a slower pace."* Wood Mackenzie's conclusion for this delayed transition scenario is to push back peak oil demand from 108 mmb/d in 2030 to 114 mmb/d in 2033. And Natural gas demand growing until 2045. We can't help feel this is the set up scenario for Wood Mackenzie to change its official forecast for peak oil demand in the coming weeks but not until after COP29 on Nov 11-22. COP29 will likely be a catalyst with the argument that governments aren't accelerating or are backing off energy transition policy. (v) When we see this "scenario, it feels like it will be the first of many to come where major forecasters finally reflect all the items we have been following for the past year on how all the major energy transition items are nowhere near meeting the aspirations embedded in the Net Zero assumptions. We feel that the data points in 2023/24 are just too many for peak oil demand by 2030 people to ignore. (vi) And if other major forecasters do the same, this should get more people to believe in stronger oil for longer. Below is Wood Mackenzie's comparison on their Base Case vs Delayed Transition Scenario. Our Supplemental Documents package includes the Wood Mackenzie send-out.

Figure 42: Wood Mackenzie Delayed Transition Scenario vs Base Case



Source: Bloomberg

IEA WEO 2024 peak oil demand by 2030 as BEVs displace 6 mmb/d of oil

On Oct 17, the IEA posted its World Energy Outlook 2024, which included their continued view for peak oil demand by 2030. Here is what we wrote in last week's (Oct 20, 2024) Energy Tidbits memo. "*Our primary concern for the IEA"s continued call for a peak in oil demand by 2030 is back to its view that STEPS is not a forecast but a scenario based on stated government policies and targets. It's only one example of a single govt policy built into the EIA's BEV assumptions but one that we are writing about later in the memo on the UK BEVs disappointing sales. On pg 351, WEO 2024 notes "STEPS: United Kingdom 80% of nw cars and 70% of new vans to be zero emission vehicles by 2030, increasing to 100% by 2035." UK has BEV to be 22% of new car sales in 2024 and they are nowhere near that. It's just one example. It is the same concern we raised in their Global Electric Vehicles Outlook (GEVO) 2024 in April that assumes BEVs displace 6 mmb/d of gasoline demand by 2030. WEO 2024 includes that same 6 mmb/d assumption and writes "EVs currently have a share of around 20% in new car sales worldwide, and this rises towards 50% by 2030 in the STEPS (a level already being achieved in China this year), by which time EVs displace around 6 mb/d of oil demand". The IEA doesn't specifically say it is the same 6 mmb/d from its GEVO 2024 but it just happens to be the same numbers. The BEVs displacement of 6 mmb/d of oil for ICE is the biggest problem we have with the IEA's continued call for peak oil demand by 2030.*

Figure 43: IEA WEO 2024 peak oil demand by 2030

Table 3.1 ▷ **Global liquids demand and supply by scenario** (mb/d)

		STEPS			APS			NZE		
	2023	2030	2035	2050	2030	2035	2050	2030	2035	2050
Road transport	42.7	43.3	40.2	34.8	40.5	34.1	16.8	31.9	20.1	2.3
Aviation and shipping	11.6	13.0	13.5	14.5	11.0	10.1	7.5	9.3	7.0	1.8
Industry and petrochemicals	20.0	23.3	24.6	25.3	21.4	20.9	17.5	19.7	18.2	13.1
Buildings and power	11.4	9.0	7.7	6.1	8.1	6.1	3.6	6.6	3.6	0.4
Other sectors	13.3	13.1	13.1	12.5	11.8	10.9	8.4	10.8	8.9	5.3
World oil demand	99.1	101.7	99.1	93.1	92.8	82.0	53.7	78.3	57.8	23.0
Liquid biofuels	2.3	2.9	3.2	4.1	4.9	6.3	7.0	6.0	6.8	5.9
Low-emissions hydrogen-based fuels	0.0	0.0	0.1	0.6	0.3	1.4	4.6	0.7	2.0	5.6
World liquids demand	101.4	104.7	102.4	97.9	98.0	89.7	65.4	85.0	66.6	34.5

Source: IEA

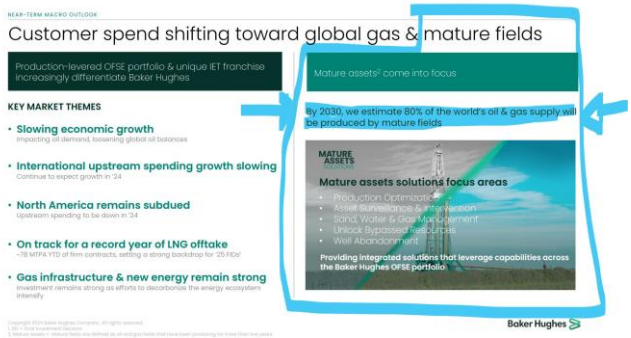
Oil: Baker Hughes, by 2030, 80% of oil & gas supply will be from mature fields

80% of 2030 oil & gas supply from mature fields

The Wood Mackenzie "delayed transition scenario" adding 8 mmb/d to demand by 2033 is a major increase to the need for more oil supply. If that scenario plays out, it will be put big stress on the need for more new oil supply over the coming 3 to 5 years, in particular because there is a maturing global oil production base. On Wednesday, we tweeted [LINK] "*For those who care about #Oil post 2030. "By 2030, we estimate 80% of the world's #Oil & #NatGas supply will be produced by mature fields' $BKR. Very bullish for oil & gas UNLESS IEA is right and demand has peaked BY 2030. #OOTT."* It didn't get much attention but it probably should in light of the Wood Mackenzie scenario. Baker Hughes held its Q3 call on Wednesday and included the below slide that highlighted the global oil and natural gas supply base should be over 80% from mature fields by 2030. Mature fields typically refers to

oil and natural gas fields that are either in decline or fighting to stay flat. This is very bullish for oil and natural gas in the 2030s.

Figure 44: by 2030, 80% of the world's oil and gas supply will be from mature fields



Source: Baker Hughes

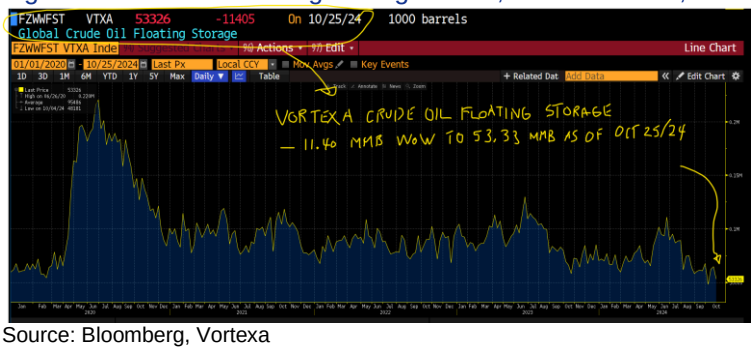
Vortexa floating storage

Oil: Vortexa crude oil floating storage est 53.33 mmb at Oct 25, -11.40 mmb WoW

We are referencing the Vortexa crude oil floating storage data posted on the Bloomberg terminal as of 9am MT yesterday. Note that these estimates get revised over the course of the week and the revisions can go back months. We do not check daily for the revisions, so our comments on the new estimates are compared to the prior week's Vortexa estimates posted on Bloomberg on Oct 19 at 9am MT. (i) Yesterday, we tweeted [LINK] "*Floating Oil Storage. Vortexa crude #Oil floating storage -11.40 mmb WoW to 53.33 mmb at Oct 25. Oct 18 revised +9.12 mmb. Even still, last 7-wks average is 59.77 mmb and last 3 wks are only times 7-wk moving average <60 mmb since Covid. Thx @vortexa @business. #OOTT.*" Floating storage has been below 70 mmb for the last ten weeks. (ii) As of 9am MT Oct 26, Bloomberg posted Vortexa crude oil floating storage estimate for Oct 25 at 53.33 mmb, which was -11.40 mmb WoW vs revised up Oct 18 of 64.73 mmb. Note Oct 18 of 64.73 mmb was revised +9.12 mmb vs 55.61 mmb originally posted at 9am on Oct 19. (iii) Also note Oct 4 of 48.18 mmb was revised up a little bit at +1.95 mmb vs 46.23 mmb posted a week ago, but remains the only week in the 40s since Covid. (iv) Revisions. Other than the +9.12 mmb revision to Oct 18, the other revisions were smaller with the next largest being Sept 27 revised +2.63 mmb. Here are the revisions for the past seven weeks compared to the estimates originally posted on Bloomberg at 9am MT on Oct 19. Oc 18 was revised +9.12 mmb. Oct 11 revised +0.54 mmb. Oct 4 revised +1.95 mmb. Sept 27 revised 2.63 mmb. Sept 20 revised +1.14 mmb. Sept 13 revised -0.32 mmb. Sept 6 revised -0.12 mmb.
(v) There is a wide range of floating storage estimates for the past seven weeks, but a simple rolling average for the last seven weeks is 59.77 mmb vs last week's then seven-week rolling average of 58.56 mmb. The last three weeks are the only times the 7-week moving average has been below 60 mmb. (vi) Also remember Vortexa revises these weekly storage estimates on a regular basis. We do not track the revisions through the week. Rather we try to compare the first posted storage estimates on a consistent week over week timing comparison. Normally we download the Vortexa data as of Saturday mornings around 9am MT. (vii) Note the below graph goes back to Jan 1, 2020 to show the run up to Covid and then how Covid started to impact Covid in March/April 2020. (viii) Oct 25 estimate of 53.33 mmb is 76.29 mmb vs the 2023 peak on June 25, 2023 of 129.62 mmb. Recall Saudi Arabia stepped in on

July 1, 2023 with its voluntary cuts. (ix) Oct 25 estimate of 53.33 mmb is -19.19 mmb YoY vs Oct 27, 2023 at 72.52 mmb. Below are the last several weeks of estimates posted on Bloomberg as of 9am on Oct 26, Oct 19, and Oct 12.

Figure 45: Vortexa Floating Storage Jan 1, 2000 – Oct 25, 2024, posted Oct 26 at 9am MT



Source: Bloomberg, Vortexa

Figure 46: Vortexa Estimates Posted 9am MT on Oct 26, Oct 19 and Oct 12

Posted Oct 26, 9am MT

Date	Last Px
Fr 10/25/2024	53326
Fr 10/18/2024	64731
Fr 10/11/2024	62271
Fr 10/04/2024	48181
Fr 09/27/2024	67534
Fr 09/20/2024	60569
Fr 09/13/2024	61326
Fr 09/06/2024	60235
Fr 08/30/2024	58281
Fr 08/23/2024	64015
Fr 08/16/2024	75076
Fr 08/09/2024	74271

Oct 19, 9am MT

Date	Last Px
Fr 10/18/2024	55613
Fr 10/11/2024	61728
Fr 10/04/2024	46225
Fr 09/27/2024	64904
Fr 09/20/2024	59427
Fr 09/13/2024	61647
Fr 09/06/2024	60364
Fr 08/30/2024	59405
Fr 08/23/2024	64488
Fr 08/16/2024	76543
Fr 08/09/2024	75587
Fr 08/02/2024	63002

Oct 12, 9am MT

Date	Last Px
Fr 10/11/2024	57563
Fr 10/04/2024	47047
Fr 09/27/2024	65143
Fr 09/20/2024	59874
Fr 09/13/2024	61309
Fr 09/06/2024	60742
Fr 08/30/2024	59621
Fr 08/23/2024	64194
Fr 08/16/2024	76071
Fr 08/09/2024	75550
Fr 08/02/2024	63168
Fr 07/26/2024	88333

Source: Bloomberg, Vortexa

Oil: Vortexa crude oil floating storage WoW changes by regions

Vortexa floating storage by region

Bloomberg also posts the Vortexa crude oil floating storage in key regions, but not all regions of the world. The regions covered are Asia, North Sea, Europe, Middle East, West Africa and US Gulf Coast. We then back into the "Other" for rest of world. (i) As noted above, last week's Oct 18 was revised +9.12 mmb. The main revision was Middle East revised +5.66 mmb, followed by Asia revised +3.90 mmb and Other revised -3.36 mmb. (ii) Total floating storage at Oct 25 of 53.33 mmb was down -11.40 mmb WoW vs the revised up Oct 18 of 64.73 mmb. The major WoW changes were Asia -6.81 mmb WoW and Middle East -5.82 mmb WoW. (iii) Oct 25 estimate of 53.33 mmb is -76.29 mmb vs the 2023 high on June 23, 2023 of 129.62 mmb. Recall Saudi Arabia started its voluntary 1 mmb/d production cuts on July 1, 2023. The major changes by region vs the last year June 23, 2023 peak are Asia -49.47 mmb and Other -20.42 mmb. (iv) Below is the table we created of the WoW changes by region posted on Bloomberg at of 9am MT yesterday. Our table also includes the

"Original Posted" regional data for Oct 18 that was posted on Bloomberg at 9am MT on Oct 19.

Figure 47: Vortexa crude oil floating by region

Region	Oct 25/24	Oct 18/24	WoW	Original Posted Oct 18/24	Recent Peak Jun 23/23	Oct 25 vs Jun 23/23
Asia	23.81	30.62	-6.81	26.72	73.28	-49.47
North Sea	0.93	0.12	0.81	0.12	5.30	-4.37
Europe	3.39	2.94	0.45	3.45	6.04	-2.65
Middle East	8.02	13.84	-5.82	8.18	6.76	1.26
West Africa	6.73	7.49	-0.76	5.24	7.62	-0.89
US Gulf Coast	1.27	1.31	-0.04	0.13	1.02	0.25
Other	9.18	8.41	0.77	11.77	29.60	-20.42
Global Total	53.33	64.73	-11.40	55.61	129.62	-76.29
Vortexa crude oil floating storage posted on Bloomberg 9am MT on Oct 26						
Source: Vortexa, Bloomberg						

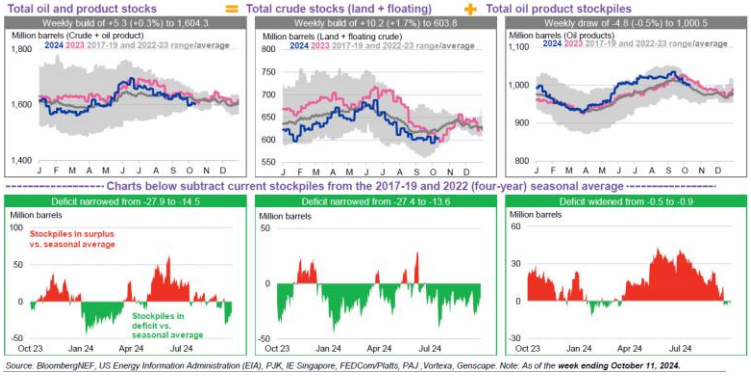
Source: Bloomberg, Vortexa

Oil: Global oil & product stocks deficit narrows to -14.500 mmb from -27.900 mmb

Bloomberg Weekly Oil Indicators

On Tuesday, BloombergNEF posted its "*Oil Price Indicators*" weekly, which provides good charts depicting near-term global oil demand and supply indicators. (i) Note BloombergNEF uses different periods to determine the surplus/deficit, sometimes using a four-year average for 2017-2019 + 2022-2023, and other times using a five-year average 2017-2019 + 2022-2023. In both cases they do not include 2020 and 2021 in the averages. (ii) The global stockpile for crude oil and products deficit narrowed to -14.500 mmb for the week ending October 11, from a deficit of -27.900 mmb for the week ended October 4. (iii) Total crude inventories (incl. floating) saw a build of +1.7% WoW to 603.800 mmb, while the stockpiles deficit narrowed, from a deficit of -27.400 mmb to a deficit of -13.600 mmb. (iv) Land crude oil inventories decreased -0.7% WoW to 543.500 mmb, widening their deficit from -14.300 mmb to -16.000 mmb against the five-year average (2017-2019 + 2022-23). (v) The gas oil, and middle distillate stocks decreased -2.2% WoW to 225.900 mmb, with the deficit against the four-year average widening to -3.200 mmb from -1.600 mmb. Jet fuel consumption by international departures in the week starting October 22, is set to decrease by -0.044 mmb/d WoW, while consumption by domestic passenger departures is forecast to decrease by -0.037 mmb/d WoW. Below is a snapshot of aggregate global stockpiles.

Figure 48: Aggregate Global Oil and Product Stockpiles



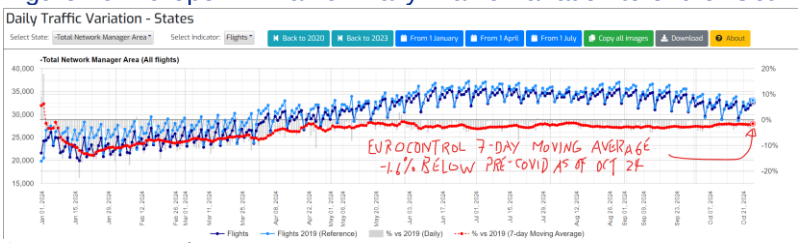
Source: BloombergNEF

Oil: Europe airports daily traffic 7-day moving average is -1.6% below pre-Covid

Europe airports daily traffic

Yesterday, we tweeted [LINK] "*Daily Europe air traffic close but still stuck below pre-Covid. 7-day moving average as of: Oct 24: -1.6% below pre-Covid. Oct 17: -1.9%. Oct 10: -1.7%. Oct 3: -2.9%. Sept 26: -2.9%. Sept 19: -2.8% Sept 12: -3.0%. Sept 5: -2.8%. Aug 29: -3.1%. Aug 22: -2.8%. Thx @eurocontrol #Oil #OOTT."* Other than over Christmas, European daily traffic at airports has been stuck just a little bit below pre-Covid. The 7-day moving average has got close to pre-Covid including -0.8% below pre-Covid as of May 30, but the 7-day moving average is now -1.6% below pre-Covid as of Oct 24, which followed -1.9% as of Oct 17, -1.7% as of Oct 10, which followed -2.9% as of Oct 3, -2.9% as of Sept 26, -2.8% as of Sept 19, which followed -3.0% as of Sept 12, which followed -2.8% as of Sept 5, which followed –3.1% as of Aug 29, and -2.8% as of Aug 22. Please note that we try to pull the data early Saturday mornings for a consistent weekly comparison. Eurocontrol updates this data daily and it is found at [LINK].

Figure 49: Europe Air Traffic: Daily Traffic Variation to end of Oct 24



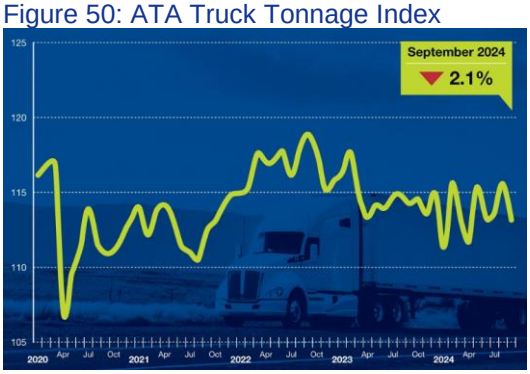
Source: Eurocontrol

Oil: ATA Truck tonnage index in September down -2.1% MoM, -0.9% YoY

September Truck Tonnage down MoM

We look to items like truck tonnage for indicators on the US economy, and the September truck tonnage is indicative of a slowly growing US economy. The American Trucking Association released its seasonally adjusted Truck Tonnage Index for September on Tuesday [LINK]. Truck tonnage fell by -2.1% MoM and decreased -0.9% YoY from September 2023. Chief Economist Bob Costello noted *"After increasing a total of 2.1% in July and August, tonnage fell by that amount in September, freight has been very choppy this year, but despite the latest drop, tonnage is up 1.8% since hitting a low in January. No doubt, the climb up has been slow and difficult as manufacturing activity remains flat, but the trend is up, not down."* Trucking serves as an indicator of the U.S. economy, representing 72.6% of tonnage carried by all modes of domestic freight transportation, including manufactured and retail goods. Trucks hauled 11.46 billion tons of freight in 2022. Motor carriers collected $940.8 billion, or 80.7% of total revenue earned by all transport modes. Our Supplemental Documents package includes the ATA truck tonnage index report.

Figure 50: ATA Truck Tonnage Index



Source: ATA

Oil & Natural Gas: Q3 will be worse for Cdn natural gas producers than Q2

AECO Q3/24 $0.66

Q3 reporting will be starting in the next week for Cdn oil and gas companies. And one of the known themes for Cdn oil and gas producers will be that Q3 will show lower oil and gas prices than for Q2 reporting, in particular for natural gas prices. Below is our table that shows the final prices to the end of Q3/24. The big negative vs Q2 is AECO averaged $0.66 in Q3/24 vs $1.12 in Q2/24 and $2.23 in Q1/24. The issue for analysts will be twofold. Reflecting the actuals in their model and what price forecast to use in their valuations. Below is our table of oil and gas prices.

Figure 51: Oil & natural gas prices

Period	Brent	WTI	EDPAR	WCS	HH	AECO
Q1/19	US$ 62.90	US$ 54.72	US$ 50.55	US$ 44.11	US$ 2.92	C$ 2.42
Q2/19	US$ 69.19	US$ 59.93	US$ 54.39	US$ 47.34	US$ 2.56	C$ 1.05
Q3/19	US$ 62.23	US$ 56.41	US$ 52.35	US$ 43.84	US$ 2.38	C$ 0.96
Q4/19	US$ 64.19	US$ 56.98	US$ 50.75	US$ 37.94	US$ 2.39	C$ 2.34
Q1/20	US$ 51.63	US$ 46.10	US$ 39.04	US$ 28.10	US$ 1.92	C$ 1.93
Q2/20	US$ 29.71	US$ 27.97	US$ 22.25	US$ 18.39	US$ 1.70	C$ 1.90
Q3/20	US$ 44.38	US$ 40.88	US$ 36.84	US$ 31.09	US$ 1.96	C$ 2.14
Q4/20	US$ 45.17	US$ 42.80	US$ 38.03	US$ 31.36	US$ 2.47	C$ 2.52
Q1/21	US$ 61.15	US$ 57.91	US$ 54.39	US$ 46.06	US$ 3.39	C$ 2.97
Q2/21	US$ 68.05	US$ 66.16	US$ 62.17	US$ 53.31	US$ 2.91	C$ 2.93
Q3/21	US$ 73.24	US$ 70.59	US$ 66.94	US$ 57.70	US$ 4.31	C$ 3.40
Q4/21	US$ 79.04	US$ 77.29	US$ 73.79	US$ 60.91	US$ 4.71	C$ 4.48
Q1/22	US$ 101.80	US$ 94.93	US$ 93.84	US$ 82.29	US$ 4.63	C$ 4.53
Q2/22	US$ 113.86	US$ 108.85	US$ 107.12	US$ 93.39	US$ 7.47	C$ 6.89
Q3/22	US$ 100.62	US$ 91.81	US$ 89.95	US$ 71.19	US$ 7.96	C$ 4.16
Q4/22	US$ 88.64	US$ 82.61	US$ 79.71	US$ 54.91	US$ 5.54	C$ 5.01
Q1/23	US$ 81.17	US$ 76.10	US$ 73.75	US$ 56.94	US$ 2.66	C$ 3.08
Q2/23	US$ 78.30	US$ 73.61	US$ 70.56	US$ 60.29	US$ 2.16	C$ 2.30
Q3/23	US$ 86.70	US$ 82.19	US$ 79.76	US$ 66.16	US$ 2.59	C$ 2.48
Q4/23	US$ 84.22	US$ 78.46	US$ 71.01	US$ 55.67	US$ 2.74	C$ 2.19
Q1/24	US$ 83.04	US$ 76.99	US$ 68.71	US$ 60.03	US$ 2.31	C$ 2.23
Q2/24	US$ 84.84	US$ 80.80	US$ 72.80	US$ 68.28	US$ 2.07	C$ 1.12
Q3/24	US$ 80.32	US$ 75.52	US$ 68.11	US$ 62.20	US$ 2.11	C$ 0.66

Source: Bloomberg

Source: Bloomberg, SAF Group

Oil & Natural Gas: TIPRO Texas oil & gas jobs see fourth consecutive month of growth

TIPRO September jobs update

This week, the Texas Independent Producers and Royalty Owners Association (TIPRO) posted its recaps for September, which included their updated their employment figures for the Texas upstream sector [LINK]. Note that the release is dated October 18, 2024. TIPRO reported a MoM increase in jobs in September, and an increase in jobs in August, which marks September as the 4th consecutive month of growth. August jobs were up +1,000 jobs MoM vs July and September jobs are up +800 jobs MoM vs August. Direct Texas upstream

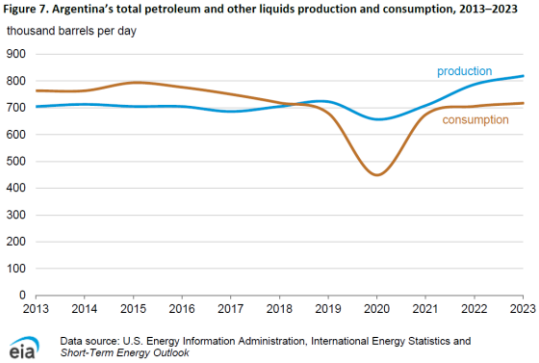
employment totaled 195,400 in September, down -2,000 from the recent high in March. TIPRO wrote *"TIPRO's new workforce data yet again indicated strong job postings for the Texas oil and natural gas industry. According to the association, there were 11,970 active unique jobs postings for the Texas oil and natural gas industry last month, an increase of 147 posted employment opportunities compared to August and 4,623 new job postings added during the month by companies. In comparison, the state of California had 4,008 unique job postings in September, followed by Florida (1,984), New York (1,910), Pennsylvania (1,658) and Oklahoma (1,528). TIPRO reported a total of 56,563 unique job postings nationwide last month within the oil and natural gas sector".* Our Supplemental Documents package includes excerpts from the TIPRO recaps for September.

Oil & Natural Gas: EIA's Argentina Country Brief

EIA's country brief on Argentina

We continue to recommend adding the EIA's country analysis briefs to reference libraries as good quick high level breakdowns of areas of interest, in this case its updated EIA country executive summary [LINK] on Argentina. We are little surprised that the EIA didn't right up front highlight the Vaca Muerta shale as the reason for Argentina returning to oil production growth. On page 1, the EIA wrote "*Following a 20% cumulative decline between 2004 and 2014 in energy production, Argentina's energy production began to increase in 2015. From 2015 to 2022, energy production grew by an annual average of 2%—primarily driven by natural gas, which contributed 62% to this growth."* But on page 5, the EIA wrote "*Since its discovery in 2010 by the former Repsol-YPF, the Vaca Muerta shale formation has driven Argentina's oil production growth*.". In 2023 Argentina produced 0.819 mmb/d, which represented +4.0% YoY increase. In 2023. Argentina had proved oil reserves of 3.0 billion barrels, of which, 48% were conventional, and in the same period, Argentina had proved natural gas reserves of 17.2 Tcf, of which, 29% were conventional. Argentina's refining capacity is 0.580 mmb/d and runs at an 89% utilization capacity. Our Supplemental Documents Package includes the excerpts from the EIA brief.

Figure 52: Argentina's total petroleum and other liquids production



Source: EIA

Energy Transition: Many energy transition reality checks from Saudi Aramco CEO

Saudi Aramco CEO reality check

Even if someone is anti fossil fuels, we recommend reading Saudi Aramco CEO Nasser's keynote speech at the Singapore International Energy Week. [LINK]. It's not that we expect anti-fossil fuels to change their position. Raher Nasser's points on developing countries will

at least get anti-fossil fuels, including western governments, to consider why the energy transition will take a lot longer than the aspirations. If so, it could help create realistic aspirations and help minimize energy cost escalation and volatility. (i) His fundamental big picture views are the energy transition isn't working as per aspirations and it's not an energy transition but an energy addition. (ii) Energy Transition has failed on its 3 core promised areas. Energy is not affordable. Progress is off the pace. And *""transition will be expensive for everyone, with estimates of between 100 and 200 trillion dollars required globally by 2050. For developing countries, almost 6 trillion dollars may be required each year."* (iii) New energy will not replace old energy, it will just be added on. Nasser said "*Gas demand has also grown, by almost 70 percent since 2000. So, rather than an energy transition, we are really talking about energy addition, where just the growth is mostly met by alternatives, instead of replacing conventional energy in any meaningful way*." (iv) Transition isn't as simple as western leaders assume. Nasser said "*Transition progress is far slower, far less equitable, and far more complicated than many expected*" (v) The point that we encourage looking at is Nasser's comments on the assumptions that developing countries can effectively jump from very little or no energy to a world of new energy. On Monday, we tweeted [LINK] "*2 overlooked #EnergyTransition thoughts from @aramco CEO keynote. How can OECD expect LDC to jump from no/little energy basics to Net Zero? OECD are creating an inevitable energy crisis in the coming years as "Planners must stop assuming the world can replace its conventional energy needs with half-baked alternatives, almost overnight, particularly in the Global South. This assumption is seriously discouraging investments in these crucial conventional sources" Lots more in this reality check. #OOTT."* Our Supplemental Documents package includes the Saudi Aramco CEO speech.

NextEra on natural gas for data centers

Energy Transition: NextEra, building more #NatGas enables adding more Renewables

Any power user for AI data centers loves to highlight any and all renewable power being used to power AI data centers, but it seems like they like to hide the fact that the power suppliers have to have 24/7 power so they can add in renewables. NextEra held its Q3 call on Wednesday and reminded that they need natural gas so they add more renewables ie. adding more natural gas power enables them to layer in more renewables. On Wednesday, we tweeted [LINK] "*Need to add 24/7 #NatGas power to enable adding more intermittent renewables. #NextEra Q3 call. "power sector is going to need to build more gas power generation and battery storage to meet growing capacity needs over the next decade. And as we build more, we also enable more renewables to come to market as the lowest-cost generation source of energy". 24/7 power can't be run on renewables. #OOTT."* Mgmt highlighted that renewables are going up but need battery storage and natural gas for capacity. They remind that solar and wind will keep increasing but need more natural gas. This is the concept we have been saying that the more wind and power that is added, the more natural gas must be added to fill in for intermittency. . "*We understand the benefits and the challenges and we know what it all costs and how long it takes to build. The power sector is going to need to build more gas power generation and battery storage to meet growing capacity needs over the next decade. And as we build more, we also enable more renewables to come to market as the lowest-cost generation source of energy. Renewables will be built for energy and battery storage and gas for capacity."*

07/11/24: Dominion CEO need #NatGas baseload to add renewables

Dominion Energy CEO said it more directly on CNBC in July on how power suppliers need more natural gas baseload to add in more renewables. Here is what we wrote in our July 14, 2024 Energy Tidbits memo. "*We still can't believe that many don't accept that renewable power isn't baseload power especially for electricity users like AI data centers that need 24/7 reliable, available, affordable power. We have been highlighting Dominion Energy AI data centers actions and views because Dominion is the world's largest provider of electricity to AI data centers and it's key operating state, Virginia, has the world's most data center electricity consumption. On Thursday, Dominion CEO Robert Blue was on CNBC and we tweeted [LINK] "AI Data Center 101. Need #NatGas baseload if want to add renewables. "we've built a substantial amount of highly efficient #NatGas generation in the last decade. That has allowed us to add in quite a few renewables" $D CEO, #1 power to data centers in the world. Also "we're going to need to add some more #NatGas and we have plans to do that". Reminds #NatGas is not a transition fuel for power generation. Thx @DavidFaber #OOTT." CNBC's David Faber asked about increasing the renewable % of the power generation to meet the unprecedented demand in electricity driven by data centers. Blue didn't' go into the numbers of how much renewable was being used but his answer was straightforward – Dominion's early buildout of efficient natural gas generation was what allowed them to add in some renewable. Note that renewables are a very small part of the actual generation for Dominion. But it was having baseload natural gas that let them add in some renewable. We created a transcript of Blue's response ""It's a really important question. … we're very fortunate to have a Governor who is focused on reliable, affordable and increasingly clean energy, which is the mission of our company. So, we've built a substantial amount of highly efficient natural gas generation in the last decade. That has allowed us to add in quite a few renewables. We're building a substantial amount of solar. We're building the largest offshore farm in the US. We're going to need to add some more natural gas as well and we have plans to do that. There is no silver bullet. And I think that's a mistake that some people make in addressing energy challenges is that there is one approach that is going to solve all of the challenges. That's just not true. It requires some of everything. It requires renewables. It requires continuing to operate our existing nuclear fleet, they are the workhorses of our fleet today. They are carbon-free. It requires adding more natural gas. And it requires investments in transmission, the big wires that are moving electricity around our area." Our tweet included the video clip we made of this Q&A."*

Energy Transition: NextEra reminds of practical limitations for nuclear SMRs

Limitations for SMRs

NextEra is one of the first nuclear power suppliers we have seen who has raised the limitations for nuclear power small modular reactors to supply any significant power additions. (i) US nuclear fuel supply chain issue. On Thursday, we tweeted [LINK] "*Overlooked SMR timing issue. The need to rebuild the US nuclear fuel supply chain post the US ban imports of Russia uranium in June. See 👇 @nexteraenergy CEO on this overlooked issue. #NatGas #Coal will be needed for longer for 24/7 power. #OOTT."* Recall that in June, the US banned imports of Russia uranium and Russia supplied 12% of US uranium imports in 2022. NextEra warns that the US isn't set up for a nuclear fuel supply chain if it is going to ramp up

nuclear power. This wasn't in the slides or prepared remarks. But in the Q&A, mgmt replied "*The other thing that doesn't get a lot of attention is nuclear fuel. There -- the nuclear fuel supply chain has a lot of repair and work that has to occur. I think most of you know, we passed sanctions against Russia on enrichment and conversion. We basically have to start an enrichment and conversion industry here in this -- in the US. It's going to take a lot of time to get that up and running. Some SM Rs, they don't run off of low-enriched uranium, they run off of (inaudible) -- remains a bit unproven as well. And so when we stack all that together, David, that's why we're just not bullish SM Rs. We think it's kind of a next -- into the next decade alternative. But it is also something that we stay close to and we have capacity at our existing generation facilities. They'll be able to add SM Rs and it's something that FPL will continue to keep a close eye on also as we move forward. But again, it's so far out in the future from a viability standpoint at scale. It's -- we're prioritizing other generation resources at this time. And I think renewables are, as I said in my prepared remarks, are here for the long haul."* (ii) New nuclear plants will only have a limited impact on electricity. NextEra is looking to recommission a nuclear plant, one of only a few that might be able to recommissioned. Ie. recommissioning nuclear plants will only play a very small role in meeting the massive increase in power demand. In the prepared remarks, mgmt said "*As a top operator of all forms of power generation, we often get asked about nuclear and gas. Let me start with nuclear. Nuclear will play a role, but there are some practical limitations. Remember, on a national level, we expect we are going to need to add 900 gigawatts of new generation to the grid by 2040. There are only a few nuclear plants that can be recommissioned in an economic way. We are currently evaluating the recommissioning of our Duane Arnold nuclear plant in Iowa as one example. But even with a 100% success rate on those recommissionings, we would still only meet less than 1% of that demand. Existing merchant nuclear generation is also limited in its ability to meet that demand given there are only approximately 20 merchant nuclear plants in this country. That nuclear capacity is also not evenly spread across the US and is not in many places. We know hyperscalers are looking to develop data centers or manufacturing – manufacturers are looking to expand their footprint. For example, there are only two merchant nuclear plants west of the Mississippi. Nuclear plants across the country are already serving existing demand. So even if they are contracted by specific customers, new resources need to be built to meet new demand. And alternatives such as new utility scale nuclear and SM Rs are unproven, expensive and again not expected to be commercially viable at scale until the latter part of the next decade."*

Energy Transition: ACEA, EU BEV sales +9.8% YoY in Sept after Aug -43.9% YoY

EU Sept BEV sales

EU BEV sales in Sept broke a string of four consecutive months of lower YoY BEV sales including the brutal -43.9% YoY in Aug to be +9.8% YoY in Sept. But the big picture theme continues with BEV sales down YoY in 2024 despite the regulatory and political push for BEV sales to increase. Declining BEV sales is not what political leaders assume in their Net Zero plans, rather the working assumption has been increasing YoY BEV sales. We do not recall any western leaders ever talking about declining YoY BEV sales in EU. On Tuesday, we tweeted [LINK] "*EU Sept new car registrations. BEV: Sept +9.8% YoY, following 4 consecutive months of YoY declines incl brutal Aug -43.9% YoY. YTD -5.8% YoY. PHEV: Sept -22.3% YoY & -5.0% YTD. HEV: continued big winner, Sept +12.5% YoY, YTD +20.1% YoY. Petrol & Diesel big losers: Petrol -17.9% YoY, YTD -4.4% YoY. Diesel -23.5% YoY, YTD -11.1% YoY. Thx @ACEA_auto #OOTT."* Finally a higher YoY month for BEV sales. But the trends that we have been seeing over the past several months are continuing. EU

BEV sales are down YoY with YTD Sept 30 BEV sales -5.8% YoY to 1,047,869. EU PHEV sales are down YoY with YTD Sept 30 PHEV sales -8.1% YoY to 550,166. Hybrid sales continue to be strong with YTD Sept 30 HEV sales +20.1% YoY to 2,404,532. Petrol sales are down YoY with YTD Sept 30 Petrol sales -4.4% YoY to 2,744,809. Diesel sales are down YoY with YTD Sept 30 Diesel sales -11.1% YoY to 994,307. Total EU car sales YD Sept are only +0.6% YoY to 7,989,776. Below is our table of ACEA Sept new car sales split by fuel type. Our Supplemental Documents package includes the ACEA Sept new car registrations.

Figure 53: EU Sept new car registrations by power source

	Sep-24	Sep-23	% Change	YTD Sept 24	YTD Sept 23	% Change
BEV	139,702	127,196	9.8%	1,047,869	1,111,925	-5.8%
PHEV	54,889	70,669	-22.3%	550,166	598,366	-8.1%
HEV	265,724	236,107	12.5%	2,404,532	2,002,816	20.1%
Others	23,635	24,458	-3.4%	248,093	238,240	4.1%
Petrol	240,805	293,143	-17.9%	2,744,809	2,872,408	-4.4%
Diesel	84,408	110,400	-23.5%	994,307	1,117,949	-11.1%
Total	809,163	861,973	-6.1%	7,989,776	7,941,704	0.6%
Others incl fuel-cell electric vehicles, natural gas vehicles, LPG, E85/ethanol, and other fuels						

Source: ACEA

09/19/24: ACEA, urgent action needed as EU BEV Aug sales -43.9% YoY

As noted above, EU BEV sales in Aug were brutal at -43.9% YoY. And, at that time, ACEA put out a call for urgent action to help EV sales. Here is what we wrote in or Sept 22, 2024 Energy Tidbits memo. "*On Thursday, the ACEA posted Europe Aug car sales and it was a brutal month for car sales, especially in BEVs. And the brutal numbers led the AEWCA to post "European auto industry calls for urgent action as demand for EVs declines". [LINK]. The ACEA has a blunt warning that BEV sales are not growing at a slower rate, rather BEV sales are declining. And the EU needs urgent action to to try to stop the decline. (i) On Thursday, we tweeted [LINK] "1/2. EU BEVs decline looks unfixable in near term. @ACEA_auto says urgent action needed. "We are missing crucial conditions to reach the necessary boost in production and adoption of zero-emission vehicles: charging and hydrogen refilling infrastructure, as well as a competitive manufacturing environment, affordable green energy, purchase and tax incentives, and a secure supply of raw materials, hydrogen and batteries. Economic growth, consumer acceptance, and trust in infrastructure have not developed sufficiently either". #OOTT." (ii) The ACEA lists a broad range of items they see leading a decline in BEV sales in EU. These include a number of items that are unfixable in the near term such as needing "affordable green energy". The ACEA is looking beyond the marginal cost of solar electricity when the sun is shining or the marginal cost of wind electricity when the wind is blowing. Instead they are looking at how power costs are going up, not down, under the EU's leading push for green energy. And the ACEA lists the obvious one tha they need to get consumer acceptance for BEVs. (iii) Brutal month for BEV sales. On Thursday, we also tweeted [LINK] on the ACEA Aug new car registration. "2/2. EU EV car sales -43.9% YoY in Aug, 4th consecutive monthly decline. @ACEA_auto ACEA Aug car sales: BEV: 92,627, -43.9% YoY, 14.4% share vs 21%. PHEV: 45,590, -22.3% YoY, 7.1% share vs 7.4%. HEV: 201,552, +6.6% YoY, 31.3% share vs 23.9%.. Petrol: 213,057, -17.1% YoY, 33.1% share vs 32.6%. Diesel: 72,177, -26.4% YoY, 11.2% share vs*

12.5%. Others: 18,634, -5.3% YoY, 2.9% share vs 2.5%. #OOTT." Below is the table we created of the ACEA data for Aug new car registrations. Our Supplemental Documents package includes the ACEA urgent action release and the ACEA Aug new car registrations."

Figure 54: EU Aug new car registrations by power source

EU August New Car Registrations by Power Source						
	Aug-24	Aug-23	% Change	YTD Aug 24	YTD Aug 23	% Change
BEV	92,627	165,204	-43.9%	902,011	983,718	-8.3%
PHEV	45,590	58,660	-22.3%	501,266	527,697	-5.0%
HEV	201,552	189,114	6.6%	2,138,474	1,765,893	21.1%
Others	18,634	19,687	-5.3%	224,692	213,537	5.2%
Petrol	213,057	257,139	-17.1%	2,504,457	2,580,076	-2.9%
Diesel	72,177	98,008	-26.4%	909,592	1,007,279	-9.7%
Total	643,637	787,812	-18.3%	7,180,492	7,078,200	1.4%
Others incl fuel-cell electric vehicles, natural gas vehicles, LPG, E85/ethanol, and other fuels						
Sources ACEA						

Source: ACEA

Energy Transition: UK Sept BEV sales +24.4% YoY since ICE/HEV sales are held back

UK Aug BEV sales +24.4% YoY

The big outlier in the ACEA Sept new car registration in Europe was the UK sold 56,387 BEV sales which was +13.2% YoY. And no surprise, Petrol sales of 83,100 were -21.2% YoY, diesel sales of 7,029 were -29.0% YoY and HEV sales 104,237 or only +11.6% YoY. We say no surprise because there has been ICE and HEV demand in the UK but car manufacturers have been holding back ICE and HEV deliveries to ensure BEV sales try to get as close as possible to the UK targeted minimum 22% of total car sales in 2024. So if the BEV demand hasn't and still isn't high enough, then the car manufacturers have to restrict and hold back ICE and HEV sales. So weak demand for BEVs automatically translates into weaker ICE and HEV sales than demand. On Tuesday, we tweeted [LINK] "*UK BEV numbers are deceiving. UK BEV sales: Another month of strong sales +24.4% YoY and YTD +13.2% YoY. @ACEA_auto. BUT not because of BEV demand but because BEVs at 17.8% is still well short of UK regulated BEVs to be 22% of 2024 total car sales. See 10/16/24 tweet: @vertumotorsCEO some car manufacturers rationing ICE & HEV to meet ZEV mandate. [LINK] #OOTT ."*

Figure 55: UK Sept new car registrations by power source

	Sep-24	Sep-23	% Change	YTD Sept 24	YTD Sept 23	% Change
BEV	56,387	45,323	24.4%	269,931	238,544	13.2%
PHEV	24,486	18,535	32.1%	124,943	98,993	26.2%
HEV	104,237	93,393	11.6%	538,935	461,739	16.7%
Others	0	0	n/a	0	0	n/a
Petrol	83,100	105,463	-21.2%	537,037	595,946	-9.9%
Diesel	7,029	9,896	-29.0%	43,248	56,686	-23.7%
Total	275,239	272,610	1.0%	1,514,094	1,451,908	4.3%
Others incl fuel-cell electric vehicles, natural gas vehicles, LPG, E85/ethanol, and other fuels						

Source: ACEA

10/23/24: Vertu: UK BEVs sales down, some ICE/HEV being rationed

Our ACEA Tuesday tweet linked to a prior Oct 16 tweet on this issue of car manufacturers holding back on ICE and HEV due to lesser BEV sales. One other item we noted was how UK BEV sales are being driven by fleet buying and not

individual consumer buying. Here is what we wrote in last week's (Oct 20, 2027) Energy Tidbits memo. "tweet No one should be surprised by the negative UK BEVs update from the Vertu H1 results. Vertu is one of the large car dealership groups in the UK. On Wednesday, we tweeted [LINK] "*More UK BEVs reality check from Vertu @vertumotorsCEO UK BEV in retail customer market -7% YoY, concerns not just price and charging infra, but also costs. UK BEV growth due to fleet. Some car manufacturers rationing ICE & HEV to meet ZEV mandate. UK needs either more incentives or reduce % of new sales to be BEV. #OOTT."* Vertu noted that retail customer BEV sales are -7% YoY despite big BEVs sale discounts but overall BEV sales are up a bit due to fleet sales. They warn retail customer demand continues to be weak due to price and charging infrastructure. But Vertu also added that retail customers are concerned about costs, which we believe relates to items like higher BEV insurance costs. Because weak retail BEV, as of Aug 2024, BEVs only accounted for 17.2% of new car registrations, which is below the government mandated target of 22% in 2024. BEVs at 17.2% would be lower if some car manufacturers hadn't already started to restrict ICE and HEV deliveries in 2024 to not make the 17.2% a lower percentage. Vertu says "*as manufacturers cannot sustain price cuts indefinitely, government incentives like tax breaks or subsidies will likely be needed to boost BEV private sales or changes to the Mandate will be required to take the pressure off the sector and make the transition to BEV vehicles more achievable and sustainable*." Ie. the government has to lower the target significantly to something realistic to customer demands. Our Supplemental Documents package includes an excerpt from the Vertu H1 release."

09/08/24: Vertu warned restricting ICE/HEV to help UK EVs sales get to 22%

Vertu was the first significant auto group to warn that car manufacturers were already restricting ICE and HEV deliveries to try not to make the BEV % of total car sales get even lower. Here is what we wrote in our Sept 9, 2024 Energy Tidbits memo. "*The UK government will be able to say UK EVs sales should be near their regulated 22% of total car sales. But it won't be because EVs demand supports 22% of total car sales. Rather it will be because car manufacturers are holding back ICE and HEVs in 2024. It's math. If EVs sales are less, then the ICE/HEV sales have to be stopped or else the denominator will get too large. On Friday, we tweeted [LINK] "Blunt talk! UK EVs should hit UK regulated EVs to be 22% of total car sales BUT not because of EVs demand. RATHER @vertumotorsCEO explains: "some franchises there's a restriction on supply of petrol cars and hybrid cars, which is actually where the demand is." "It's almost as if we can't supply the cars that people want, but we've got plenty of the cars that maybe they don't want." "They [manufacturers] are trying to avoid the fines. So they're constraining the ability for us to supply petrol cars in order to try and keep to the government targets." "The new car market is no longer a market, unfortunately. It's a state-imposed supply chain." #OOTT." This is the concern that others have had but weren't as blunt as Vertu Motors CEO Forrester – disappointing demand for EVs means car manufacturers have to restrict deliveries of ICE and HEVs. Vertu Motors posted The Daily Telegraph story that included Forrester's comments. They also wrote "But the scheme has prompted stark warnings from bosses at major brands, such as Vauxhall owner Stellantis and Ford, which have said they cannot sacrifice profits by selling EVs at large discounts*

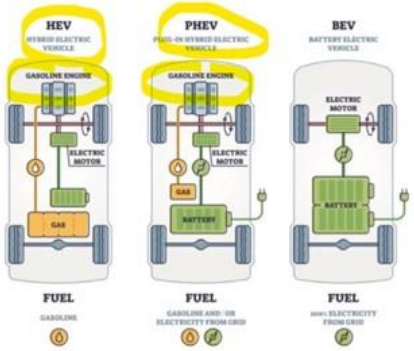
indefinitely. Instead, they have previously warned they may be forced to restrict petrol car supplies to artificially boost their ZEV mandate performance. The warning from Vertu is the first confirmation that carmakers have now begun doing so." Our Supplemental Documents package includes the Vertu posted story. [LINK]"

Energy Transition: HEVs & PHEVs are really just more fuel efficient ICE vehicles

HEVs/PHEVs are just fuel efficient ICE vehicles

The emergence of HEVs over the past year as the growth areas for cars is a win or at least a much lesser loss of gasoline/diesel consumption vs EVs. No one can deny an HEV will burn less gasoline or diesel than its ICE counterpart. However, we still find many don't understand that HEVs and even PHEVs are really just more fuel-efficient ICE vehicles and, in particular, for PHEVs that are generally lumped in with EVs for an electrified car group. HEVs and PHEVs run on gasoline or diesel for likely at least half of the time for PHEVs and probably 90% for HEVs. On Sept 4, we tweeted [LINK] "*HEV/PHEV 101 - They are really just more fuel efficient ICE. Ford: HEV F150 does 23 mpg vs ICE150 at 19 mpg. Volvo: PHEVs km driven are split 1/2 using battery, 1/2 using petrol/diesel. #OOTT."* Our tweet referenced Ford and Volvo data on HEVs and PHEVs. On Ford F150 Hybrid vs ICE mpg. Our tweet included the EPA rated mileage for the Ford F150 ICE vs Hybrid. The EPA rates the Hybrid fuel efficiency as being only 4 mpg more than the ICE. That increased fuel efficiency would be reduced if it was a full apples-to-apples comparison. The ICE has a much larger towing capacity. The F150 ICE 3.5L cyl F-150 does 19 MPG with a tow capacity of 13,500 lbs. The F150 HEV 3.5L 6 cyl F-150 does 23 MPG with a tow capacity of 11,200 lbs. On Volvo PHEVs, most just lump PHEVs in with EVs because both are electrified. But the reality is that a lot of PHEV is driven in ICE mode. As noted earlier, Volvo backed off its fully electric plans and its press released noted "*Volvo Cars' most recent data shows that around half of the kilometres covered by the latest plug-in hybrid Volvo cars are driven on pure electric power."* So based on the "most recent data", Volvo PHEVs are driven around 50/50 between km driven in battery mode vs ICE mode. Given the press release was Volvo having to back away from its electrified goals, we have to be believe the "around half" driven by PHEV is likely below half. We also believe that Volvo has likely picked the best time period for PHEVs driving in battery mode. We would assume the most recent data is referring to some spring/early summer period and it does not include winter months where the PHEVs will be driven more in their ICE mode.

Figure 56: HV vs PHEV vs BEV



Source: Engineering Infrastructure

Energy Transition: Equinor blue hydrogen is not ready, green is even further away

Equinor, blue and green hydrogen are far from ready

The Equinor Q3 call on Thursday is another good example of how the best insights come from the Q&A portion of conference calls when mgmt is more or less forced to answer questions apart from their prepared remarks. On Thursday, we tweeted [LINK] "*Hydrogen isn't ready for prime time. Blue hydrogen "needs to be significant before any green hydrogen can actually be viable" And Blue Hydrogen doesn't work: it's uneconomic, "no significant customer base to life an investment like this", not "a well functioning market to do that". @Equinor CEO. #Oil #NatGas will be needed for longer. #OOTT."* In the Q&A, mgmt had some direct comments on green and blue hydrogen and was clear that hydrogen is far from ready. Equinor was negative on Green Hydrogen as that will only come after Blue Hydrogen. And Equinor also is far from bullish on Blue Hydrogen in the near term as Blue Hydrogen has the same basic problems that we have noted before: it isn't economic, there are no significant customers and it is not a well functioning market. Here is what mgmt said in the Q&A. Mgmt was asked "*Yeah, hi. Thanks for taking my question. I'll keep it to one, then. I just wanted to ask about the recent cancellation of a blue hydrogen project and hydrogen pipeline to Germany with RWE. Could you maybe talk about why the project wasn't viable, and what is next for your hydrogen plant? Thank you*." CEO replied "*Okay, thanks, Kim. Yeah. We do believe that blue hydrogen is going to be very important for Europe, and we also do believe that that needs to be significant before any green hydrogen can actually be viable, as such. For a blue hydrogen value chain to work, there are three things that really need to be in place. One is there needs to be an economic framework for investing into it; the second is there needs to be a customer base, and I would say actually a significant customer base to lift an investment like this; and the third one is actually a well-functioning market to do that. And I'm sorry to say, none of these are in place sufficiently to justify an investment like this. So that is the reason that things are going slower than we had hoped, and we think we are all better in actually maybe thinking of the different ways of creating a blue hydrogen value chain in Europe."*

Energy Transition: Repsol halting all renewable [green] hydrogen projects in Spain

Repsol halts Spain green hydrogen

We repeat what we said last week that no one should be surprised that green energy project developers are pulling the plug or indefinite delays to projects – green hydrogen is very expensive and major buyers aren't stepping up to commit to any term buying to give the confidence for the supply project to spend the billions to get the project done. Because, without major buyers to commit to term buying at some very high price, the returns aren't there for the project developer. Last week it was Uniper in Europe and this week it is Repsol halting all its Green Hydrogen projects in Spain. On Monday, we tweeted [LINK] *"Opportunistic excuse? "Repsol has decided to halt all its renewable [Green] hydrogen projects in Spain after the government said it's considering making a controversial windfall tax on energy companies permanent" . Thx @Thomgua. Blame Spain or #GreenHydrogen economies aren't working. See 👇10/14/24 tweet on Uniper. #NatGas #OOTT."* We checked and there was no Repsol press release or tweet so we relied on the Bloomberg reporting that "*Repsol has decided to halt all its renewable hydrogen projects in Spain after the government said it's considering making a controversial windfall tax on energy companies permanent. The Madrid-based oil producer will hold back on plans to build so-called electrolyzers with a total capacity of 350 megawatts, a spokesperson for the company told Bloomberg News. The projects were nearing investment decisions, the representative said.*

The move comes after Spanish Economy Minister Carlos Cuerpo said the cabinet is considering indefinitely extending a levy on the domestic revenue of energy companies. The tax, approved in 2022 to fund measures to curb the impact of a cost-of-living crisis, sparked criticism that it would make Spanish companies less competitive." We haven't seen any reports that Repsol is halting an other energy projects. The reality is that green hydrogen projects are not economic to the project developers so it just seemed like Repsol was being opportunistic in halting their Spain green hydrogen projects once they saw word that Spain was 'considering' the extension of the tax. Our Supplemental Documents package includes the Bloomberg Repsol report.

10/14/24: Uniper "*are hardly any major customers who buy green hydrogen*"

Our Repsol tweet referenced Uniper's Oct 14, 2024 direct comments on green hydrogen not being economic. Here is what we wrote in last week's (Oct 20, 2024) Energy Tidbits memo. "*No one should be surprised that green energy project developers are pulling the plug or indefinite delays to projects – green hydrogen is very expensive and major buyers aren't stepping up to commit to any term buying to give the confidence for the supply project to spend the billions to get the project done. Because, without major buyers to commit to term buying at some very high price, the returns aren't there for the project developer. That was the very clear message from Uniper. On Monday, we tweeted [LINK] "No Green Hydrogen = Need #NatGas #Coal for longer. Uniper delays €8b in green projects. CEO "There are hardly any major customers who buy green hydrogen. That's why we have to put the brakes on a bit." "We cannot invest where we don't expect a good return" reports @MonicaRaymunt. Fits 👇10/09/24 tweet @BloombergNEF "End of the Hydrogen Hype Cycle?" #OOTT." There wasn't a press release, but Bloomberg reported "Uniper SE said a lack of demand is forcing the German utility to postpone €8 billion-worth ($8.7 billion) of investments into green hydrogen and other emissions-friendly technology beyond 2030. "We must not ignore developments in our business environment," Chief Executive Officer Michael Lewis said in an interview with Germany's Frankfurter Allgemeine Zeitung. The company had planned to invest €8 billion by the end of the decade, but Lewis said reaching that target will "probably take a few years longer," namely until "the early 2030s." "We cannot invest where we don't expect a good return," Lewis said, adding delays were necessary due in part to lacking demand for green hydrogen. "There are hardly any major customers who buy green hydrogen. That's why we have to put the brakes on a bit." Our Supplemental Documents package includes the Bloomberg report"*

07/16:24: EU green hydrogen plan based on politics not robust analysis,

On Monday, we tweeted [LINK] "*For anyone surprised by #GreenHydrogen not meeting the ambitions of EU/EC leaders, see 👇07/16/24 tweet. European Court of Auditors scathing rebuke of EU/EC "set overly ambitious targets for the production and import of renewable hydrogen.... These targets were not based on a robust analysis, but were driven by political will" "Building up an EU hydrogen industry requires massive public and private and investment" #NatGas will be needed for way longer. Thx @EUauditors #NatGas #OOTT."* Here is what we wrote in our July 21, 2024 Energy Tidbis memo. "*EU renewable energy plan based on politics not robust*

analysis. No one should be surprised that the European Court of Auditors scathing calling-out of the EU politicians on their renewable hydrogen plans and unrealistic targets that were set based on politics and not any robust analysis. And the problem is being unrealistic means that the costs are huge and nowhere the nirvana sold by western politicians that the transition won't lead to higher and more volatile energy prices. (i) On Tuesday, we tweeted [LINK] "Busted! No real analysis = EU unrealistic green hydrogen targets! "EU's industrial policy on renewable hydrogen needs a reality check" "set overly ambitious targets for the production and import of renewable hydrogen.... These targets were not based on a robust analysis, but were driven by political will" "Building up an EU hydrogen industry requires massive public and private and investment" "The EU should decide on the strategic way forward towards decarbonisation without impairing the competitive situation of key EU industries or creating new strategic dependencies." #Oil #NatGas will be needed for longer. Thx @EUauditors #OOTT." (ii) European Commission politicians have ignored this report. The ECA issued the report on Tuesday and EC President von der Leyen highlighted the EC's green hydrogen plans as if the plan and targets were fine in her Thursday speech on being reappointed EC President. (iii) EC needs a reality check in their renewable hydrogen targets. The ECA posted their report on the EC's renewable hydrogen plans and targets and titled their release "Renewable hydrogen-powered EU: auditors call for a reality check." The ECA said "The auditors call for a reality check to ensure that the EU's targets are realistic." (iv) The renewable hydrogen targets were politically driven, not driven by analysis. This is the big point we have highlighted for years – energy transition targets are NOT being set on analysis and reality. They are aspirational political ambitions. So they are doomed not to be met. The ECA clearly said this "To start with, the Commission set overly ambitious targets for the production and import of renewable hydrogen, i.e. 10 million tonnes each by 2030. These targets were not based on a robust analysis, but were driven by political will." (v) There is a massive requirement for public and private investment. This is another of our longstanding criticisms of setting energy transition targets that aren't based on analysis – there will be much higher costs. The ECA warned "Building up an EU hydrogen industry requires massive public and private and investment." (vi) Plus a line that looks to be more of a general big slap down that the EU's decarbonization plans are hurting Europe competitiveness. The ECA wrote "The EU's industrial policy on renewable hydrogen needs a reality check," said Stef Blok, the ECA Member in charge of the audit. "The EU should decide on the strategic way forward towards decarbonisation without impairing the competitive situation of key EU industries or creating new strategic dependencies." Our Supplemental Documents package includes the ECA release and excerpts from their report."

EC President immediately ignored the EC auditor warning on green hydrogen

It is clear why there is an increasing gap between EU politicians and green hydrogen projects proceeding – the EU/EC leaders are ignoring any information that isn't supportive that they are on track for green hydrogen aspirations. The best example was how EC President von der Leyen immediately ignoring the above European Court of Auditors report on green hydrogen. Here is what we wrote in our July 21, 2024 Energy Tidbits memo. "*EC President immediately ignored the EC auditor warning on green hydrogen. EC President, EU will stay the course on renewable*

hydrogen goals. It looks like the European Commission leaders are determined to not change their renewable hydrogen goals and plans even in the face of the above FCA clear report that they have an unrealistic target. EC President von der Leyen clearly stated there is no change to their renewable hydrogen 2030 goal. It looks like the European Commission leaders ignored thie ECA report. The ECA issued its report on Tuesday and EC President von der Leyen's acceptance speech on continuing as EC President spoke about renewable hydrogen as if the ECA never wrote its report. She or her staff had two days to acknowledge the report and amend what von der Leyen said about renewable hydrogen. Rather von der Leyen spoke as if the EC renewable hydrogen plans and targets were just fine and that "we will stay the course on our new growth strategy and goals we set for 2030 and 2050." Here is an excerpt from her Thursday acceptance speech "Honourable Members, Let me give you some figures. To start: in the first half of this year, 50% of our electricity generation came from renewables – home-grown and clean. Investments in clean technologies in Europe have more than tripled in this mandate. We attract more investments in clean hydrogen than the US and China combined. Finally, in the last years, we have concluded with global partners 35 new agreements on clean tech, hydrogen and critical raw materials. This is the European Green Deal in action. So I want to be clear. We will stay the course on our new growth strategy and the goals we set for 2030 and 2050. Our focus now will be on implementation and investment to make it happen on the ground."

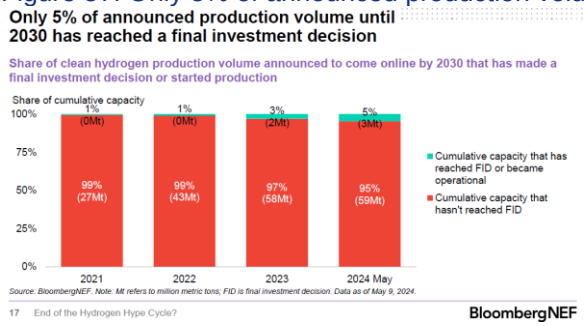
Energy Transition: BloombergNEF charts for "*End of the hydrogen hype cycle?*"

"End of the hydrogen hype cycle?"

Our tweet on Equinor stating Green Hydrogen won't be coming until Blue Hydrogen is working but that Blue Hydrogen isn't working as it is uneconomic and there are no significant customers. It reminds of the recent BloombergNEF Oct 9 report "End of the hydrogen hype cycle?" Here is what we wrote in last week's (Oct 13, 2024) Energy Tidbits memo.
"*BloombergNEF charts for "End of the hydrogen hype cycle?" We believe in hydrogen BUT our view on hydrogen scaling up has been consistent that the glowing growth forecasts from the past few years were nowhere near happening because the costs, in particular green hydrogen, were way too expensive so buyers in scale wouldn't step up. And without buyers in scale who are prepared to pay up, any growth in hydrogen will be modest at best and nowhere near Net Zero aspirations/goals. (i) On Wednesday, we tweeted [LINK] "Great charts from @BloombergNEF Sami Alisawi. - Funding for hydrogen in 2024 (annualized) is 1/4 of 2023 levels. - BNEF cut its hydrogen demand in 2030 by 70% vs 2021 & by 22% vs 2022 fcast. - Electrolyzer costs proving to be ~60% higher than estimated. - Green hydrogen production costs are ~100% higher than expected. - Only 5% of announced production volumes to 2030 have actually reached FID. - Developers are cancelling projects such as 👇Oct tweet. Hydrogen nowhere near aspirations for Peak #Oil #NatGas by 2030. #OOTT." (ii) "End of the Hydrogen Hype Cycle?" was the name of BloombergNEF's hydrogen update that laid out a series of charts that were negative on all the key items that are needed to ramp up hydrogen and this has meant a way less than expected ramp up in hydrogen. It's a good recap of all the negatives and it's hard to see the hydrogen market going much lower but the question is when it can it start to get on any sustained bounce of the bottom. (iii) Here are a few of the negatives. Project funding for YTD Apr 30, 2024 was only $11.3b, which compares to $139.6b in 2023 and $129.7b in*

2022. That is a huge drop in funding and funding drives the actual moving ahead on projects. BloombergNEF's new forecast for hydrogen demand in 2030 is 390 million metric tonnes per year, which is down 70% from its 2021 forecast of 1,318 mtpa and even down 22% from the 2021 forecast. Electrolyzer project costs were underestimated in al parts of the world and it looks like the updated project costs are ~60% higher than the prior cost estimates. There is a lack of buyers with only 12% of clean hydrogen capacity having identified offtakers. This is the problem that Saudi Aramco has raised for years – there aren't any buyers of size to get hydrogen suppliers to commit to spend the capex. Here is the big reason why hydrogen will disappoint for its growth to 2030 – only 5% of announced production volumes until 2030 have reached a FID. So projects announced their hydrogen project will be onstream by 2030 but 95% of the volume hasn't taken a final investment decision. There are more slides on the same theme. (iii) It's hard to see how hydrogen quickly goes on a sustained run up. BloombergNEF ends with a slide of the steps to success. They start with the easy one – finalize policies. But then step thru the reality check problems to date – reduce costs, increase offtake and increase investment. Then they can start building. Our Supplemental Documents package includes excerpts from the BloombergNEF "End of the hydrogen hype cycle?" report. "

Figure 57: Only 5% of announced production volume until 2030 has reached a FID



Source: BloombergNEF

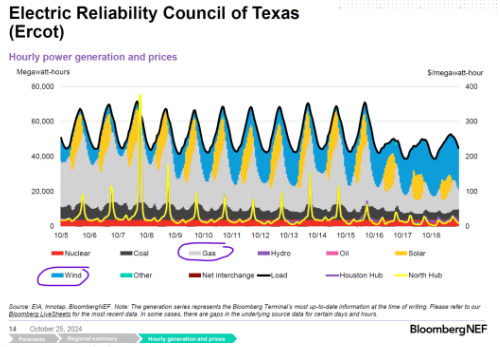
Energy Transition: Texas seasonally peak wind generation = less natural gas demand

Texas wind generation is up

We remind that Texas wind generation is seasonal and, like in Europe, it is weak in the summer and stronger in the winter. It's why Texas is most at risk for power shortages in the summer as electricity demand is then at its highest but wind generation is then the lowest. And now that its October, Texas wind generation is ramping up and that means natural gas gets squeezed out especially because it's shoulder season in Texas and that means Texas power generation is lower. So with wind generation up, it means natural gas gets squeezed. We were reminded of this when we saw the BloombergNEF US Power weekly graph of ERCOT power generation by source and natural gas was very low and wind was up. So we compared to the same graph in late July that shows how wind is down and natural gas is way up. On Friday, we tweeted [LINK] "*Reminder Texas #NatGas consumption gets seasonally squeezed as @ERCOT_ISO Texas wind generation is seasonally higher in Q4 and Q1. And since Texas electricity consumption is seasonally lower right now, below 👇 @BloombergNEF graphs show how #NatGas consumption gets hit. #OOTT."* Our tweet included the below ERCOT graph showing the monthly power by fuel source and then the

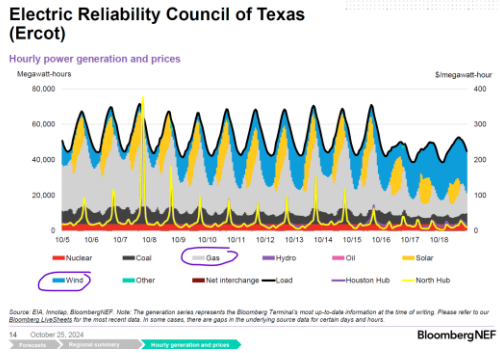
Bloomberg NEF graphs showing the hourly split of electricity fuel sources in late Oct vs late July.

Figure 58: ERCOT Texas monthly electricity by fuel source



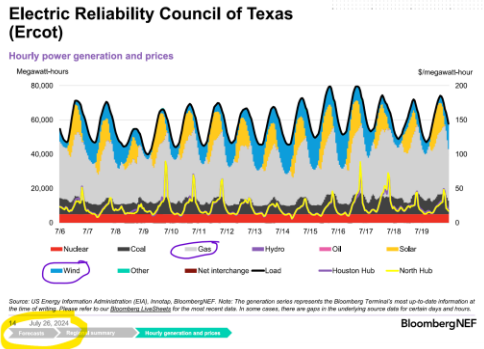
Source: ECOT

Figure 59: Texas hourly electricity by source, Oct 5-18



Source: ERCOT

Figure 60: Texas hourly electricity by source, July 8-19



Source: ERCOT

Capital Markets: Final BC election results expected today

BC election final count today

Yesterday, we tweeted [LINK] "*Final BC election count expected Sunday. But as of 6pm MT, recount is increasing NDP lead in both seats. Juan de Fuca Malaha: lead now +106. Surrey City Centre: lead now +178. Looks like NDP to govern with some form of Green support. NDP 46. Conservatives 46. Green 2. #OOTT [LINK].*" It looks like the election night results will be the final results, which, if confirmed today, will be NDP 46, Conservatives 46 and Green 2. No one will have a majority so that means the Green party will hold the balance of power. And no one expects that the Green could support the Conservatives. So it looks like the existing NDP government will continue to govern with some form of Green support.

Capital Markets: IFIC, mutual funds equity & balanced funds net redemptions in Sept

IFIC Cdn mutual fund data

We have been highlighting the big change to Cdn mutual funds that started in Q2/22 – when there started a shift from net sales to massive net redemptions in balanced and equity funds. What started in H2/22 played out even bigger in 2023 and is continuing, but on a lesser scale, in 2024 to date. However, we are seeing the rate of net redemptions slow, and in 2024, we are beginning to see a return to net sales in some periods as YTD equity funds turning positive. IFIC does not provide any explanations but one of the key changes in the last few months is falling interest rates. On last Tuesday, IFIC (Investment Funds Institute of Canada) reported mutual funds and ETF sales for September [LINK]. IFIC reported net redemptions (sale of positions) for balanced funds to be -$1.192b in September net redemptions of -$1.383 in August. This brings the YTD figure for balanced funds net redemptions to -$22.450b, less than last year's September YTD figure of -$37.148b in YTD 2023. Equity funds saw net redemptions of -$0.630b in September, after net sales of $1.093b in August and $2.088b of net sales in July. Equity fund net sales are down -$1.723b MoM from August. Recall February saw equity funds turn to net sales, which reversed a 12 month trend of net redemptions; March followed with small net sales in equity funds. Following this, Q2 saw net redemptions until July which once again returned to net sales. Our Supplemental Documents package includes the IFIC release.

Figure 61: Cdn Mutual Fund Net Sales/Net Redemptions ($ Millions)

Mutual fund net sales/net redemptions ($ millions)*

Asset class	Sep 2024	Aug 2024	Sep 2023	YTD 2024	YTD 2023
Long-term funds					
Balanced	(1,192)	(1,383)	(6,147)	(22,450)	(37,148)
Equity	(630)	1,093	(2,411)	585	(15,995)
Bond	2,335	2,538	(925)	18,674	7,666
Specialty	396	547	133	5,553	2,775
Total long-term funds	909	2,795	(9,349)	2,361	(42,702)
Total money market funds	(119)	(420)	1,537	2,075	11,678
Total	790	2,376	(7,812)	4,436	(31,024)

Source: IFIC

There were massive redemptions in Cdn active equity/balanced funds in 2023

2023 was a brutal year for net redemptions for Cdn balanced and equity funds and even more than in 2022. Here is what we wrote in our Jan 28, 2024 Energy Tidbits memo. *On Friday, we tweeted [LINK] "Brutal year for net redemptions in balanced and equity mutual funds in Canada. @ific reflects $82.5 billion net redemptions including $56.9b from balanced mutual funds and $25.6b from equity mutual funds. #OOTT." One of the big Cdn equity stories in 2022 continued to play out in an even*

bigger way in 2023 – the continued net redemptions from active managed Cdn equity and balanced mutual funds. This flipped in Q2/22 from massive net sales into balanced and equity mutual funds to massive net redemptions in equity and balanced mutual funds. This year, the 2023 net redemption total dwarfed those in 2022. On Wednesday, IFIC (Investment Funds Institute of Canada) reported [LINK] mutual funds and ETF sales for November. IFIC reported net redemptions for balanced mutual funds were $4.612b in December vs $6.510b in November and $8.569b in October. IFIC also reported net redemptions for equity mutual funds were $2.514b vs net redemptions of $3.178b in November and $4.142b in October. This means, barring any major revisions, that in 2023 there were $82.5b of net redemptions in balanced and equity mutual funds! This is more than double the net redemptions of 2022.

Figure 62: Cdn Mutual Fund Net Sales/Net Redemptions ($ Millions)

Mutual fund net sales/net redemptions ($ millions)*

Asset class	Dec 2023	Nov 2023	Dec 2022	2023	2022
Long-term funds					
Balanced	(4,612)	(6,510)	(4,935)	(56,866)	(29,959)
Equity	(2,514)	(3,178)	(3,069)	(25,568)	(8,461)
Bond	845	(435)	(2,187)	6,986	(13,811)
Specialty	176	391	102	3,538	1,306
Total long-term funds	(6,105)	(9,732)	(10,088)	(71,909)	(50,925)
Total money market funds	790	1,227	1,802	14,825	7,196
Total	(5,315)	(8,506)	(8,286)	(57,084)	(43,729)

Source: IFIC

Twitter: Thank you for getting me to 11,000 followers

@Energy_Tidbits on Twitter

Last month, I went over 11,000 followers on Twitter/X. I really appreciate the support and, more importantly, some excellent insights and items to look at from Twitter followers. It helps me do a better job. 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.

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 food.

Wine of the week: 2000 Chateau de Beaucastel Chateauneuf du Pape

In August, I started the wine of the week when I realized I had to get to opening up some wines bought 20 to 30 years ago that included some that, unfortunately, were getting past their prime. One of the negatives of the change in life from Covid was a huge absence of entertaining at home, which means there has been a big shortfall in wine drinking at our home. So am now making sure what, when I bought them 15-25

years ago, were some good wines and make sure bottles get opened especially as many are 20 to 40 years old. On Friday, I tweeted out the wine of the week, which was the 2000 Chateau de Beaucastel Chateauneuf du Pape. It was another bottle in the cellar during the great Alberta flood of 2013 so the label was a little beaten up and the expert review was gone. I decanted it for only an hour and it was still drinking really well. Normally I drink the Chateauneuf du Pape wines around the 15 year mark so I wasn't surprised that the wine is still drinking very well and no need to rush the remaining half a case.

Figure 63: 2000 Chateau de Beaucastel Chateauneuf du Pape

Source: SAF Group