SAF GROUP

Energy Tidbits

Oct 2, 2022

Produced by: Dan Tsubouchi

US Oil Production in July is Only +166,000 b/d vs Dec 2021

Welcome to new Energy Tidbits memo readers. We are continuing to add new readers to our Energy Tidbits memo, energy blogs and tweets. The focus and concept for the memo was set in 1999 with input from PMs, who were looking for research (both positive and negative items) that helped them shape their investment thesis to the energy space, and not just focusing on daily trading. Our priority was and still is to not just report on events, but also try to interpret and point out implications therefrom. The best example is our review of investor days, conferences and earnings calls focusing on sector developments that are relevant to the sector. Our target is to write on 48 to 50 weekends per year and to post by noon MT on Sunday. The Sunday noon timing was because PMs said they didn't have research to read on Sundays and Sundays are a day when they start to think about the investing week ahead.

This week's memo highlights:

1. EIA actuals for July US oil production were 11.80 mmb/d, only +166,000 b/d vs Dec 2021 of 11.634 mmb/d. (Click Here)

2. Did OPEC+ switch to 1st in-person meeting since Covid so it could deliver expected oil cuts on Wed including real cuts for all countries? (Click Here)

3. More showcasing of LNG Canada, surely Phase 2 FID is coming really soon? (Click Here)

4. Signs of China reopening? China domestic air flights are increasing. (Click Here)

5. Sounds like the Houthi truce with the Saudi backed Yemen govt is about to end tonight. (Click Here)

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

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

Dan Tsubouchi
Chief Market Strategist
dtsubouchi@safgroup.ca

Ryan Dunfield
CEO
rdunfield@safgroup.ca

Aaron Bunting
COO, CFO
abunting@safgroup.ca

Ryan Haughn
Managing Director
rhaughn@safgroup.ca

Table of Contents

Natural Gas – Natural gas injection of +103 bcf, storage now -180 bcf YoY deficit

YoY storage at -180 bcf YoY deficit

It's shoulder season, which means no significant weather related demand. For an example, daytime highs in most of the US are in the mid to high 60s, which means its leave the windows weather. The YoY storage deficit started the winter at -282 bcf YoY at Oct 31 and is now -180 bcf YoY. The EIA reported a +103 bcf build (vs +95 bcf expectations) for the Sep 23 week, which was below the 5-yr average build of +77 bcf, and above last year's injection of +88 bcf. Storage is 2.977 tcf as of Sep 23, decreasing the YoY deficit to -180 bcf, from -197 bcf last week and storage is -306 bcf below the 5-year average vs -332 bcf below last week. Below is the EIA's storage table from its Weekly Natural Gas Storage Report [LINK].

Figure 1: US Natural Gas Storage

	Stocks billion cubic feet (Bcf)				Historical Comparisons: Year ago (09/23/21)		Historical Comparisons: 5-year average (2017-21)	
Region	09/23/22	09/16/22	net change	implied flow	Bcf	% change	Bcf	% change
East	721	690	31	31	775	-7.0	807	-10.7
Midwest	879	844	35	35	930	-5.5	937	-6.2
Mountain	176	168	8	8	200	-12.0	203	-13.3
Pacific	243	237	6	6	243	0.0	283	-14.1
South Central	958	935	23	23	1,010	-5.1	1,052	-8.9
Salt	204	199	5	5	237	-13.9	257	-20.6
Nonsalt	754	736	18	18	772	-2.3	795	-5.2
Total	**2,977**	**2,874**	**103**	**103**	**3,157**	**-5.7**	**3,283**	**-9.3**

Source: EIA

Natural Gas – AccuWeather forecast a warm start to a warmer than normal winter

AccuWeather Winter Forecast

On Wednesday, AccuWeather released their annual winter weather forecast for the US [LINK]. AccuWeather forecasts a warm start to a warmer than normal winter in most of the key natural gas demand regions. This is despite this being the 3rd year of a La Nina. Despite the warm start to winter, AccuWeather raises the potential for a colder end to winter. AccuWeather wrote *"The last two Februarys have featured significant cold waves for the central and southern Plains. There is a chance once again on this third La Niña winter, that cold air reaches this region."* AccuWeather also raises the potential for another polar vortex in February that would push cold air across the Rockies and most of the central U.S., increasing fuel demand to heat homes. Our Supplemental Documents package includes the AccuWeather winter forecast.

Figure 2: AccuWeather Forecast Dec Temperature Departures from Normal

Source: AccuWeather

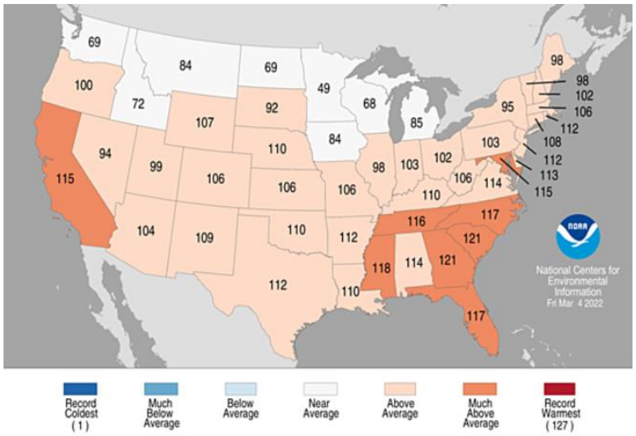
Figure 3: AccuWeather Forecast D/J/F Temperature Departures from Normal

Source: AccuWeather

Winter 2021-2022 was one of the warmest DJF in the US on record

US HH natural gas prices have been driven to these high levels by global LNG markets. But winter weather is always a key to natural gas prices. Last year, it didn't make a difference because of what happened to natural gas and LNG markets post Russia's invasion of Ukraine. As a reminder, HH was $3.82 on Dec 31, 2021 as it was a warm start to a warm winter. Dec/Jan/Feb was the 18th hottest winter in the last 127 years. It was very hot in almost all states. Below is NOAA's statewide average temperature maps for Dec/Jan/Feb. [LINK]

Figure 4: Statewide Average Temperature Ranks Dec 21-Feb 22



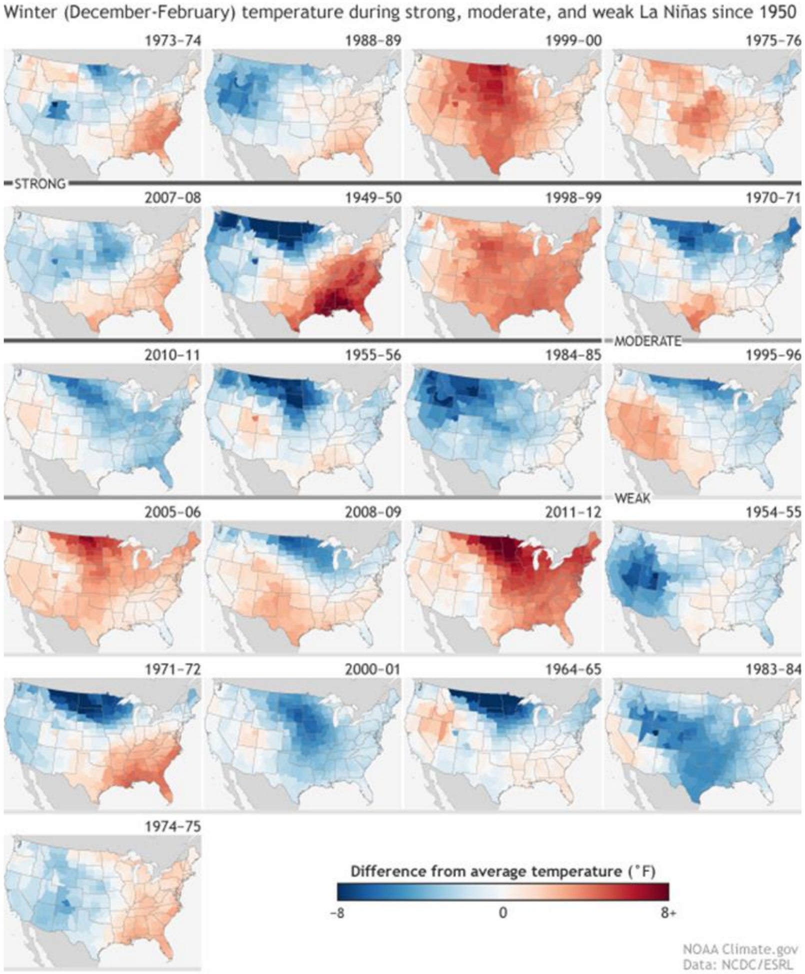
Source: NOAA

Natural Gas – La Nina winters correlations to cold winters are far from 100%

La Nina winters are unpredictable

AccuWeather's winter forecast is the 3rd year of La Nina conditions, yet they call for a warmer than normal winter. It's a good reminder that La Nina winters aren't always cold. Our Aug 11, 2022 Energy Tidbits highlighted NOAA's call for a La Nina/Normal winter. And we included our normal comment that La Nina winters are more often normal to colder than normal than a warmer winter. But we remind of an Oct 6, 2017 NOAA brief *"Temperature patterns during every La Niña winter since 1950"*, which looked at all La Nina winters from 1950 thru 2016/17, classified them as strong, moderate or weak La Ninas, and then showed the average winter (Dec thru Feb) temperature map. The link still works [LINK]. The bottom line is that La Nina winters may slightly favor a normal to colder than normal winter, but there have some been near record high temperature La Nina winters. NOAA's new seasonal outlook doesn't call for record warm Dec/Jan/Feb, but does call for a warmer than normal winter. Below is the NOAA graphic.

Figure 5: Winter (Dec-Feb) Temp in Strong, Moderate And Weak La Ninas 1950 - 2017



Source: CPC

Natural Gas – US July gas production down -0.1 bcf/d MoM to 98.3 bcf/d

US July gas production -0.1 bcf/d YoY

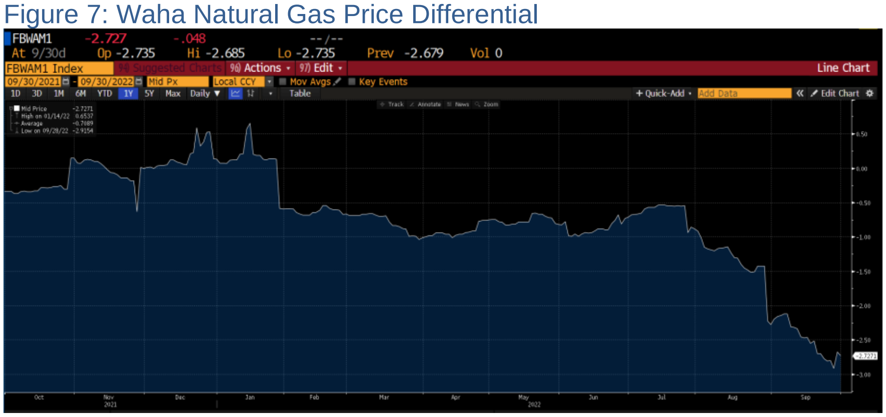
It hasn't received a lot of attention, but Waha gas differentials started to widen in July, which is an indicator that Permian gas takeaway was being restricted ie. some Permian natural gas has been shut-in. On Friday, the EIA released its Natural Gas Monthly on Friday, [LINK], which includes its estimates for "actuals" for July gas production. The key takeaway from the July actuals is that July is down -0.1 bcf/d MoM to 98.3 bcf/d but still sits above the recent Nov/Dec 2021 peak of 97.0 bcf/d. July 2022 is +4.6 bcf/d YoY. With the backdrop of Waha gas price diffs widening, we believe July gas production would have been higher, but we can't point to a specific number. Unfortunately, this means we can't tell if there is still increasing MoM US natural gas production or if US production is starting to settle out. We had seen a change in April with data showing US natural gas production had started to break out in April. Below is the Waha natural gas price differential graph for the past year. Our Supplemental Documents package includes excerpts from the EIA Natural Gas Monthly.

Figure 6: US Dry Natural Gas Production

bcf/d	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	56.0	60.0	66.0	65.3	66.8	73.4	73.6	70.6	78.7	89.4	95.1	92.8	95.3
Feb	57.2	58.8	67.0	65.4	68.4	73.8	77.3	71.5	80.4	90.0	98.1	86.2	94.5
March	57.3	61.5	65.0	65.3	68.9	74.1	73.8	73.2	81.3	90.6	94.6	92.3	95.4
Apr	57.6	62.3	64.8	66.1	70.5	75.2	73.7	73.3	81.2	91.0	92.9	93.2	96.5
May	58.0	62.4	65.0	65.9	70.2	74.1	72.9	73.3	82.1	91.7	87.8	93.0	97.7
June	57.2	62.1	64.6	65.8	70.5	74.0	72.2	74.0	82.5	92.0	88.4	93.2	98.4
July	58.2	62.5	66.3	67.1	72.0	74.2	72.8	74.7	84.2	92.5	89.8	93.7	98.3
Aug	58.9	63.2	66.0	66.9	72.4	74.3	72.2	74.7	85.9	94.8	90.2	94.3	
Sept	59.1	63.1	66.4	66.8	72.4	74.7	71.7	76.0	87.3	94.7	89.5	93.6	
Oct	60.1	65.1	66.5	67.0	73.1	74.2	71.4	77.3	88.4	96.0	88.9	95.6	
Nov	60.1	65.9	66.6	67.7	72.6	73.9	72.0	79.8	89.9	96.7	92.0	97.0	
Dec	61.0	65.6	66.0	66.5	73.2	73.9	71.2	80.4	89.5	97.0	92.5	97.0	
Average	58.4	62.7	65.9	66.3	70.9	74.2	72.9	74.9	84.3	93.0	91.6	93.5	96.6

Source: EIA

Figure 7: Waha Natural Gas Price Differential



Source: Bloomberg

Natural Gas – US LNG exports inJuly showed full impact of Freeport LNG shut down

US July LNG flat at 9.7 bcf/d YoY

As expected, US LNG exports were still lower in July as July showed the full impact of the Freeport LNG 2.2 bcf/d shut down on June 8. US LNG exports have continued to slip from the monthly record of 11.7 bcf/d in March, and 11.3 bcf/d in May to 9.7 bcf/d in July. The Freeport LNG explosion was on June 8. This is the reason why US LNG exports were below

11 bcf/d for the second consecutive month. The big driver to stronger (and higher downside support) US natural gas prices has been the ramp up in US LNG exports, which, prior to Freeport LNG shut down, were up ~7 bcf/d over the past 3 years. This is ~2.5 tcf a year of added gas demand for US natural gas supply. On Friday, the EIA Natural Gas Monthly reported "actuals" for US LNG exports were 9.7 bcf/d in July, which is flat YoY and down -0.3 bcf/d from June of 10.0 bcf/d. Note our table rounds to one decimal and the actual is 9.691 bcf/d for July. Below is our table of EIA's monthly LNG exports.

Figure 8: US LNG Exports (bcf/d)

(bcf/d)	2016	2017	2018	2019	2020	2021	2022
Jan	0.0	1.7	2.3	4.1	8.1	9.8	11.4
Feb	0.1	1.9	2.6	3.7	8.1	7.4	11.3
March	0.3	1.4	3.0	4.2	7.9	10.4	11.7
Apr	0.3	1.7	2.9	4.2	7.0	10.2	11.0
May	0.3	2.0	3.1	4.7	5.9	10.2	11.3
June	0.5	1.7	2.5	4.7	3.6	9.0	10.0
July	0.5	1.7	3.2	5.1	3.1	9.7	9.7
Aug	0.9	1.5	3.0	4.5	3.6	9.6	
Sept	0.6	1.8	2.7	5.3	5.0	9.5	
Oct	0.1	2.6	2.9	5.7	7.2	9.6	
Nov	1.1	2.7	3.6	6.4	9.4	10.2	
Dec	1.3	2.7	4.0	7.1	9.8	11.1	
Full Year	0.5	1.9	3.0	5.0	6.6	9.7	10.9

Source: EIA

Natural Gas – US pipeline exports to Mexico basically flat MoM at 6.1 bcf/d in July

The EIA Natural Gas Monthly also provides its "actuals" for gas pipeline exports to Mexico, which were 6.1 bcf/d in July, which up MoM from June of 6.0 bcf/d but down YoY vs 6.4 bcf/d in July 2021. There were no revisions to this month's data. We believe part of the reason for the lower YoY pipeline exports to Mexico is the higher price of natural gas. Power costs are increasing at a much higher rate in many parts of Mexico relative to the US.

Figure 9: US Pipeline Gas Exports To Mexico (bcf/d)

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

Source: EIA

Natural Gas – Surely FID for LNG Canada 1.8 bcf/d Phase 2 is coming any day now!

LNG Canada 1.8 bcf/d Phase 2

We recognize we were the first, a long time ago, to say the dramatic changed LNG market in mid 2021 was going to lead to Shell FID on LNG Canada Phase 2 in 2022. There was a host of other reasons including to get the brownfield cost benefits by keeping the contractors on site and maintaining Asian fabricator slots. This became even more solidified when Shell, including new Shell CEO Sawan, amped up the showcasing of LNG Canada at the Shell Feb

2022 investor outlook. This week, LNG Canada held a tour for the press and, no surprise, there were glowing reports on the construction process, now ~70% completed. And also no surprise, LNG Canada CEO comments point the way to a FID for LNG Canada Phase 2. We still believe the likely timing is ahead of Shell Q3 release on Oct 27. On Thursday, we tweeted [LINK] "*We have substantially de-risked Phase 2 by building Phase 1" #LNGCanada CEO. Surely FID coming by #Shell Q3 release 10/27? See 👇06/11 tweet, LNG Canada is a game changer for 🇨🇦 #NatGas, Phase 1 is >10% of AB/BC #NatGas, Phase 2 doubles that. Thx @roberttuttle. #OOTT."* Bloomberg was on the trip and wrote "*The business case for that "looks very compelling," said Jason Klein, chief executive officer of LNG Canada Development Inc., the global consortium led by Shell Plc that's behind the project. "We have substantially de-risked Phase Two by building Phase One."* Two months ago, Shell said they were evaluating LNG Canada Phase 2. We find it almost impossible to believe Klein would say what he did if he had any doubt Shell wouldn't FID LNG Canada Phase 2. Our Supplemental Documents package includes the Bloomberg report.

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

A future Cdn natural gas supply squeeze

The reason why we were early focus on LNG Canada Phase 1 and call for an FID a year before the FID was because LNG Canada Phase 1 is 1.8 bcf/d and is a game changer to western Canada natural gas. It is over 10% of BC/AB natural gas production. On Sept 20, 2017, we posted our 4-pg blog "*China's Plan To Increase Natural Gas To 10% Of Its Energy Mix Is A Global Game Changer Including For BC LNG*" that concluded "*And perhaps most of all for Canada, its why we see a better chance than ever to see a Shell FID on its BC LNG in 2018."* LNG Canada sets up a supply squeeze on natural gas much like is being seen in the US today. It's why, on June 11, 2022, we tweeted [LINK] a reminder that the under construction LNG Canada Phase 1 of 1.8 bcf/d sets up a similar natural gas supply squeeze as being seen today in the US. And this is just from the under construction LNG Canada Phase 1. We tweeted *"#LNGCanada Phase 1 is 1.8 bcfd already sets up Cdn #NatGas supply squeeze like in US. >10% of BC/AB #NatGas supply 16 bcfd ie. like US #LNG exports now ~12 bcfd vs ~100 bcfd total supply. LNG Canada Phase 2 adds another 1.8 bcfd. Cdn nat gas looks very good thru 2030. #OOTT*". The US currently exports ~12 bcf/d vs total US natural gas supply of ~100 bcf/d. LNG Canada Phase 1 is 1.8 bcf/d vs BC/Alberta natural gas supply of ~16 bcf/d. The math is very similar. LNG Canada and Shell have never been specific on the exact timeline but have noted that they expect first LNG by the middle of this decade ie. inferring late 2024. And our tweet reminded that LNG Canada Phase 2 is another 1.8 bcf/d for a total of the two phases being 3.6 bcf/d.

Will new Shell CEO Sawan recommend FID LNG Canada Phase 2

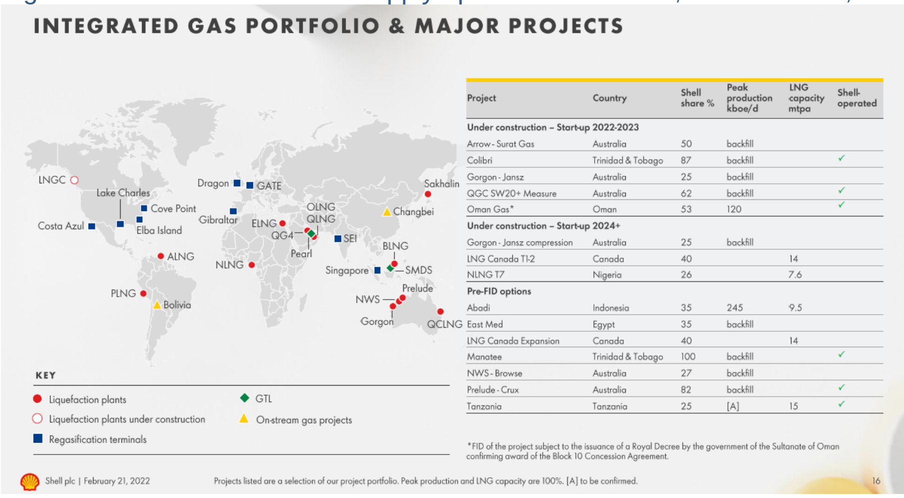
We missed our expectation for Shell to FID LNG Canada Phase 2 in September, but it's hard for anyone to not believe it's coming soon. Our Sept 18, 2022 Energy Tidbits memo was titled "*Will New Shell CEO Sawan Move in Near Term on FID for LNG Canada's Brownfield 1.8 bcf/d Phase 2? We Think So."* In that memo, we wrote "*There is only two weeks to go in September to see if our long standing call will turn out that we should see Shell FID the 1.8 bcf/d LNG Canada Phase 2 in H2/22 with our expected timing in September. (i) We still feel that timing has a good shot, especially since their big Thursday announcement [LINK] "Shell Chief Executive Officer Ben van Beurden to step down, Wael Sawan appointed as his successor". Sawan has been running their key group "Integrated Gas, Renewables and Energy*

Solutions". A FID on LNG Canada Phase 2 would be a major decision for Shell and we would think they wouldn't announce it and then appoint Sawan to be CEO. Van Beurden is stepping down at year end and a FID would seem to be a fitting major announcement as part of his legacy and also as part of the start of Sawan's legacy. (ii) Sawan has made a point of noting LNG Canada's strengths. We have been reporting on Sawan's comments on LNG and LNG Canada, which is why we tweeted [LINK] "Gotta believe new #Shell CEO Sawan will be recommending FID for #LNGCanada brownfield 1.8 bcfd Phase 2. See 👇 Feb 21 thread, #LNG outlook only stronger since Sawan's showcasing of LNG Canada. What's good for LNG Canada is great for West Cdn #NatGas valuations. #OOTT." We linked to two Feb 21 tweets on comments by Sawan on the Shell major webcasts "Shell Integrated Deep Dive" on Feb 21. Sawan made a number of positive comments on LNG Canada that we said felt like it was showcasing the project for a Phase 2 FID in 2022. (iii) This followed their separate LNG Outlook 2022 webcast that day that had a very bullish LNG outlook including their forecast for a LNG supply gap to emerge in the mid-2020s. The LNG outlook has only got more bullish since the Shell outlook. (iii) The combination of Sawan's glowing comments on LNG Canada and the even stronger LNG outlook is why we still believe in our expectation for Shell to FID its LNG Canada Phase 2 sooner than later." .

Seems like Sawan was showcasing LNG Canada in the Feb 21 webcast

Here is what we wrote in our Feb 27, 2022 Energy Tidbits. "*Natural Gas – still seems Shell is showcasing LNG Canada as prelude to Phase 2 FID. We recognize that almost no one else has been believing Shell will FID LNG Canada Phase 2 this year, but we can't help still believe this following Shell's LNG Outlook 2022 and its Integrated Business Deep Dive webcast that followed the outlook webcast. We tweeted [LINK] "Was #Shell showcasing #LNGCanada or just highlighting its positives today? @Shell expects average IRR of 14-18% for its pre-FID projects, which includes #LNGCanada Phase 2. #LNGCanada "is set to deliver the lowest carbon intensity in the entire industry". #OOTT #NatGas #LNG". (i) Just like we have been highlighted over the past months, this week, Shell seemed to showcase LNG Canada on multiple fronts (i) Shell now plans assuming there is an LNG supply gap in mid 2020s and that this "focuses attention" on the need for more LNG supply FIDs. So they are saying there is a clear market need for someone to step forward. (ii) In the Integrated Gas comments, mgmt said they are making good progress on LNG Canada Phase 1 construction and first LNG cargos are on track for by the middle of this decade. (iii) LNG Canada is the lowest emissions LNG project in industry. This is making the case that if there is any LNG to be done in a world of reducing emissions, it is the lowest emissions and Shell says LNG Canada is the best. Mgmt said "But the long term role of gas depends on efforts to abate emissions and develop cleaner pathways for gas. This is why we continually try to reduce the carbon intensity of our new projects. Take LNG Canada currently under construction. It will run on hydropower and is set to deliver the lowest carbon intensity in the entire industry." (iv) Shell's pre-LNG FID supply projects that includes LNG Canada have high RORs. Mgmt said "For the pre-FID projects, we have an expected average internal rate of return of between 14% and 18%, and a unit technical cost below $5/mmbtu. With most of these projects clearly having lower costs than the average* *in the industry. These are good numbers, but you will understand that we strive to push the IRR to the higher end and to push the unit costs down even further.” There were other items showcasing LNG Canada including pictures. It just feels like Shell continues to showcase LNG Canada, which we believe keeps pointing to them wanting to FID LNG Canada Phase 2 in 2022 and sooner rather than later. Our Supplemental Documents package includes excepts from the Shell Integrated Gas slide deck and transcripts we made of some of the Shell mgmt comments.”*

Figure 10: Shell Pre-FID LNG supply options – Indonesia, LNG Canada, Tanzania



Source: Shell

Shell wants enough gas supply to align with LNG Canada offtake obligations

There was another very interesting comment from new Shell CEO Sawan on the Feb investor presentation. Our reference to mgmt. is to comments from Sawan, who said Shell wants to make sure they have enough natural gas supply for their share of the LNG offtake at LNG Canada. We were surprised by Sawan being that specific. Here is another excerpt from our Feb 27, 2022 Energy Tidbits. “*We couldn’t help tweet [LINK] “Buckle up, could be huge for Cdn #NatGas M&A. @Shell just said like to align equity #NatGas supply and offtake obligations, used #LNGCanada, Shell has 40% interest so would be 1.44 bcf/d if it FIDs #LNGCanada phase 2. It's why #LNGCanada Phase 2 is the must watch event #OOTT #LNG”. Shell specifically said they want to have enough natural gas supply to align with their offtake obligations at LNG Canada. There was another excellent example of mgmt showcasing LNG Canada when they really didn’t have to do so. In the Q&A, the analyst asks a general question if they will align their natural gas supply with their offtake obligations for any LNG project and then the analyst asked about the Coastal GasLink attack. The percentage question was not specifically directed at LNG Canada. However, mgmt took the opportunity to answer the supply question using LNG Canada. Mgmt replied “typically, what I would say, as much as possible, having access across the entire value chain in as close of a percentage as you can, helps ensure that wherever value might rate at any point in time, you are capturing that* *value. So in general. Take our LNG Canada investment that you just referenced in the second question, we would look to be able to at least assure ourselves that we are not caught up by vagaries of one part of the market. let's say the gas supply, but we would want to have enough on the gas supply equity side to be able to make sure if gas prices go up there, we benefit from them while maybe disadvantaging the midstream or vice versa depending on where prices go. So we are not in the game of necessarily taking undue risk. we are in the game of creating integrated value chains that we can leverage as part of the broader portfolio." Shell has 40% in LNG Canada. Phase 1 is 1.8 bcf/d so Shell equity gas supply is 0.72 bcf/d. Our tweet included the Shell disclosure on North America natural gas supply, they don't provide Canada/US split, but that is roughly equal to North America in Q4/2021. They have some GoM natural gas but don't know the split. Maybe half or a little more in Canada? Phase 2 is 1.8 bcf/d so another 0.72 bcf/d."*

Natural Gas – Mexico's natural gas production still stuck below 5 bcf/d, +3.0% YoY

Mexico natural gas still stuck below 5 bcf/d

On Wednesday, Pemex reported [LINK] its oil and gas data for August. Pemex reported natural gas production of 4.796 bcf/d, which was +3.0% YoY but -0.4% MoM. For the past 3 years, an ongoing theme of the Mexican energy sector, has been their inability to grow domestic natural gas production. Mexico's unchanged production over the past five years has created the need for increased US pipeline exports to Mexico as Mexico builds out its domestic natural gas infrastructure. Pemex does not provide any commentary along with its production data. Below is our ongoing table of Pemex reported monthly natural gas production.

Figure 11: Mexico Natural Gas Production (bcf/d)

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

Source: Pemex

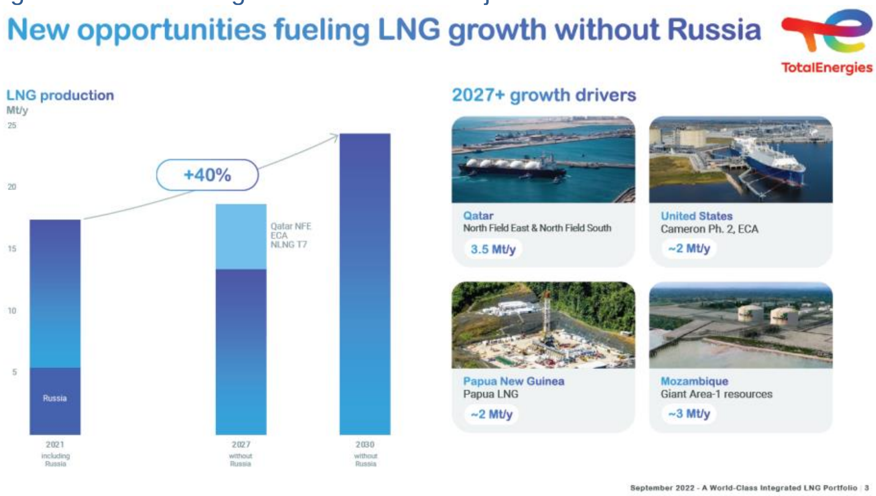
Natural Gas – TotalEnergies not planning Mozambique LNG until after 2027

TotalEnergies Mozambique LNG

TotalEnergies held its investor day on Wednesday and did not give any expected restart to its Mozambique LNG. Circumstances can change, but, on the call, mgmt gave no indication or inference that they might be close to a restart around year end. Rather they just said a normal type line "*And in Mozambique, I will come back on it. Of course, security is today improving, but yet to have to improve before we can restarted to project, but the project is there, and we are working to see how we can relaunch it."* But it looks like TotalEnergies is not assuming any early 2023 restart at Mozambique LNG. We tweeted [LINK] *"#TotalEnergies just posted #LNG slides for today's investor day. Not planning a quick restart to Mozambique LNG as NO volumes are included in LNG growth until AFTER 2027. #OOTT #NatGas*." TotalEnergies includes Mozambique LNG in their forecast for sometime after

2027. Last week's (Sept 25, 2022) Energy Tidbits memo noted comments from TotalEnergies country manager. We then wrote "The latest Cabo Ligado Weekly: 12-18 September 2022 was posted on Tuesday. [LINK] The weekly highlighted Nyusi's comments from last week. But interestingly, the weekly also had comments from TotalEnergies Mozambique country manager. Cabo Ligado Weekly wrote "*This recognition that there is still much work to be done was echoed by her colleague Stéphane Le Galles, Director of TotalEnergies' Mozambique liquefied natural gas (LNG) project, who said there are "visible signs of people coming back to the region but we are not there yet." "The journey is long but the direction is very good," he concluded*."

Figure 12: TotalEnergies LNG Growth Projects



Source: TotalEnergies

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

It is important to remember that a restart of TotalEnergies Mozambique Phase 1 is more than a restart of the 1.7 bcf/d for Phase 1 – it's really sets in motion 5.0 bcf/d of Mozambique LNG. This is why we have highlighting TotalEnergies force majeure on its Mozambique LNG Phase 1 for the past 17 months as the game changing event for LNG markets. TotalEnergies Mozambique Phase 1 at 1.7 bcf/d is significant, but our view has been because TotalEnergies delaying Phase 1 of 1.7 bcf/d is actually leading to a delay of 5.0 bcf/d. This was the reason why, on April 28 2021, we posted a 7-pg blog "*Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?*" [LINK] We thought, and still think, there has been a major change to the outlook for LNG supply in the 2020s and one that is still being overlooked – there is a big new LNG supply gap starting around 2025 that is hitting faster and bigger than anyone expects. We saw Total's April 27, 2021 announcement of force majeure at its Mozambique Phase 1 LNG of 1.7 bcf/d was much more significant that viewed. We just didn't see market focused on the fact that this situation backs up an additional 3.3 bcf/d of LNG supply that is also being counted on in all LNG supply forecasts. Total's Phase 2 of 1.3

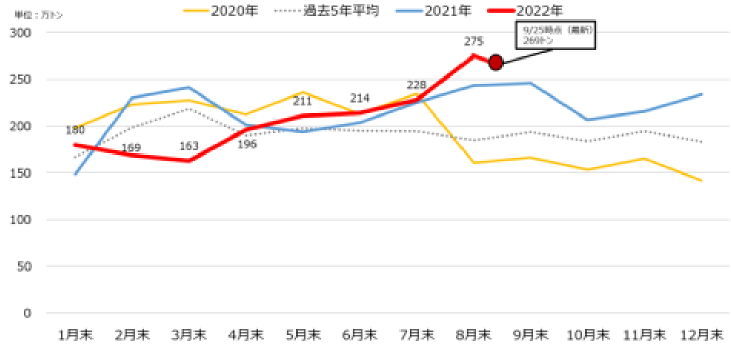
bcf/d was to follow, and Exxon's Rozuma Phase 1 of 2.0 bcf/d was originally expected to go FID in 2019 but is now not expected to have a FID decision until 2022 at the earliest. Mozambique is considered a premium LNG supply region for Asia and is in LNG supply forecasts. Total's original in service for Phase 1 is 2024. We had been warning that Mozambique has a major LNG market impact and its why we posted the April 28 blog. Its also why earlier we said that this is starting the clock running for other LNG projects wanting to go FID to make their mind up ie. like LNG Canada Phase 2. Our Supplemental Documents package includes our 7-pg April 28, 2021 blog.

Natural Gas – Japan's LNG stocks up +5.7% from last week

Japan LNG stocks +5.7% WoW

The risk for Japan in the winter is that they need full storage and continued LNG imports to avoid natural gas outages. That's because Japan's LNG stockpiles are not huge relative to LNG imports that have ranged from 7 to 14 bcf/d since Jan 1, 2021. A cold winter or interruption in LNG imports could easily lead to a shortage. LNG stockpiles held by Japanese power producers have exceeded both last year's level and the 4-year average. Japan's METI weekly LNG stocks data was released on Wednesday [LINK]. LNG stocks at Sep 25 were ~129 bcf, +5.7% WoW from 122 bcf and up from the 5-yr average of 118 bcf. Below is the LNG stocks graph from the METI weekly report.

Figure 13: Japan's LNG Stocks



Source: METI

Natural Gas – Not including near term Japan temp forecasts during shoulder season

Shoulder season in Japan

We normally include the Japan Meteorological Agency weekly near term (next month) temperatures forecasts for Japan. However, we don't plan to include these forecasts for the few weeks during shoulder season as there really isn't any significant weather related natural gas demand. For example, AccuWeather forecast for Tokyo over the next few weeks is for above average temperatures with daily highs +/-22C and daily lows +/-15C. That seems like perfect leave the windows open weather. We expect to relaunch their inclusion as we get closer to the end of Oct.

Natural Gas – TotalEnergies reality view of the need for Russian natural gas in Europe

TotalEnergies on Russian natural gas

The market focus has been on how Europe survives winter 2022-23 without Russian natural gas, but we are seeing more realize that surviving this winter doesn't mean it's all better thereafter and Europe can do without Russian natural gas. On Wednesday, we tweeted

[LINK] "*Common sense view. "my view is if we want to exit from this war and to find peace on this continent again, the #NatGas business will have to be part of the peace between RUS and EU" @PPouyanne.Thinks eventually 50 bcm (~5 bcfd) comes back of 150 bcf (~15 bcfd). #LNG #OOTT."* TotalEnergies held investor meetings on Tues and Wed. In the Q&A on Wed, mgmt. was asked if they thought some volume of Russian natural gas will eventually come back and work its way into Europe. Our tweet included the transcript we made of TotalEnergies CEO Pouyanne's comments. At 9:59, Pouyanne said "*my view is if we want to exit from this war and to find peace on this continent again, the gas business will have to be part of the peace between Russia and Europe. But not as it was before. Not at 150 bcm, but I would not be not be surprised to see 50 bcm continuing to flow. Is it LNG, is it piped gas, I don't know. LNG offers more flexibility to everybody."*

Natural Gas – Germans natural gas consumption is going up, not down

Germans increase natural gas consumption

It looks like Germans are doing the exact opposite of what they are supposed to be doing. They are consuming more natural gas and not cutting natural gas consumption. We have to believe a key reason is that consumers have been protected from a lot of the increased gas and electricity prices. On Thursday, Germany's Federal Network Agency reported [LINK] "*Gas consumption of households is increasing too much at the moment" President Müller: "We need sustainable savings efforts".* We tweeted [LINK] "*1/2. Expected impact of protecting consumers from price. Last week, German households/businesses "well above average consumption of previous years" (1st Oktoberfest?) But now need to cut #NatGas consumption by >20% to avoid a gas shortage even if it gets colder. #OOTT*." They wrote "*The gas consumption of households and businesses in the last week was well above the average consumption of previous years. This week's figures are therefore very sobering. Without significant savings, even in the private sector, it will be difficult to avoid a gas shortage in winter. Although the last week was colder than the weeks of the previous year and the consumption is always snapshots and can change quickly, savings must take place even with further falling temperatures and this is not a matter of course," says Klaus Müller, President of the Federal Network Agency. "In view of the well-filled storage facilities, we can get through the winter well under three conditions: First, the projects initiated to increase gas imports must be implemented. Secondly, gas supplies in our neighbouring countries must also remain stable. And thirdly, gas must be saved, even if it gets even colder in winter. It will depend on each individual."* Then later, "*The Federal Network Agency currently assumes that a reduction in consumption of at least 20 percent is required to avoid a gas shortage*." Our Supplemental Documents package includes the FNA release.

Natural Gas – Germany industrial natural gas demand getting creamed

German industrial demand -22% YoY

One of our concerns is that Europe has not yet seen the full impact of the big industrial activity hit flow thru to the economy. German households and businesses may not be cutting natural gas consumption, but industrial gas users are making big cuts to natural gas consumption basically because they can't afford the high price of natural gas. There is some switching to petroleum products where possible, but we have been noting stories for a year now how the sky-high price of natural gas is forcing capacity reductions, or closures. We tweeted [LINK] "*2/2.Vs Germany industry getting creamed. How much of big German #NatGas industrial demand reduction turns into permanent demand destruction as DE moves from cheap piped RUS gas to #LNG. Aug industrial consumption -22% YoY, -30% vs 2018-21 average. #OOTT*." This was the other part of the Federal Network Agency report. "*The* *large industrial customers need around 60 percent of the gas. The consumption of these large consumers fell by 22 percent in August and was also significantly below the average consumption of previous years last week (1170 GWh/week versus an average of 1679 GWh/week in 2018-2021*)."

Natural Gas – No hint of any Germany/Qatar LNG deal from last Sunday's meeting

No Germany Qatar LNG deal

Last week's (Sept 25, 2022) Energy Tidbits memo had a 7am MT (4pm Qatar time) so we didn't have any results from the German Chancellor Scholz meeting with Qatar Emir Sheikh Tamim bin Hammad Al-Thani. Scholz was unsuccessful in getting any LNG deal and there didn't seem to be any hint that a deal could be coming soon. There is no indication of why no deal, but we have to believe the issues remain Germany not being prepared to go to any reasonable length and what the LNG pricing mechanism. Last Sunday night, we tweeted [LINK] *"#Scholz "noted that he had discussed with HH the Amir imports of the #NatGas, looking forward to making more progress in this regard" reports @Qatar_Tribune. Sounds like DE didn't get the 👇09/24 @PPouyanne memo ie. lot of distance to close before any Qatar/DE #LNG deals. #OOTT."* The Qatar Tribune reported "*The German chancellor noted that he had discussed with HH the Amir imports of the natural gas, looking forward to making more progress in this regard. He also noted continued cooperation with Qatar in the field of hydrogen and electricity production, aspiring for deepening cooperation in other economic fields such as air navigation, modern technology and heavy equipment*." Our Supplemental Documents package includes the Qatar Tribune report.

Qatar's shortening of term seemed to set the stage for a Germany LNG deal

We were a little surprised that there wasn't at least a positive tone coming out of Scholz's Qatar meeting given Qatar seemed to set the stage for a deal suggesting both countries had more or less agreed on the length of a deal. Here is what we wrote in our Sept 25, 2022 Energy Tidbits "*As of our 7am MT news cut off, we don't' believe German Chancellor Scholz has yet met with Qatar Emir Sheikh Tamim bin Hammad Al-Thani. Scholz was in the UAE this morning and was meeting the Emir later today. It seems like Qatar is setting the stage for potential LNG deals with German companies. Yesterday, we tweeted [LINK] "Qatar can't do much to help EU in short term. But trying to get EU/DE into its #LNG expansion volumes by moving off 20-yr term, Energy Minister "i think 10-15 year deals are probably what are most acceptable to both sides". Thx @energyintel. #OOTT." Energy Intelligence posted its Thursday interview with Qatari Energy Minister Saad al-Kaabi. The headlines from the interview were "There is not much Qatar can do to alleviate Europe's gas crisis in the short term due to contractual commitments, Qatari Energy Minister Saad al-Kaabi tells Energy Intelligence". But, in the same interview, it looks like Qatar is setting the stage for potential deals if German buyers want to sign up for LNG in Qatar's expansions. The key holdup has been Qatar's standard 20-yr term for its LNG supply and Germany not wanting to commit to long term LNG supply due to its emissions cutting targets. In the interview, Qatar is making a public statement they are prepared to dramatically cut the term to 10-15 years. Energy Intelligence wrote "Al-Kaabi also serves as head of state-owned QatarEnergy, which is in active discussions with customers for the new supplies. Significantly, targeted contract durations are shorter than the 20-year deals seen in Qatar's original LNG expansion, reflecting European reluctance to lock into gas supplies long-term. "I think 10-15-year* *deals are probably what are most acceptable to both sides. But for us, the long-term deal, it's not just about duration, it's about price," he said." Note Qatar is not prepared to move on pricing structures. Our Supplemental Documents package includes the Energy Intelligence report."*

TotalEnergies CEO warned Europe won't get LNG on the cheap

Our tweet on the Scholz Qatar meeting included the comment "*Sounds like DE didn't get the 👇09/24 @PPouyanne memo ie. lot of distance to close before any Qatar/DE #LNG deals."* The reference was to the comments by TotalEnergies CEO Patrick Pouyanne at his press conference in Qatar last week announcing TotalEnergies as the first international partner in Qatar''s latest expansion. Here is what we wrote in last week's (Sept 25, 2022) Energy Tidbits memo. "*There was a warning from TotalEnergies CEO Patrick Pouyanne to Europe LNG buyers at yesterday's press conference in Qatar. He warned Europe can't expect to get LNG on the cheap if it wants security of supply. Euronews reported [LINK]. "A "price" to pay. The total halt in Russian gas supplies via the Nord Stream pipeline since 2 September has raised fears in Europe of a serious energy crisis this winter, prompting European governments to call on the population and businesses to reduce their consumption. "We need new capacity, that's for sure and (this investment) is timely," TotalEnergies' DMP said on Saturday. "Most world leaders now know (the importance) of LNG," he added, adding that European countries need to make more long-term investments and pay a possibly higher price to secure their energy supply. "To ensure supply, there is a price (to pay)," he said."*

Natural Gas – Germany says it needs coal, nuclear without Russian natural gas

Germany needs coal, nuclear

Yesterday morning, Germany's finance minster Christian Lindner tweeted [LINK] "*#Energiekrieg [Energy War] and #Inflation endanger our prosperity. Now everything has to be connected to the grid that secures livelihoods: coal and #Kernkraft [Nuclear power]- also in #Niedersachsen . This is how we ensure network stability and lower the high prices. CL #EsKommtAufUnsAn*." It's the reality check reminder that the cutting off of Russian natural gas to Germany mean they need all their available coal and nuclear power to ensure there is grid stability. Because Lindner warns that without grid stability, German prosperity is at risk. We think Lindner's warning is a little too late as Germany prosperity from industry has already been hammered by the energy war.

Lindner's prosperity warning reminded of Habeck's social peace warning

Lindner's warning reminded us of warnings we first saw from Germany's Vice Chancellor Habeck early in March that cutting off Russian natural gas would endanger social peace in Germany. It's why our tweet yesterday morning was [LINK] "*DE holds firm v RUS despite. @c_lindner warns Energy War & Inflation endanger DE prosperity. Need #Coal #Nuclear to ensure grid stability. 03/03/22, Habeck, against ban on RUS #NatGas "because we are endangering social peace in the republic" #OOTT [LINK]."* Here is what we wrote in our March 6, 2022 Energy Tidbits. "*Germany says "endangering social peace" if cut off Russia natural gas. On Wednesday, Germany's Economic Minister Habeck (from the Green party) said what everyone knows – Germany needs Russia's natural gas, oil and coal or else there will be major issues within Germany. Habeck made it clear that Germany cannot cut* *off Russia oil, natural gas and coal. Der Spiegel reported [LINK] "At the same time, the Economics Minister made it clear that Germany does not support calls from other countries for a ban on the import of oil, gas or coal from Russia. "I would even speak out against it because we are endangering social peace in the republic," said Habeck. Germany is initially dependent on deliveries of oil, gas or coal. The dependency on Russia for energy that has built up in recent years cannot be ended in a few months, said the Green politician. "That's why we need and will keep open the possibility of energy supplies from Russia." This is needed to create price stability and energy security. However, work is being done to reduce dependency, for example by building up coal and gas reserves. In addition, efforts to save energy would have to be intensified, demanded Habeck. Coal-fired power plants that went offline would be held in reserve; The problem, however, is that they also need fuel. Energy prices are unlikely to remain as high as they are now, but: »It is very, very likely that we will have to expect higher prices."*

Putin: abandoning natural gas may put humans back in caves

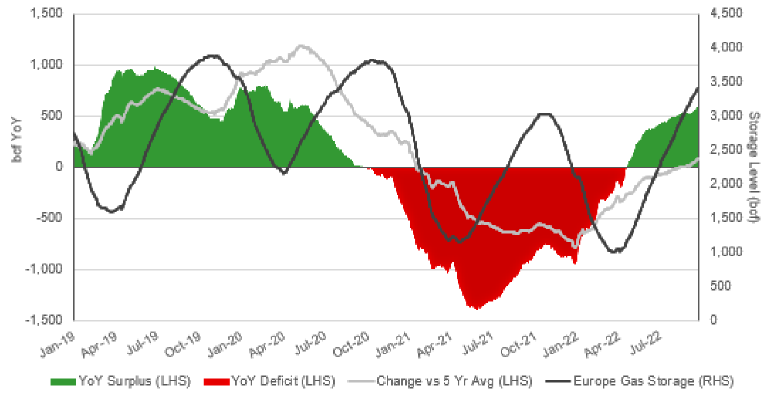
When we saw Habeck's March comments about endangering social peace if they cut off Russia natural gas, it reminded us of Putin's classic comments from Nov 2019. On Nov 20, 2019, we tweeted [LINK] "*How could i not note Putin's comments "discarding the purest hydrocarbon like gas seems utterly bizarre", re the complete abandonment of hydrocarbons "it seems to me that the human race may find itself again in caves". Hope not*!" Putin had a lengthy Q&A at the Russian Investment Forum on Nov 20 [LINK]. And he jumped in on the potential abandonment of natural gas. Putin said "I*n this sense, neglecting a pure hydrocarbon such as natural gas is, in my opinion, uncalled for, because it is the purest hydrocarbon out there. When ideas like this are promoted, it sounds like humanity will once again end up in caves, but this time because it will consume nothing, if all energy is reduced to zero, or if we rely solely on solar energy or wind energy or tidal energy. Today's technology is such that without hydrocarbons, nuclear energy or hydropower, humanity will not be able to survive or preserve its civilisation. This must be taken seriously or, as people say, in an adult-like manner."*

Natural Gas – Europe storage is now +13.97% YoY ie. 88.25% full vs 74.28%

Europe storage now 88.25% full

It looks like the continued strong LNG imports and massive industrial demand response to sky-high natural gas prices are having a big impact. Even with the reduced volumes on Nord Stream, Europe storage continues to have increasing YoY levels. Europe gas storage began the year in a YoY deficit, but the YoY Europe storage deficit changed to a YoY storage surplus, and it continues to build this week. Europe gas storage started the winter down 18.52% YoY and is now a YoY surplus of 13.97%. Inventories are rising all across Europe, as is normal during spring and early summer. Europe gas storage started 2020 winter (Nov 1/20) at basically full levels at 94.66% and had dropped by 65.77% to be 28.89% at Apr/21. Europe storage levels bottomed in late Apr/22 at 29%, which was the lowest level since Apr 2018. This winter began (Nov 1/21) with gas storage at 77.14% capacity, down 18.52% YoY. The YoY deficit has turned to surplus after months of the deficit tightening. Thanks to the warm weather and US LNG, storage as of Sep 28 is at 88.25%, which is +13.97% greater than last year levels of 74.28% and are +1.90% above the 5-year average of 86.15%. Below is our graph of Europe Gas Storage Level.

Figure 14: Europe Gas Storage Level



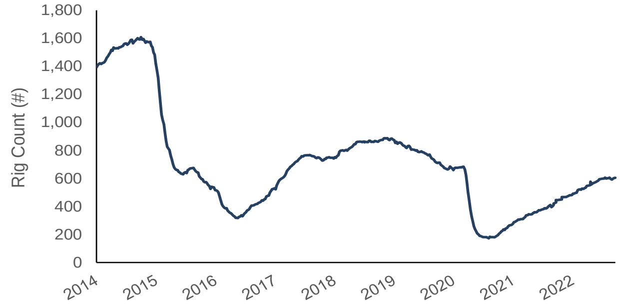
Source: Bloomberg

Oil – US oil rigs +2 to 604 oil rigs at Sep 30

Baker Hughes released its weekly North American drilling activity data this morning. This week US oil rigs were +2 to 604 oil rigs. US oil rigs have been more or less rangebound for the past 15 weeks from 591 to 605 oil rigs. US oil rigs hit a 14-week low of 591 three weeks ago. US oil rigs are now +425 oil rigs since the Covid Sept 17, 2020 oil rigs of 179 oil rigs. And US oil rigs are +183 oil rigs YoY. US gas rigs were -1 WoW to 159 gas rigs with the declines coming in Utica and Woodford outweighing the additions in Marcellus. We expect the pull back in oil prices to keep US oil rigs relatively flat in the pre–US Thanksgiving period.

US oil rigs +2 WoW

Figure 15: Baker Hughes Total US Oil Rigs



Source: Baker Hughes

Oil – US frac spreads +2 to 290 spreads for the week ending Sept 30

Mark Rossano (C6 Capital Holdings) held his weekly US frac spread recap for the week ending Sept 30 on the Primary Vision network. YouTube video is at [LINK]. For the week ending Sept 30, US frac spreads at the high point in the week were +2 to 290 spreads. Here are some of his comments on the week. Spent some time at the intro discussion how the global markets for US exports will continue to support drilling and frac spread activity. Spreads are closing out Sept at 290, which is about 5 below where he thought it would be.

Frac spreads +2 to 290

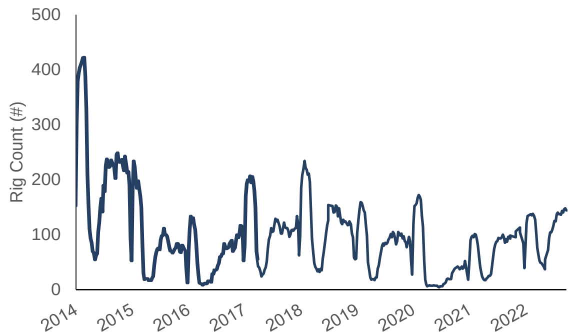
But spreads are still very much on pace for the final push to 300 spreads with growth in some of the smaller basins and the Appalachia (normal for this time of the year). He highlighted the increase in horizontal drilling rigs of +2 in New Mexico and +2 in West Virginia.

Oil – Total Cdn rigs down -2 WoW to 213 total rigs, +48 rigs YoY

Total Cdn rigs were -2 to 213 rigs as of Sep 30, 2022. Cdn oil rigs were -4 to 144 oil rigs. Cdn gas rigs were +2 to 69 rigs. A pull back in oil prices should lead to a continued flattish rig count until the ramp up in winter drilling season. Total rigs are now +138 vs the comparable Covid period of 75 rigs on Oct 1, 2020. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 97 and Cdn gas rigs were 68 for a total Cdn rigs of 165, meaning total Cdn oil rigs are +48 YoY to 144 oil rigs and Cdn gas rigs are +2 to 69 gas rigs.

Cdn rigs down WoW

Figure 16: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production drops to 12.0 mmb/d

Please note the following below comment on the Form 914 actuals for July oil production. The EIA provides weekly estimates of US oil production, which had a small decline to 12.0 mmb/d from 12.1 mmb/d for the week ended Sept 23. The EIA weekly oil estimates show US oil production has been range bound between 11.9 to 12.1 mmb/d for the past 20 weeks. Lower 48 production declined WoW to 11.6 mmb/d from 11.7 mmb/d last week and Alaska saw an immaterial increase WoW of 0.004 mmb/d to 0.434 mmb/d. US oil production is up YoY at +0.9 mmb/d, mainly attributed to last year's impact of Hurricane Ida, but is still down significantly at -1.1 mmb/d since the 2020 peak of 13.1 mmb/d on March 13.

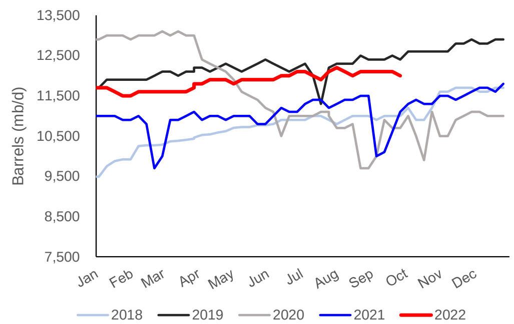
US oil production declines WoW

Figure 17: EIA's Estimated Weekly US Oil Production

Year-Month	Week 1		Week 2		Week 3		Week 4		Week 5	
	End Date	Value	End Date	Value	End Date	Value	End Date	Value	End Date	Value
2020-Jan	01/03	12,900	01/10	13,000	01/17	13,000	01/24	13,000	01/31	12,900
2020-Feb	02/07	13,000	02/14	13,000	02/21	13,000	02/28	13,100		
2020-Mar	03/06	13,000	03/13	13,100	03/20	13,000	03/27	13,000		
2020-Apr	04/03	12,400	04/10	12,300	04/17	12,200	04/24	12,100		
2020-May	05/01	11,900	05/08	11,600	05/15	11,500	05/22	11,400	05/29	11,200
2020-Jun	06/05	11,100	06/12	10,500	06/19	11,000	06/26	11,000		
2020-Jul	07/03	11,000	07/10	11,000	07/17	11,100	07/24	11,100	07/31	11,000
2020-Aug	08/07	10,700	08/14	10,700	08/21	10,800	08/28	9,700		
2020-Sep	09/04	10,000	09/11	10,900	09/18	10,700	09/25	10,700		
2020-Oct	10/02	11,000	10/09	10,500	10/16	9,900	10/23	11,100	10/30	10,500
2020-Nov	11/06	10,500	11/13	10,900	11/20	11,000	11/27	11,100		
2020-Dec	12/04	11,100	12/11	11,000	12/18	11,000	12/25	11,000		
2021-Jan	01/01	11,000	01/08	11,000	01/15	11,000	01/22	10,900	01/29	10,900
2021-Feb	02/05	11,000	02/12	10,800	02/19	9,700	02/26	10,000		
2021-Mar	03/05	10,900	03/12	10,900	03/19	11,000	03/26	11,100		
2021-Apr	04/02	10,900	04/09	11,000	04/16	11,000	04/23	10,900	04/30	10,900
2021-May	05/07	11,000	05/14	11,000	05/21	11,000	05/28	10,800		
2021-Jun	06/04	11,000	06/11	11,200	06/18	11,100	06/25	11,100		
2021-Jul	07/02	11,300	07/09	11,400	07/16	11,400	07/23	11,200	07/30	11,200
2021-Aug	08/06	11,300	08/13	11,400	08/20	11,400	08/27	11,500		
2021-Sep	09/03	10,000	09/10	10,100	09/17	10,600	09/24	11,100		
2021-Oct	10/01	11,300	10/08	11,400	10/15	11,300	10/22	11,300	10/29	11,500
2021-Nov	11/05	11,500	11/12	11,400	11/19	11,500	11/26	11,600		
2021-Dec	12/03	11,700	12/10	11,700	12/17	11,600	12/24	11,800	12/31	11,800
2022-Jan	01/07	11,700	01/14	11,700	01/21	11,600	01/28	11,500		
2022-Feb	02/04	11,600	02/11	11,600	02/18	11,600	02/25	11,600		
2022-Mar	03/04	11,600	03/11	11,600	03/18	11,600	03/25	11,700		
2022-Apr	04/01	11,800	04/08	11,800	04/15	11,900	04/22	11,900	04/29	11,900
2022-May	05/06	11,800	05/13	11,900	05/20	11,900	05/27	11,900		
2022-Jun	06/03	11,900	06/10	12,000	06/17	12,000	06/24	12,100		
2022-Jul	07/01	12,100	07/08	12,000	07/15	11,900	07/22	12,100	07/29	12,100
2022-Aug	08/05	12,200	08/12	12,100	08/19	12,000	08/26	12,100		
2022-Sep	09/02	12,100	09/09	12,100	09/16	12,100	09/23	12,000		

Source: EIA

Figure 18: US Weekly Oil Production



Source: EIA, SAF

Oil – EIA Form 914 July oil production is only +166,000 b/d vs Dec 2021 exit

EIA Form 914 July

US oil production is viewed as a key global oil supply growth, but to date, the growth in 2022 has been less than expected. There are two key takeaways from the EIA's look back at July actual oil production – July is only +166,000 b/d vs the Dec 2021 exit and was -230,000 b/d below the weekly estimates. The EIA released its Form 914 data [LINK] on Friday, which is the EIA's "actuals" for July US oil and natural gas production. (i) Form 914 estimates total US oil production is up 0.022 mmb/d MoM to 11.800 mmb/d in July. The actuals for July were

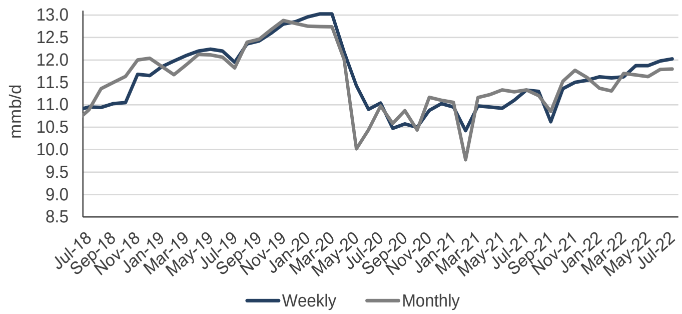
>200,000 b/d lower than the EIA's weekly estimates that worked out to just over 12.030 mmb/d. (ii) One of the growing questions has been how much US oil will grow in 2022. July actuals at 11.800 mmb/d is only +166,000 b/d more than the year end Dec 2021 average of 11.634 mmb/d.

Figure 19: EIA Form 914 US Oil Production

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2022	11,369	11,316	11,701	11,668	11,629	11,788	11,800					
2021	11,124	9,925	11,326	11,305	11,356	11,356	11,347	11,277	10,918	11,569	11,790	11,634
2020	12,852	12,842	12,797	11,914	9,713	10,442	11,006	10,577	10,921	10,457	11,196	11,168
2019	11,869	11,673	11,913	12,149	12,154	12,218	11,902	12,486	12,590	12,809	13,000	12,978
2018	10,001	10,281	10,467	10,500	10,435	10,641	10,897	11,392	11,443	11,509	11,886	11,945
2017	8,875	9,110	9,166	9,101	9,185	9,111	9,247	9,250	9,517	9,669	10,085	9,983
2016	9,202	9,066	9,101	8,874	8,835	8,676	8,662	8,690	8,544	8,804	8,903	8,816

Source: EIA

Figure 20: EIA Form 914 US Oil Production vs Weekly Estimate



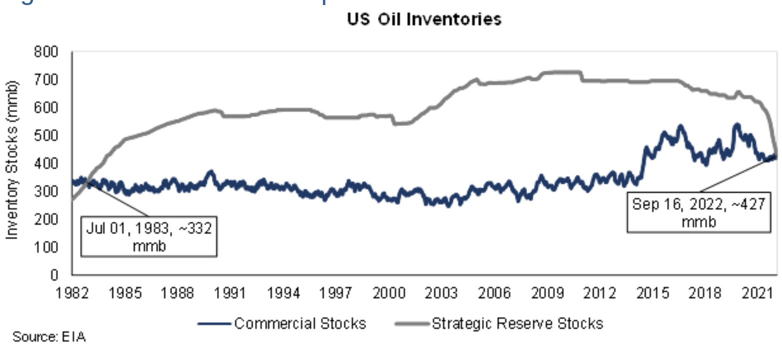
Source: EIA

Oil – Less US SPR reserves now than commercial crude oil reserves

SPR reserves keep going lower

Oil in US Strategic Petroleum Reserves (SPR) went below total US commercial crude oil reserves in the Sept 16 week and the deficit widened this week. The below graph notes SPR reserves on Sept 16 were 427 mmb and fell below commercial crude oil reserves for the first time since July 1, 1983. The EIA's new weekly oil data for Sept 23 has SPR reserves at 422.58 mmb vs commercial crude oil reserves at 430.56 mmb.

Figure 21: Canada CBR Exports to US Gulf Coast vs WCS Differential



Source: EIA

Oil – TotalEnergies oil sands assets are now for sale

TotalEnergies to its Cdn oil sands

On Wednesday morning, we tweeted [LINK] on the breaking news "*Another new public Cdn #OilSands company in 2023. #TotalEnergies spinco of Cdn oil sands to be voted at May 2023 shareholder meeting.2022 CFFO >$1.5b. #OOTT*." And we posted a followup tweet [LINK] "*should have said #TotalEnergies just put the "for sale" sign up for next six months. Hard to believe many of their shareholders want spinco shares of a Cdn #OilSands company. #OOTT*." We look at TotalEnergies announcing a spinco as putting up a for sale notice. Especially because we have trouble believing many of the shareholders in TotalEnergies want to own shares in a Canadian oil sands company. The reason why we tweeted this out on Wed morning was that this was news to the market. On the call, mgmt. said "*These asset Surmont and Fort Hills are generating in '22 more and $1.5 billion of cash flow. So it's quite a good situation. We think it's the right time to try to get the value out of it. We are not the best shareholder of these assets because as we have a climate strategy, a climate strategy, we don't want to invest in these assets. We declared that in 2019, we made some write-offs, but these assets are there. They generate assets. So after having a look to various solutions, we think that the spin-off because we have that in our hands. It's up to us to execute it. It does not depend from others, is a solution will create a SpinCo to put Surmont and Fort Hills play the midstream and trading-related activities. We intend to list this Canadian company on the Toronto Stock Exchange to retain a minority shareholding to smooth the transition and then to leave it moving as an independent company. We will work to that our objective is to be able to submit such as been spin off by to the vote of the next Annual Shareholders Meeting in May '23, and our shareholders will get shares from this company, which is quite a good value. So that's another point.*"

Figure 22: Total Cdn weekly oil storage - YOY

Source: TotalEnergies

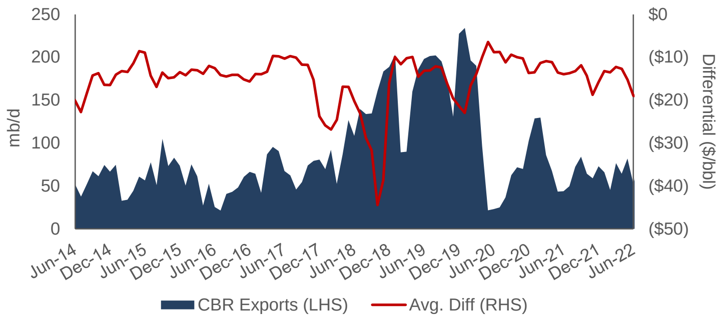
Oil – Cdn crude by rail imports to Gulf Coast up 58% YoY in July to 78,000 b/d

Cdn CBR imports to Gulf Coast up 28,000 b/d YoY

The EIA posted its monthly "U.S. Movements of Crude Oil by Rail" [LINK] on Friday, which also had good insights on Cdn crude by rail. Canadian CBR volumes to PADD 3 (Gulf Coast) were 78,000 b/d in July, which is up 25,000 b/d MoM from June, and up 28,000 b/d YoY vs

July 2021. There were no revisions to last months data. The slight increase in exports is attributed to strong demand for heavy/medium sour crude from the removal of Russian crude from global markets. Below is our graph of Cdn CBR exports to the Gulf Coast.

Figure 23: Canada CBR Exports to US Gulf Coast vs WCS Differential



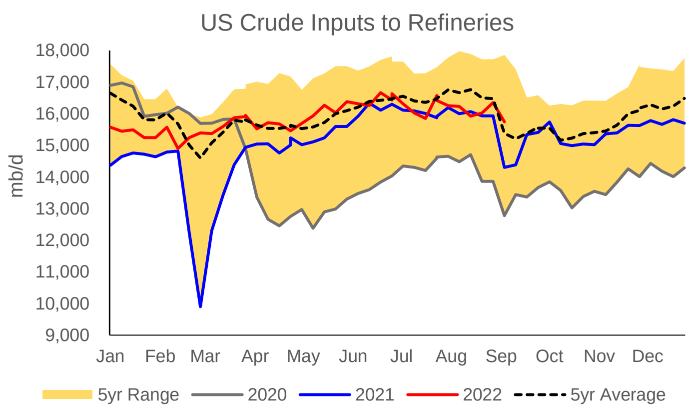
Source: EIA, Bloomberg

Oil – Refinery inputs down -0.604 mmb/d WoW to 15.751 mmb/d

Refinery inputs down WoW

September is normally a turnaround month for refineries in the US and that means less crude oil inputs into refineries. The EIA crude oil input to refinery data is for the week ended Sep 23. We are now entering the season that normally sees increasing processing volumes every year, but the EIA reported crude oil inputs to refineries down -0.604 mmb/d to 15.751 mmb/d for the week ended Sep 23 but are up +1.008 mmb/d YoY. Refinery utilization was up to 93.6%, which is +2.2% YoY. Total products supplied (i.e., demand) increased WoW, up 1.832 mmb/d to 20.770 mmb/d, and Motor gasoline was up 0.504 mmb/d at 8.825 mmb/d from 8.322 mmb/d last week. The 4-week average for Motor Gasoline was down -0.607 mmb/d YoY to 8.592 mmb/d. The 4-week average of Total demand was down -0.623 mmb/d YoY to 19.728 mmb/d.

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



Source: EIA

Oil – BP 160,000 b/d Toledo refinery could be down until 2023

BP's 160,000 b/d Toledo refinery is down

It sounds like BP's Toledo refinery could be down until 2023. Last week's (Sept 25, 2022) Energy Tidbits memo highlighted the fire and shut down of BP's 160,000 b/d Toledo refinery as it runs on Cdn crude oil. (i) In last week's memo, we highlighted Bloomberg's Sept 23 report that referenced comments from "a person familiar with operations" who suggested it could down for much longer. Although there is still no word from bp as to how long the refinery will be down. On Friday afternoon, Bloomberg wrote "** BP Plc workers at the company's fire-damaged BP-Husky Toledo refinery have returned to the shuttered plant for cleanup and safety checks prior to an investigation into the Tuesday fire that killed two BP employees, a person familiar with operations said * The 150.8k b/d Ohio refinery has been shut since the fire, which Wood Mackenzie's Genscape said started at the 120k b/d Crude Unit 1, the biggest crude unit * No timeline for how long the cleanup and investigation will take, person said ** It may be weeks before repairs can be initiated and completed, and no decision made yet as to whether the refinery can restart partially while repairs to the fire-damaged section are ongoing".* (ii) On Tuesday, we tweeted [LINK] "*#BP Toledo refinery shut down. @barbarajpowell8 reports repairing & restarting @bp_plc Toledo refinery "may not be completed until early 2023, people familiar with operations said." Negative to Cdn #Oil diffs, See 👇WCS/WTI diffs hit ~$1.25 since 160,000 b/d refinery fire. #OOTT."* (iii) On Wednesday, we tweeted [LINK] "*More indicators #BP Toledo 160,000 b/d refinery will be shut down for extended time. @LauraSanicola reports BP laid off most contractors according to sources indicating will experience a prolonged shutdown following last week's explosion and fire." #OOTT [LINK]."* Our Supplemental Documents package includes the Bloomberg and Reuters reports.

Oil – California says industry hasn't made it clear why gasoline prices increasing

California gas prices going up

We have to believe that both sides of the aisle have to think that, at least sometimes, there shouldn't be the standard line on the oil industry not being transparent to make sure their citizens have someone to blame. Yesterday morning, we tweeted [LINK] "*Hmm! #CARB says industry haven't made clear why very high #Gasoline prices, yet then lists the key factors increasing gas prices ie. "a recent refinery fire, West Coast refinery maintenance challenges, Hurricane Ian, and other geopolitical events". #OOTT [LINK]."* The full sentence from CARB's Friday release was "*The gasoline market in California is currently experiencing very high prices for reasons that industry has not made clear, but that appear to include, in part, a recent refinery fire, West Coast refinery maintenance challenges, Hurricane Ian, and other geopolitical events."* The sentence was part of the California Air Resources Board's Regulatory Advisory: September 30, 2022 "*Early Transition to Winter-Blend Gasoline"* that is allowing the an early move to higher emissions winter-blend gasoline. CARB said "*This action is necessary to address the extreme and unusual fuel supply circumstance caused by the multiple events described above and is necessary for the immediate preservation of the public peace, health and safety or general welfare*." Our Supplemental Documents package includes the CARB advisory.

Oil – US "net" oil imports down -1.604 mmb/d WoW at 1.803 mmb/d

US "net" oil imports down WoW

US "NET" oil imports were down -1.604 mmb/d WoW to 1.803 mmb/d for the Sep 23 week driven by increased exports. US imports were down -0.498 mmb/d to 6.449 mmb/d. US exports increased, up 1.106 mmb/d to 4.646 mmb/d. US's Top 10 imports by country which were down by -0.603 mmb/d from last week. Some items to note on the by country data. (i)

Canada was down this week by -0.093 mmb/d to 3.775 mmb/d. (ii) Saudi Arabia was down -0.067 mmb/d to 0.422 mmb/d this week. (iii) Colombia was down -0.140 at 0.072 mmb/d. (iv) Ecuador was down -0.128 mmb/d at 0.191 mmb/d. (v) Iraq was up +0.082 mmb/d to 0.202 mmb/d. (vi) Mexico was down -0.257 mmb/d to 0.598 mmb/d.

Figure 25: US Weekly Preliminary Oil Imports by Major Countries

(thousand b/d)	July 22/22	July 29/22	Aug 5/22	Aug 12/22	Aug 19/22	Aug 26/22	Sep 2/22	Sep 9/22	Sep 16/22	Sep 23/22	WoW
Canada	3308	3,673	3,351	3,455	3,834	3,093	3,538	2,937	3,868	3,775	-93
Saudi Arabia	516	500	412	244	247	330	423	425	489	422	-67
Venezuela	0	0	0	0	0	0	0	0	0	0	0
Mexico	639	815	710	661	503	440	965	484	855	598	-257
Colombia	150	328	174	214	143	289	261	288	212	72	-140
Iraq	165	369	181	163	225	401	222	343	120	202	82
Ecuador	150	243	212	36	278	231	144	199	319	191	-128
Nigeria	143	57	161	253	72	137	2	232	0	0	0
Kuwait	0	0	0	0	0	0	0	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0	0
Top 10	5,071	5,985	5,201	5,026	5,302	4,921	5,555	4,908	5,863	5,260	-603
Others	1,093	1,357	970	1,106	869	1,035	1,224	884	1,084	1,189	105
Total US	6,164	7,342	6,171	6,132	6,171	5,956	6,779	5,792	6,947	6,449	-498

Source: EIA

Oil – Pemex oil production still stuck around 1.7 mmb/d, and partners slip to 69,000 b/d

Pemex August oil 1.691 mmb/d

On Wednesday, Pemex released its August production for its interests, it was 1.691 mmb/d of oil, which is basically unchanged for the last several months. Pemex has been unable to grow its own oil production. However, the non-Pemex oil production in Mexico is now at 69,000 b/d in August and has averaged 64,000 b/d for YTD August 31. As a result, total Mexico oil production (Pemex and non-Pemex) was 1.760 mmb/d for August and 1.690 mmb/d for YTD August 31. Below is our chart tracking Pemex oil production.

Figure 26: Pemex (Excl 3rd Party) Mexico Oil Production

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

Source: Pemex

Oil – Mexico January oil exports down to 915,000 b/d, lowest since March

Pemex August oil exports

We aren't aware of any major Mexican oil tanker loading issues in August. But Mexico exports in Aug were 0.915 mmb/d, which was down MoM vs 1.062 mmb/d in July. Mexico's original 2022 plan was to significantly reduce oil exports over 2022 , but that hasn't happened. Rather Mexico oil exports have been ranged around 0.9 to 1.0 mmb/d because of the delayed start in operations in the new Dos Bocas refinery and not seeing any major uptick in existing refinery throughput. Pemex oil exports to US were 0.671 mmb/d in August, which was in line with the average of the prior few months. Below is our table of the Pemex oil export data.

Figure 27: Pemex Mexico Oil Exports

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

Source: Pemex

Oil – 1st in-person OPEC+ meeting since Covid points to a surprise?

OPEC+ meeting Oct 5

It's hard not to expect something significant at OPEC+ meeting on Wed given the last-minute change to the first in-person meeting since Covid. Surely Saudi Energy Minister Abdulaziz isn't organizing this public show of force to say no change to OPEC quotas. Rather, we have to believe the better odds are for a significant cant. The last in-person OPEC+ meeting was March 2020. OPEC+ surprised yesterday morning with the last minute change to have its Wed Oct 5 meeting be the first in-person meeting since Covid. [LINK]. Early yesterday morning, we tweeted [LINK] "*Oops! Abdulaziz wants to some gamblers on #Oil price "ouching like hell". Last minute change to a 1st post-Covid in-person #OPEC+ Oct 5 meeting. Must want visuals for something significant ie. a bigger #Oil supply cut. That's why he is "The Man". Thx @Amena__Bakr. #OOTT.*" Saudi Energy Minister Abdulaziz has done a great job of having short OPEC+ meetings because of his prep work in building a consensus before the actual meeting. We can't remember the last time there was a hint of a contentious meeting.

Oil – Will Abdulaziz get all OPEC+ countries to cut production?

Will all OPEC+ countries cut?

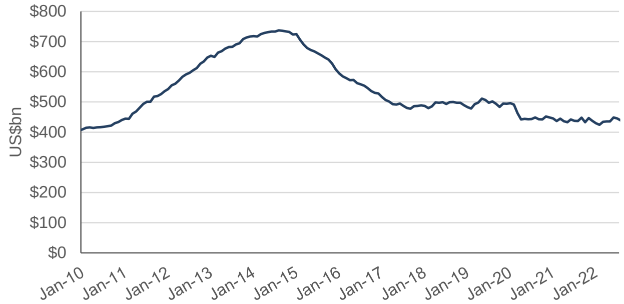
Interesting perspective brought up by Gulf Intelligence this morning, the concept that the reason for the in-person OPEC+ meeting is so the big producers want to tell all producers they have to cut even if they are producing under quota. It seems like all the views on OPEC+ is that there will be cuts but that it won't be a real cut because most countries are producing below quota and any cut will only really be a cut by Saudi Arabia, UAE, Kuwait and Iraq. Earlier this morning, we tweeted [LINK] *"Hmmm! Food for thought! Will any #OPEC+ cut be a REAL across the board production cut from ALL countries even those producing < quota? Surely that can happen if The Man, Saudi Energy Minister Abdulaziz starts to call in his huge # of IOUs? Thx @sean_evers. #OOTT."* We had retweeted the Sean Evers (Gulf Intelligence Founder) tweet this morning [LINK] "*so basically those countries that are actually pumping at their quota (Gulf OPEC: UAE, Iraq, Kuwait, Saudi) want in-person meeting because they want to make it crystal clear that they aren't going to cut from their QUOTA level unless rest agree to cut from PRODUCTION! #OPEC #OOTT."*

Oil – Saudi nest egg, decline in net foreign assets in August despite Brent ~$100

Saudi net foreign assets

We continue to see key financial reasons why Saudi Arabia is going to do all it can to maintain high oil prices for the foreseeable future. And we continue to believe the #1 financial theme for Saudi Arabia in the 2020s will be their continued, and likely increasing, use of Other People's Money as they try to transition their country to MBS's Vision 2030. We believe this has been obvious with how Saudi Arabia's net foreign assets dropped by about $300 billion over seven years. We are surprised that markets and oil watchers didn't seem to pay attention to the Saudi net foreign assets data ie. what we call their nest egg to help them thru the Energy Transition. Saudi net foreign assets have dropped by $298.1b in the last 8 years, from is peak of $737.0b on Aug 31 2014 to $438.9b on Aug 31, 2022. That is an average of $3.1b per month for the last 8 years. Oil prices were softening at the end of Aug, but Brent was ~$100 for the month, yet Saudi Arabia's net foreign assets on August 31 were down $6.7b MoM to $438.9b vs $445.6b in July. Saudi Arabia is far from going broke but there has been a huge decline in the last 8 years, but it is still a very big nest egg. This net foreign asset depletion is why we have been highlighting that the primary financial theme for Saudi Arabia in the 2020s is getting Other People's Money (OPM) to fund as much of their Vision 2030 as possible. And no question, accessing OPM has helped to slow down and temporarily pause the decline in net foreign assets. Saudi Arabia's central bank (SAMA) doesn't provide explanations for the monthly swings. Saudi net foreign assets on August 31 of $438.9b are up $1.87b YoY from $437.0b at August 31, 2021. We believe the $298.1b drop in net foreign assets is why there has been such a big push in the last few years to get OPM so Saudi doesn't keep depleting its nest egg. And why we call this the #1 financial theme for Saudi Arabia in the 2020s – the increasing use of Other People's Money. And not just in Saudi Aramco, although we do expect to see more equity and bond sales from Aramco. Below is our graph of Saudi Arabia net foreign assets updated for the August 31 data.

Figure 28: Saudi Arabia Net Foreign Assets



Source: Bloomberg

Oil – Saudi King Salman gives up the Prime Minster part of his job to MBS

Is stage being set for MBS to become King

On Tuesday, the Saudi Press Agency announced [LINK] "*The Custodian of the Two Holy Mosques King Salman bin Abdulaziz Al Saud issued today three royal orders as follows: First: 1- His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al Saud, the Crown Prince, shall be the Prime Minister; as an exception to the provision of Article (56) of the Basic Law of Governance, and the relevant provisions contained in the Law of the Cabinet.*" Note that the splitting off of the Prime Minister role from the King's rule required an exception to the law. MBS is taking over the Prime Minister office from the King and becomes head of state for Saudi Arabia. There was a good timing point raised by The Guardian that also answered a question we had wondered in June as to what MBS got from

Biden. The Guardian wrote [LINK] "*But the timing of the decision was seen by critics of the Saudi government as almost certainly linked to a looming court-ordered deadline next week. The Biden administration had been asked by a US judge to weigh in on whether Prince Mohammed ought to be protected by sovereign immunity in a case brought by the fiancee of Khashoggi, Hatice Cengiz. Such protection is usually granted to a world leader, such as a prime minister or a king. In July the administration sought a delay in filing its response to the court, which had initially been sought by 1 August. John Bates, a district court judge, agreed to extend the deadline to 3 October. Among other issues, he called on the administration to state whether it believed Prince Mohammed ought to be granted immunity under rules that protect countries' head of state.*"

We thought MBS might have become Saudi King in H2/22

We hadn't considered the potential for the King to split of the Prime Minister function from his King role, And maybe it is like The Guardian suggests as linked to protection afforded to a world leader. We had expected that the next role for MBS was going to be King and Prime Minister in succeeding his father in H2/22. Here is what we wrote in our June 26, 2022 Energy Tidbits. "*We can help wonder if the stage is being set for MBS to become Saudi King in the coming months, perhaps ahead of the G20 leaders summit in October? There were two unrelated items on Monday morning that make us wonder. (i) On Monday, we tweeted [LINK] "Hmmm! #Biden/#MBS meet. "i think what MBS ultimately gets, in my opinion is the final blessing of Washington to ascend to become King. I think that is the real big prize here for him. Because up to know, they haven't given that" said @sean_evers. MBS is a positive for #Oil. #OOTT" There was a direct comment from Sean Evers (Gulf Intelligence founder) on their daily podcast. We have been listening to his daily podcast for the past year or two and he is an experienced oil follower, who generally doesn't make any outrageous type statements. He is in UAE. Here is what he said this morning "I struggle, I can see what the Saudis obviously get and the region. I think what MBS ultimately gets is, in my opinion, is the final blessing of Washington to ascend to become King. I think that is the real big prize here for him. Because up to now, they haven't given that." (ii) A Bloomberg report on Monday morning "Saudi Arabia's de facto ruler will go on a rare regional tour to build bridges ahead of US President Joe Biden's visit." The "rare" description caught my eye. Leaders don't normally do "rare" things without some reason. If we hadn't listened to Evers comments, we might not have linked it. (iii) So two unrelated events but we have to wonder. Then the question is what does this mean? There are so many potential implications but a few to come to mind. It will be the end of a redemption tour post Khashoggi killing. At least from MBS perspective. So we think there could be two items: First, If we accept the premise that MBS has been the de facto leaders, then it means continuation of what has been happening ie. aggressively using OPM to fund Vision 2030, no change to their oil policy (it's working), building relations with Israel (we think this is more the enemy of my enemy is my friend), continued negative vs Iran, cracking down on the Saudi wealthy who don't agree with him, etc.). Second, the real question is has MBS has been holding back on some items post the Khashoggi killing to get to this redemption, if he backs off of some of these to go back to his original approach pre-Khashoggi, or if he is agreeing with Biden's team to keep on some of these relaxed items as part of this deal. Ie. will he keep trying for some sort of peace with the*

Houthis or go back to blowing them away. Will he maintain the truce with Qatar for the past year or go back to trying to squeeze Qatar. We think this will be one of the key quesitons, will he go back to causing regional conflicts in Yemen, Qatar."

The Guardian's report might answer what MBS got from Biden in June
After the Biden/MBS meeting in Jeddah in June, we couldn't figure out what MBS was getting from Biden. The Guardian report seems to answer the question as they noted how the Biden Administration delayed the deadline from July to Oct 3. Here is what we wrote in our June 26, 2022 Energy Tidbits. "*We still wonder what MBS is getting from Biden because there has to be a lot more than the chance to be smiling/gloating in a photo op with Biden. We can't help remember what we wrote in our March 6, 2022 Energy Tidbits. "Oil – Saudi MBS "simply, I do not care" if Biden misunderstands something about him. The Atlantic's March 3 report "Absolute Power" [LINK] based on its interviews Saudi crown prince Mohammed bin Salman got some good headlines. MBS says their "aim is to keep it and strengthen it" talking about their long historical relationship with the US. The headlines were on his Biden comments and warning to not interfere in Saudi domestic issues. The Atlantic wrote "We asked whether Biden misunderstands something about him. "Simply, I do not care," he replied. Alienating the Saudi monarchy, he suggested, would harm Biden's position. "It's up to him to think about the interests of America." He gave a shrug. "Go for it." For now, MBS's main request to the outside world, and especially the United States, is the usual request of misbehaving autocrats—namely, to stay out of his internal affairs. "We don't have the right to lecture you in America," he said. "The same goes the other way." Saudi affairs are for Saudis. "You don't have the right to interfere in our interior issues." It reminds that no one should expect the Saudi's to bend over in anyway to the US on oil. The problem for Biden and the Democrats is that it's difficult to reverse their view on MBS. We look at it as another of the situations where Biden and the Democrats like to have a villain to make sure they can get people onside their views. But by doing so, it makes it difficult for Biden to back track in a public way. It's like now with the oil companies, they really can't say anything positive about them or ask them to help without looking very weak. They made the oil companies the villains to sell energy transition for so long. How can they go back and say something good. They made MBS out to be a huge villain, Biden's team making it clear that Biden wouldn't meet or talk with MBS, only the King, they pulled out a Patriot missile defense system from Saudi Arabia, and have supposedly not given in to Saudi's request for more Patriot missiles to replace the shot missiles. So no surprise by the MBS comments on US. And unfortunately for the US, it means that Saudi isn't likely to help the US unless it helps them. We will be watching to see if there are reports on restocking Patriot missiles and any potential MBS/Biden meeting."*

Oil – Hard to see a JCPOA if Iran wants US guarantees it won't ever withdraw again

IRNA wants US guarantees

Iran keeps publicly insisting on something they know Biden can't deliver - a commitment that future US governments won't pull out of any resigned JCPOA. We have to believe Iran knows Biden can't obligate future administrations to stay in the deal so we thought they were being prepared to settle for a commitment to stay in JCPOA as long as Biden is president. If it's for the basis of negotiations, they will need Biden to bite and he hasn't appeared to have done so to date. But, at least for now, it makes it difficult to see how there can be return to the JCPOA. On Friday morning, we tweeted [LINK] *"#JCPOA - hard to see a deal if this is a must have. ""Reaching a deal is important but the implementation of the deal is more important if a durable deal is reached, even the next [US] administration, no matter from which party it may be, will have to respect that." #OOTT*." IRNA, Iran's state news agency, reported on comments from Iranian Foreign Minister Hossein Amirabdollahian. IRNA wrote "*On the long course of talks with the Western sides and indirect talks with the American side, Amirabdollahian said that the thing important is that Iran has not negotiated for the sake of negotiations, rather it has been negotiating to reach a point where the removal of the sanctions are ensured and the country can benefit from the economic interests of a 2015 nuclear deal. Noting that both sides have had enough negotiations, he said that now the ball is in the US court to make a decision. "Reaching a deal is important but the implementation of the deal is more important if a durable deal is reached, even the next [US] administration, no matter from which party it may be, will have to respect that."* Our Supplemental Documents package includes the IRNA report.

Oil – Sounds like the Houthi/Saudi backed Yemen truce is ending tonight

Houthi/Yemen truce about to end?

As of our 7am MT news cut off (4pm Yemen local time), it sounds like the truce between the Houthis and the Saudi backed Yemen govt is ending tonight. We caution we haven't heard seen any official confirmation. The 6-month truce ends today and there have been UN proposed extension. But we are seeing similar reports from the Jerusalem Post [LINK] and The National (UAE) [LINK] reporting that, last night, the Houthis saying that the ceasefire is at a "*dead end*". The Jerusalem Post reported ""*Unfortunately, it became clear that the aggression countries, after they had exhausted all their cards, had no choice but to target the livelihood of the Yemeni people as the easiest way to bring the people to their knees and use it as a military tactic and a war tool to pressure them," said the Houthis' negotiating delegation. "It became clear that their desire is not peace as much as it is to keep the countries of aggression away from the repercussions of the war and direct targeting and besiege them inside Yemen, and to transfer the war to the economic field, and the continuation of their siege and the imposition of unjust restrictions on the Yemeni people to prevent access to their legal and humanitarian entitlements." "We affirm the right of our Yemeni people to defend themselves and their rights and to confront aggression and siege, and we hold the countries of aggression responsible for reaching understandings to a dead end as a result of their intransigence and disavowal measures that have no aim other than to alleviate the human suffering of our dear Yemeni people."*

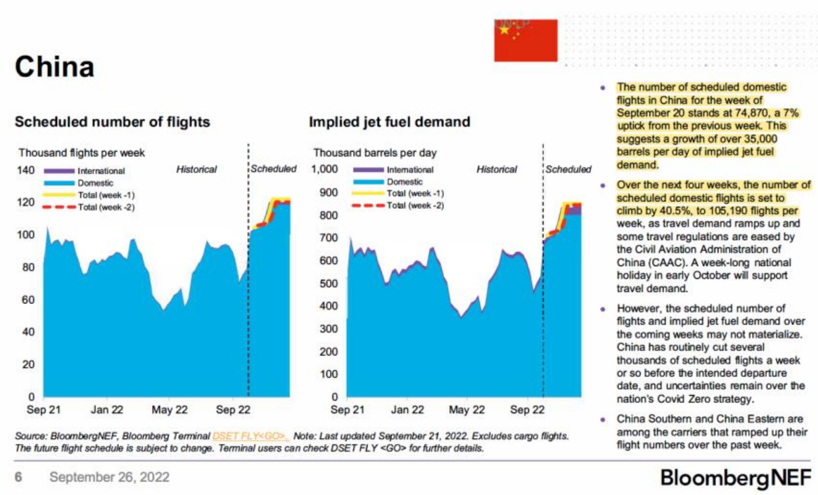
Oil – Chinese scheduled airflights +7% WoW, looks like strong growth to come in Oct

Big jump up in Chinese scheduled air flights

It looking like China is at the early stages of opening up, which would be in line with our expectations that this would happen in and around the big national congress in mid October. It's only one week, but, as BloombergNEF was showing, there was a big increase in Chinese air flights last week, which was in line with the scheduled air flights. On Wed, we tweeted [LINK] "*China air flights +7% WoW to 74,870 flts in Sept 20 week. # of scheduled flts set to climb +40.5% to 105,190 flts over next 4 weeks. Incl 09/20 wk, would add ~300,000 b/d #JetFuel demand. See 👇09/20 tweet, China airlines maybe knew something! Thx @BloombergNEF. #OOTT."* BloombergNEF's Aviation Indicators Weekly includes weekly graphs of China scheduled flights and implied jet fuel demand. The Sept 26 weekly wrote "*The number of scheduled domestic flights in China for the week of September 20 stands at*

74,870, a 7% uptick from the previous week. This suggests a growth of over 36,000 barrels per day of implied jet fuel demand. Over the next four weeks, the number of scheduled domestic flights is set to climb by 40.5% to 105,190 flights per week." Last week's (Sept 25, 2022 Energy Tidbits) memo wrote "*We have to wonder if the Chinese airlines believe or being hinted that Xi is opening up China soon. Maybe not this week, but sometime in the coming weeks sometime. On Tuesday, we tweeted [LINK] "Chinese airlines planning for China reopening any day now. Scheduled flights can always be canceled at last min. Compare last 6 wks, biggest near term jump in Chinese airlines sched flights. Maybe not today, but very soon. Add >300,000 b/d jet fuel. Thx @BloombergNEF. #OOTT." The speculation over the past few weeks is that he might do so right around the party congress that starts on Oct 16. The scheduled flights in this week's report jump up much faster than the last couple months. But that is only evident if you compare each forecast. Every week, BloombergNEF's Aviation Indicators Weekly report includes a caveat in their "Spotlight: China" slide that includes the scheduled number of domestic flights going forward for the next couple months and the implied jet fuel demand for these scheduled flights. The caveat is "however, the scheduled number of flights and implied jet fuel demand over the coming weeks may not materialize, as China has routinely cut several thousands of scheduled flights a week or so before the intended departure date". We were looking at the new Sept 19 chart and it looked like big jump up in scheduled flights and therefore incremental implied jet fuel demand of >300,000 b/d. It seemed like a big jump up so we compared it to be the last several weeks of reports. If you look at the dotted line (that is the current flight numbers), none of the last several weeks has as big a jump up that is close to the jump up in the Sept 19 report. Who knows what Xi will do, but the reminder in this jump up graph is that it could quickly add >300,000 b/d of jet fuel demand in China*." Below is this week's chart.

Figure 29: China scheduled flights & implied jet fuel demand



Source: BloombergNEF

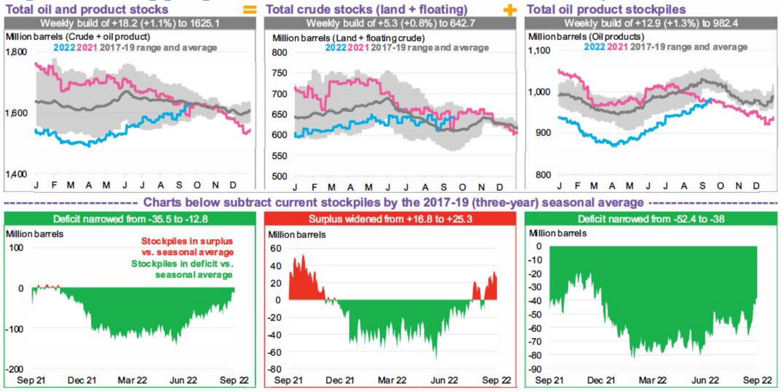
Oil – BNEF: global product and oil stocks deficit narrowed

For those with a Bloomberg terminal we recommend flipping thru BloombergNEF's "Oil Price Indicators" weekly that came out on Tuesday as it provides good charts depicting near-term

BNEF's global oil inventories

global oil demand and supply indicators. The trends were overall negative for oil this week. The global oil and products stockpile deficit narrowed for crude and products from 35.5 mmb to 12.8 mmb. The stockpile deficit against the five-year average (2015-19) narrowed from 52.4 mmb to 38.0 mmb. Total crude inventories increased by 0.8% to 642.7 mmb, including global floating inventories. Product stocks were up 0.1% WoW with the stockpile deficit against the 3-year average widening from 4.9 mmb to 5.5 mmb. Gas oil and middle distillate stocks have narrowed against their three-year average deficit (2017-2019) from 34.1 mmb to 30.1 mmb. Jet fuel consumption by international departures fell by 43,200 b/d WoW and consumption by domestic passenger departures decreased by 16,700 b/d. The global mobility index dropped over the past week, decreasing by 1.4% in the week of Sep 22. Below is a snapshot of aggregate global stockpiles. Our Supplemental Documents package includes excerpts from the BloombergNEF report.

Figure 30: Aggregate Global Oil and Product Stockpiles



Source: Bloomberg

Oil – Vortexa crude oil floating storage 91.24 mmb as of Sept 30, -16.27 mmb WoW

Vortexa crude oil floating storage

We are referencing the Vortexa global crude oil floating storage data posted on the Bloomberg terminal as of 1pm MT yesterday. Note that these estimates get revised over the course of the week and the revisions can go back months. We do not check daily for the revisions, so our comments today on the new estimates are compared to the prior weeks Vortexa estimates posted on Bloomberg on Sept 24 at 1pm MT. (i) As of 1pm MT yesterday, Bloomberg posted Vortexa crude oil floating storage estimate for Sept 30 was 91.25 mmb, which is -16.27 mmb WoW vs revised up Sept 23 of 107.52 mmb. Note Sept 23 was revised up +2.15 mmb vs the 105.37 mmb posted on Bloomberg as of 1pm MT on Sept 25. (ii) Note that the revisions to the last several weeks were mixed, some up, some down. The revisions posted yesterday vs the estimates posted on Bloomberg at 1pm on Sept 24 were Sept 23 revised +2.15 mmb. Sept 16 revised -1.58 mmb. Sept 9 revised -3.84 mmb. Sept 2 revised -0.19 mmb. Aug 26 revised +1.36 mmb. Aug 19 revised +3.28 mmb. Aug 12 revised +2.04 mmb. (iii) With the revisions, other than the Sept 23 week, the last six weeks were generally +/- 90 mmb, as opposed to mostly +/- 100 mmb in last week's estimates. (iv) Also remember Vortexa revises these weekly storage estimates on a regular basis and we do not track the revisions through the week. (v) Sept 30 estimate of 91.25 mmb is -133.5 mmb vs the post Covid peak on June 26, 2020 of 224.75 mmb. (vi) Note that the below graph goes back 3 years and not just 2 years as floating oil storage was in the big ramp up period in Q2/20 as Covid started to have a huge impact. Sept 30 estimate of 91.25 mmb is -33.41 mmb YoY vs 124.66 mmb on Oct 1, 2021. (vii) Below are the last several weeks of estimates made as of yesterday at 1pm MT, Sept 24 at 1pm MT, and Sept 18 at 4pm MT.

Figure 31: Vortexa Floating Storage posted on Bloomberg Oct 1 at 1pm MT

Source: Bloomberg, Vortexa

Figure 32: Vortexa Estimates Posted Oct 1 1pm MT, Wept 24 1pm MT, Sept 18 4pm MT,

Posted Aug 13, noon MT

FZWWFST VTXA Inde — 08/11/2019 - 08/12/2022

	Date	FZWWFST VT... Last Px
Fr	08/12/2022	106.908k
Fr	08/05/2022	92319
Fr	07/29/2022	91794
Fr	07/22/2022	85237
Fr	07/15/2022	87468
Fr	07/08/2022	93508
Fr	07/01/2022	94246
Fr	06/24/2022	92554
Fr	06/17/2022	101.729k
Fr	06/10/2022	98995
Fr	06/03/2022	82782

Aug 6, noon MT

FZWWFST VTXA Inde — 08/04/2019 - 08/05/2022

	Date	FZWWFST VT... Last Px
Fr	08/05/2022	97720
Fr	07/29/2022	95816
Fr	07/22/2022	87022
Fr	07/15/2022	86619
Fr	07/08/2022	96039
Fr	07/01/2022	96794
Fr	06/24/2022	96394
Fr	06/17/2022	106.642k
Fr	06/10/2022	103.827k
Fr	06/03/2022	86967
Fr	05/27/2022	97566

July 30, noon MT

FZWWFST VTXA Inde — 07/28/2019 - 07/29/2022

	Date	FZWWFST VT... Last Px
Fr	07/29/2022	78861
Fr	07/22/2022	85128
Fr	07/15/2022	87534
Fr	07/08/2022	92763
Fr	07/01/2022	95352
Fr	06/24/2022	94533
Fr	06/17/2022	104.531k
Fr	06/10/2022	103.166k
Fr	06/03/2022	85334
Fr	05/27/2022	96018
Fr	05/20/2022	97847

Source: Bloomberg, Vortexa

Oil – Bloomberg Oil Demand Monitor: China's covid rules continue to weigh on travel

We recommend reading the Bloomberg terminal Oil Demand Monitor for a good recap of key oil demand indicators around the world. Note that the Oil Demand Monitor highlighted the lagging Chinese international air travel, whereas the BloombergNEF data later is focused on the increasing Chinese domestic air travel. The Oil Demand Monintor noted how China is lagging US in airline passengers, covid rules continue to stymie Chinese international travel, Indian road fuel demand recovery completely, while Europe is mixed. China boasts fewer airline passengers than the U.S., with the outlook for aviation fuel demand clouded by uncertainty over whether the nation's coronavirus policy will allow for more normal economic activity. US jet fuel consumption jumped above 2019 levels, highlighting a slow, but steady recovery; opposed to China, which recovered quickly before slowing amid a series of coronavirus lockdowns. In Europe, flight activity slowed over the past month with flight numbers being 12% lower than 2019 levels. One of the stronger performers however was Greece, measuring 7% higher than the same period in 2019, notwithstanding an overall drop since the country's summertime peak in July-August. With Europe being a nonfactor and China only partially participating in international travel, its to no surprise we see current commercial flight numbers down 14% from covid-free levels experienced in 2019 and closer to last years numbers. Separately, we are seeing road fuel consumption trends that are mixed across the globe. The U.S. gasoline demand was down around 6% in August with the UK reporting similar numbers. Indian consumption was up with a 21% increase in gasoline sales from 2019 levels and diesel coming in 12% higher for August. A snapshot of 13 major world cities showed only three with higher levels of congestion than 2019, London, Taipei, and Tokyo, this is lower than the five cities two weeks prior. China's congestion index gained 12% over a four-week period. A sign that commuting and general road activity is on the mend again with fewer major urban areas under lockdown. Chengdu, a city of 21 million people that endured a strict lockdown in the first half of September, has staged a dramatic recovery as its streets fill up again before the Golden Week national holiday in China. Our Supplemental Documents package includes the Bloomberg Oil Demand Monitor.

Oil – Caixin PMI for Sept is below 50 at 48.1 after last month at 49.5

Caixin PMI down again in Sept

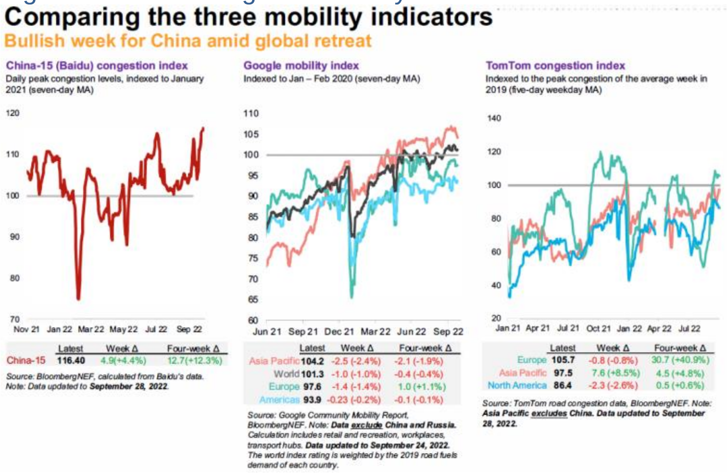
We may be seeing positive China oil indicators with increased mobility and air flights, but, at least looking at September, Chinese manufacturers are going the other way. On Friday, IHS Markit released the Caixin China Manufacturing PMI data for September [LINK] and the index showed the second consecutive month of below 50 with Sept at 48.1 (vs expectations of 49.5) and down from Aug at 49.5. The tone is negative for manufacturers with one key reason being weak export demand. This makes sense – a slowing global economy means less orders for Chinese products. The Caixin Insight Group said ""*The gauges for production and total new orders were both lower than 50, and recorded new lows in the past four and five months, respectively. External demand also contracted sharply, with the reading for new export orders the lowest since May."* Our Supplemental Documents package includes the Caixin China PMI for September..

Oil – BNEF, positive uptick in China mobility amid global drop in mobility

Mobility down globally, China and Asia Pacific up

On Thursday, BloomergNEF posted its Global Road Traffic Indicators which highlighted that globally mobility fell, however China was the odd one out and posted a positive change. TomTom congestion index showed Europe down -0.8%, Asia Pacific up 8.5%, China up 4.4%, and North America down -2.6%% from last week. Europe and North America are bearish, subject to drivers responding to rising cost, including high gasoline prices. China's mobility data highlights the relaxing of covid restrictions in the country. Our Supplemental Documents package includes excerpts from the BNEF Global Road Traffic Indicators report.

Figure 33: BloombergNEF Mobility Indicators



Source: BloombergNEF

Oil – One of many real world slowdown reports – CarMax used car miss

Huge CarMax miss

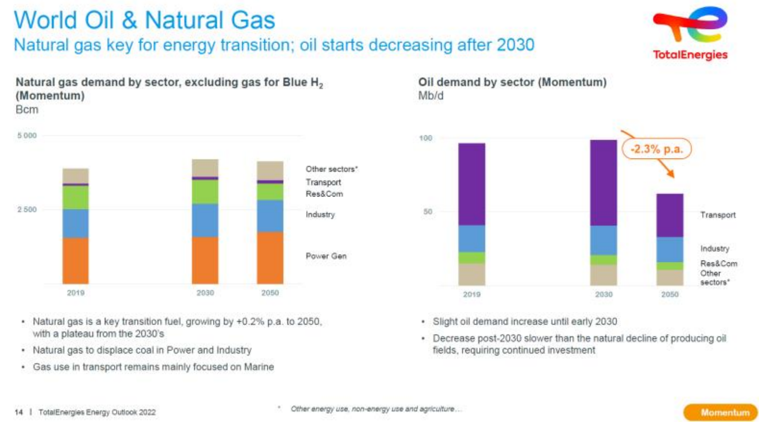
The near term tone to oil is negative with markets expecting hits to oil demand with a global slowdown. We could have included many examples of real world slowdown, but we decided to highlight one of the high profile public examples – CarMax. Its shares were down 24.6% following a quarter that was hugely below expectations. On Thursday, we tweeted [LINK] "*Near-term #Oil tone to stay impacted by real world slowdown. CarMax Q2 big miss from a number of macroeconomic factors "such as vehicle affordability challenges that stem from widespread inflationary pressures, as well as climbing interest rates and low consumer confidence" #OOTT.*" CarMax reported "*Total retail used units sold decreased 6.4%, while used unit sales in comparable stores were down 8.3%*" and "*We believe a number of macroeconomic factors impacted our second quarter unit sales performance, such as vehicle affordability challenges that stem from widespread inflationary pressures, as well as climbing interest rates and low consumer confidence.*"

Oil & Natural Gas – TotalEnergies reduces post 2030 demand forecasts for both

Lower post 2030 oil and gas demand

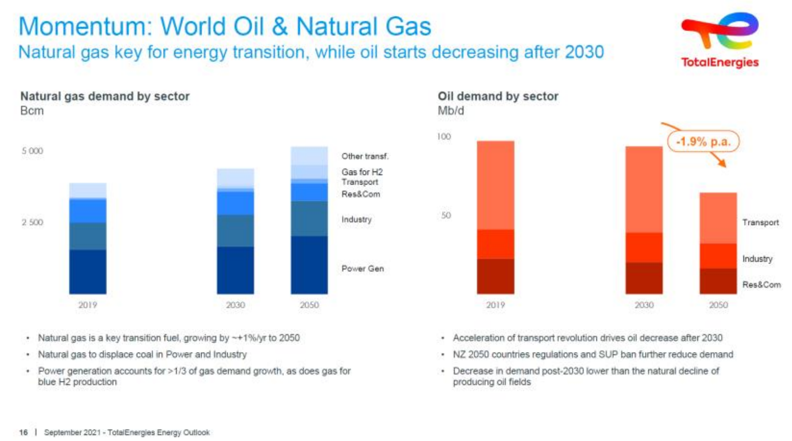
TotalEnergies investor day lower forecast for both oil and natural gas demand after 2030 didn't seem to get much attention this week. (i) It's hard to tell the numbers, but TotalEnergies forecasts higher oil and natural gas demand growth to 2030, but much lower growth after 2030. (ii) Oil. One ot they keys to their lower oil demand outlook is EVs, which displaced about 1 mmb/d last year. Continued EV penetration in the developed countries and China are a key lower oil demand forecasts post 2030. Mgmt also highlighted how improvements in electric trucks would reduced natural gas for trucks, and we would assume this would also impact diesel for trucks. (iii) Natural gas. We were a little surprised by the lower post 2030 natural gas demand forecast vs last year. In the Q&A, Mgmt explained two of the key reasons for the lower natural gas outlook. Part of the reason is that they moved any natural gas demand for blue hydrogen out of natural gas demand and into a hydrogen outlook. The second reason is interesting, they see electric truck improvements and that means less having to use natural gas for trucks than last year. In the Q&A, mgmt. said "*The second point* *is on transportation, in fact what we observe, you know, there was quite a big push to use gas as a fuel, I would say for heavy duty and even for marine transportation. We believe that this in particular for heavy-duty will not be as strong as we thought in the previous years because we observed a big push first on the electricity-driven trucks. I think all these investments, which are done by car manufacturers in EVs and so in the battery technologies, it's billions of dollars, it's thousands of people, engineers and technicians, we believe that it will accelerate strongly these -- I mean the capacity of these batteries including on the next step for heavy duty."* Below are TotalEnergies oil and natural gas outlooks slides this year and last year.

Figure 34: TotalEnergies World Oil & Natural Gas Outlook – Sept 2022



Source: TotalEnergies

Figure 35: TotalEnergies World Oil & Natural Gas Outlook – Sept 2022



Source: TotalEnergies

Dallas Fed quarterly energy Survey

Oil & Natural Gas – Dallas Fed Survey, costs rise for seventh straight quarter

One of our favorite quarterly reports is the Dallas Fed quarterly energy survey posted this week [LINK]. The survey provides a good window into what the US oil and gas sector is thinking about prices, activities and issues. It's a must read. It is important to remember that the data for this survey was collected September 14-22 from a total of 163 firms, 105 E&P and 58 oilfield services. Even though optimism waned in the new survey, it is likely lower today. WTI fell from $88.88 to $83.38 and Henry Hub from $8.70 to $7.99 as the survey was being conducted. (i) The headlines were similar to last quarters report on the expansion in oil and gas activity, cost pressures building, and supply-chain delays persist. (ii) Activity shrunk slightly compared to last quarter, the Dallas Fed wrote "*The business activity index—the survey's broadest measure of conditions facing Eleventh District energy firms—remained elevated at 46.0 but below the 57.7 record-breaking reading last quarter.*" (iii) Six-month outlooks declined, with the index remaining positive but declining from 32.7 last quarter to 25.4. After three quarters of a declining uncertainty index, it jumped from 12.4 to 35.7 suggesting that uncertainty became much more pronounced this quarter. (iv) On average, respondents expect a West Texas Intermediate (WTI) oil price of $89 per barrel by year-end 2022; responses ranged from $65 to $122 per barrel. Survey participants expect Henry Hub natural gas prices of $7.97 per million British thermal units (MMBtu) at year-end 2022. For reference, WTI spot prices averaged $85.49 per barrel during the survey collection period, and Henry Hub spot prices averaged $8.16 per MMBtu. (v) One big red flag in the survey was the rising costs for the seventh straight quarter with indexes near historical highs. The Dallas Fed wrote "*Among oilfield services firms, the index for input costs remained elevated but slipped from its series high to 83.9. None of the 58 responding oilfield services firms reported lower input costs. Among E&P firms, the index for finding and development costs was 64.7, down slightly from its high last quarter of 70.6. Additionally, the index for lease operating expenses was 70.2, easing slightly from the high last quarter of 74.1.*" (vi) We are interested in the respondents answer to special survey questions. When asked, 69% of the firms participating in the survey believe the age of inexpensive U.S. natural gas to end by year-end 2025 and an addition 12% believe this will happen by year-end 2030. Eighty-five percent of participants said they expect a significant tightening of the oil market by the end of 2024. In addition, the majority of the participants asked, 79%, said they expect some financial investors to return to the oil and gas sector. While 11% expect many will return, and 10% expect investors will not return. Our Supplemental Documents package includes excerpts from the Dallas Fed survey.

EIA's country brief on Iraq

Oil & Natural Gas – Updated EIA Iraq country brief

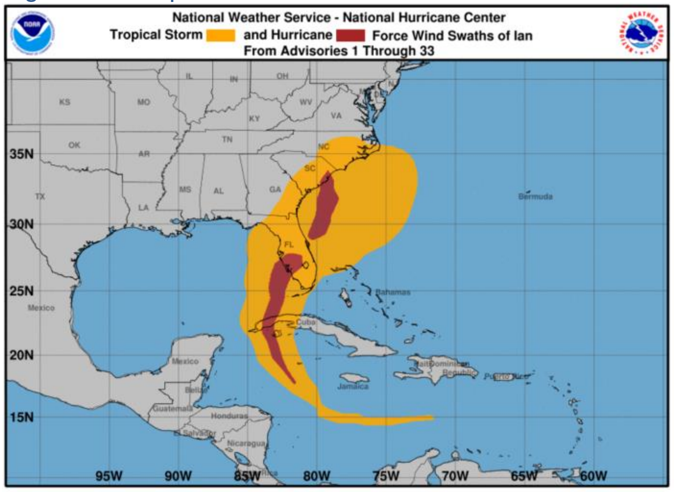
We continue to recommend adding the EIA's country analysis briefs to reference libraries as good quick references, in this case its new EIA country executive summary [LINK] on Iraq. Iraq is the second-largest crude oil producer in OPEC after Saudi Arabia. It holds the world's fifth largest proved crude oil reserves at 145 billion barrels. All known oilfields are onshore and most major fields are producing or in development. From 2013 to 2019 Iraq grew crude oil production by 1.7 mmb/d and averaged its highest daily production over a year in 2019 at 4.7 mmb/d.Iraq voluntarily reduced crude oil output in 2020 to comply with the OPEC+ agreement. The countries production rose in the first half of 2022 due to the reversal of the cuts made in 2020. Crude oil export revenues account for a large part of the country's economy. In 2019, crude oil revenue accounted for an estimated 92% of Iraq's total government revenues, according to the International Monetary Fund (IMF). Due to strong oil prices in 2021, Iraq's revenues rose to $75b from $42b the year prior. Iraq had federal elections in October 2021. Although the Moqtada al-Sadr party won the general election, a census government could not be formed nor elect a president. Iraq consumed an estimated 2 quadrillion British thermal units of total primary energy in 2021, making it the fourth largest consumer of energy in the middle east. Petroleum (70%) accounted for most of the countries primary fuel consumption, followed by natural gas (29%), hydropower (1%), and solar (<1%). Of the 4.1mmb/d produced in 2021, more than 3.6 mmb/d was produced under the central government, while about 445,000 b/d was produced at the northern fields currently operated by the Kurdistan Regional Government (KRG). The KRG is the official ruling body of the semi-autonomous region in northern Iraq that is predominately Kurdish. A non-binding independence referendum was held in 2017, which received 90% voting for independence. Iraq's oil ministry intends to lift production capacity to 8 mmb/d by 2028 and will target several upstream expansion projects from fields in southern Iraq. However, due to political struggles, lack of budget, and the international oil companies' uncertainty about the investment climate will likely delay some projects. The countries inability to attract foreign investment in the downstream sector leads to the country importing more oil from countries with the built-out infrastructure. Iraq's net electricity generation grew by an annual average of about 7% each year between 2010 and 2020, reaching 92 Twh. Our Supplemental Documents package includes the EIA brief.

Oil & Natural Gas – Hurricane Ian path was east of GoM oil, gas, LNG

Hurricane Ian

Hurricane Ian's path was as generally projected that took it east of the major Gulf of Mexico offshore oil and gas and the major Gulf Coast refineries, oil & products export terminals, LNG export projects and natural gas processing. There were some shut-in of offshore GoM production that was more precautionary and the reports were that the operators had quickly move to retore people to the platforms. The peak shut-in was on Sept 27 at 190,358 b/d of oil (11% of GoM), and 0.184 bcf/d (8.56% of GoM).

Figure 36: Tropical Storm Ian Was East of Oil & Gas, but Hammered Florida



Source: NHC

Hurricane Ian poised to be one of costliest US hurricanes

It's hard for any of us who never lived near hurricane hit areas to understand how hard Hurricane Ian was when it made landfall. But it's clear from the aftermath coverage that Hurricane Ian hit with devasting force wiping out swaths of buildings. It's still early, but Hurricane Ian will be one of the costliest US hurricanes ever. NOAA's five most costliest hurricanes are "*For all United States hurricanes, Hurricane Katrina (2005, $186.3B*) is the costliest storm on record. Hurricane Harvey (2017, $148.8B*) ranks second, Hurricane Maria (2017, $107.1B*) ranks third, Hurricane Sandy (2012, $81.9B*) ranks fourth, and Hurricane Ida (2021, $78.7B*) ranks fifth.*"

Energy Transition – Multiple energy transition views from TotalEnergies investor days

TotalEnergies energy transition items

There was a good reminder this week of our view that the best insights from management comes in presentations comes in the Q&A. It's where they have to go offscript and tend to give more revealing information/views. That was the case in the TotalEnergies two days of investor meetings on Tues/Wed and throughout the two days were a number of energy transition insights. There were some that were supportive that the energy transition is moving ahead on a good clip, but, to the most part, they were items that would raise concerns on the expectations for a smooth energy transition. Below we note some of the key energy transition items.

Big push on electric trucks is faster than TotalEnergies expected

Earlier in the memo, we noted how one of the factors for TotalEnergies lowering its post 2030 natural gas demand forecast is that they see less of long term push in natural gas for trucks because of the big push on electricity driven trucks. And they also believe the manufacturers push on electric trucks should see "*the capacity of these batteries including on the next step for heavy duty*".

"*Renewables, if you compete with others, you lose money*"

There is no change to TotalEnergies view that there are lLow renewable returns for competitive bidding projects on wind; Mgmt's comments should not have surprised anyone as they are in line with their and other's comments on the challenge to make money in renewable projects like offshore wind if there is any competitive bidding. On Wednesday, we tweeted [LINK] ""*Renewables, if you compete with others, you lose money! Okay, I said that, I declared it." says @PPouyanne. It's why #TotalEnergies is selective to ensure their renewables deliver >10% ROE ie. uses its advantage to farm-down, merchant, trading, to enhance returns. #OOTT."* CEO Pouyanne also said ""*Renewables, if you compete with others, you lose money! Okay, I said that, I declared it." "I say to my colleagues, stop spending your time to go to this because we face competitions with financial institutions, when clearly I am not ready to pay NPV 4 or NPV 5."*. TotalEnergies lifts up the returns of its renewables projects by farming down interests, allocating trading profits, etc.

TotalEnergies' farm down strategy allows them to get renewable IRRs to >10%

18 months ago, we tweeted on TotalEnergies farm down strategy on renewables and how that was key to them getting >10% return on offshore wind. TotalEnergies tries

to be an early mover to tie up wind and solar opportunities. This early capture allows them to sue farm downs as the key part of their strategy to get renewable IRRs to >10%. On Feb 24, 2021, we tweeted [LINK] "*$TOT farms down some #RenewableEnergy assets. IRR lift on farm down helps get renewable IRRs to >10%. Lower renewable IRRs vs #Oil #NatGas remind of @lc_hurst reporting on challenge for EU big oil - investors want transition to #NetZero yet not at the expense of returns. #OOTT".* Our tweet included Total's Q4/20 call slide on how it gets to renewables to a >10% IRR.

Nowhere enough animal fat/municipal waste to make forecasted SAF

TotalEnergies was pretty clear there just isn't enough source product to replace jet fuel with sustainable aviation fuel. After hearing CEO Pouyanne's Q&A response, it feels like SAF might be able, over time, to replace maybe 10%, maybe a little more of the jet fuel market? We tweeted [LINK] "*Reality check.@PPouyanne if make Sustainable Aviation Fuel from all animal waste + all the municipal waste in the world, it is ~1/2 of SAF to decarbonize #JetFuel. See 👇Delta Airlines CEO Bastian reminded SAF is 3-4x cost of jet fuel. Air travel will be $$$$. #OOTT."* Our tweet included the transcript we made of Pouyanne's reply. From Q&A, at approx. 7:05am MT, Pouyanne on the challenge to use Sustainable Aviation Fuels to decarbonize jet fuel " *… just to show you that it's a real challenge. We make a theoretical exercise within TotalEnergies, which I can share with you the result. We see, okay, if we take all the waste coming from animal waste, biomass waste, plus all the municipal waste, we identify what is the fat in it. And we try to transform all this, at the world level. You take everything at the world scale, world level and you transform that into SAF, only dedicating all this fat coming from waste to SAF, it will represent only half of the sustainable aviation fuel, which will be required if we want to decarbonize 100% of the plane fuels. That means we could cover only 50%."* If using all the fat and municipal waste in the world only gets to 50%, it has to make you think the realistic best case scenario is something more like 10% to 20%.

Copper may be the key limiting factor for offshore wind, and soon

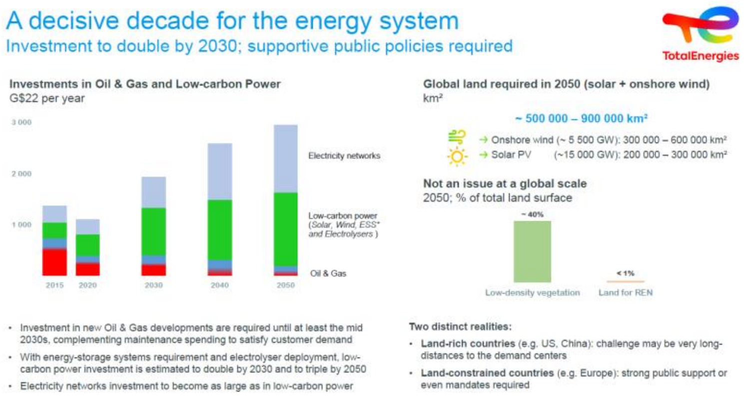
A good simple reminder from TotalEnergies on offshore wind – copper is needed in the cables to bring the offshore electricity to markets. Every clean energy plan depends on the rapid, accelerated growth in offshore wind to be the major contributor to renewable power generation servicing the vast majority of the developed world that doesn't have big available land mass like Canada and the US. TotalEnergies reminded that a key risk to this assumption is copper. We tweeted [LINK] "*Exponential growth in offshore #Wind is in all #CleanEnergy plans. @PPouyanne reminds a lot of #Copper needed for electric cables from offshore #Wind, some suppliers already warned might be facing copper shortage for offshore wind. #NatGas will be needed for longer. #OOTT."* Our tweet included the transcript we made of Pouyanne's reply in the Q&A. At 7:22am MT, Pouyanne "… *your question on copper is more interesting because it could affect not only EVs by the way, but we know electric cables when you make offshore wind farms, you need a lot of copper. And I begin to have some suppliers who told us, be careful we have, we might face a shortage of copper to make all these wind farms that you are ready to invest around the world. So that's something on which I will be frank with you.*

TotalEnergies, we need to to invest, to better understand each of these materials but it is very possible that the world, the planet will go from one dependency, which is oil and gas, gas in particular this year with Russian gas, to another dependency which is another type of materials. You know the planet is round, so in the end everything is limited on the planet".

A doubling of clean energy investment is needed by 2030

How can the cost of energy in the 2020s not be way higher if capital, especially front end capital, has to be dramatically increased in the 2020s? We tweeted [LINK] "*It's only math! Here's why the cost of energy will probably double under #EnergyTransition - @TotalEnergies reminds need to keep spending on #Oil #NatGas to keep the lights on during transition & double the capex on low carbon to reduce emissions for the transition. #OOTT."* TotalEnergies reminded that oil and gas capex has to continue thru the 2020s to provide the needed energy for the world during the energy transition. But then highlighted that there has to be a sooner and larger acceleration, a doubling, in clean energy investment if the world is to get to some of its emissions targets. A key element will be government policies. It just stands to reason that maintaining oil and gas investment and a doubling in clean energy investment has to lead to a decade or longer of dramatically higher energy costs.

Figure 37: Investment to double by 2030



Source: TotalEnergies

Energy Transition – Denmark reminds air fares going up in transition to SAF

Denmark's SAF movement

No one disputes Sustainable Aviation Fuel will have a lower emissions impact than conventional jet fuel. And no one can dispute air travel will cost more as countries start to charge/tax air passengers even before there is any SAF blended in with conventional jet fuel. And it will be much more costly once countries start to actually blend in more SAF to their mix. (i) This fact that air travel will be more expensive even without any SAF blended in was reinforced by Denmark last week. On Sept 20, "*Denmark unveils plan to make aviation sustainable" "The government's plan aims to ensure that Denmark has a domestic 100 percent green flight route by 2025 and that all domestic aviation will be green by 2030. The transition will be financed by imposing a flat passenger fee of 13 DKK."* The flat passenger fee is $1.69 per passenger. And Denmark also acknowledges "*Today, sustainable aviation fuels are far more expensive than fossil-based jet fuels. Consequently, the Danish government proposed to allocate more than 1.8 billion DKK ($234 million) to increase demand for sustainable aviation fuels.*" Denmark is one of the few countries that has a chance at this challenge as Denmark tip-to-tip max is 400 km north to south, and 350km East to West. Our Supplemental Documents package includes the Denmark release. [LINK].

On Jan 1, 2022, Denmark PM said all domestic flights to be green by 2030
The Denmark release is in line with the Denmark PM's plan. Here is what we wrote in our Jan 2, 2022 Energy Tidbits memo "*Denmark PM Frederiksen's new year's speech [LINK] said that Denmark would be making all domestic air flights be green by 2030. Note that she said this would be difficult but possible. And then she said "If we succeed. Then it will be a green breakthrough. Not just for Denmark. But for the whole world." After reading her speech, we tweeted [LINK] "Denmark domestic air flights to be green by 2030. PM says difficult but possible & "it will be a green breakthrough. Not just for Denmark. But for the whole world." Really? DK tip to tip max is 400 km N/S, 350 km E/W. Will take decades to replace global #JetFuel #OOTT #NetZero." We don't see how this will be a breakthrough for the whole world as Denmark is a small country in area. That is unless she means to include the >6 hour flight to Greenland. For perspective, Denmark's area is ~44,000 km2, which is roughly 80% of the area of Nova Scotia. Our tweet noted that the maximum distance tip-to-tip is 400 km north to south, and 350 km east to west. These are short flights so we don't see how this is a breakthrough for the world.*"

Energy Transition – Silence on on PG&E's battery storage fire/shut down

PG&E's 182.5 MW Moss Landing battery storage site

We find it amazing that it's been 11 days of relative silence on any investigation update for why PG&E reportedly shut down indefinitely its 182.5 megawatt battery storage facility because of a fire at 1 of 256 Tesla mega batteries. As of our 7am MT news cut off, we haven't seen any updates or preliminary investigation reports. We think it's fair to say that if there had been any industrial fire accident that shut down a refinery, or natural gas plant or other oil and gas facility, politicians and media would be screaming for updates. We continue to believe this is potentially a major issue for the energy transition because every clean energy plan has lithium-ion battery storage as a critical component. We are surprised that it seems like silence from politicians and media. Last week's (Sept 25, 2022) Energy Tidbits memo had an item "*Is PG&E's battery storage fire/shut down the tip of the iceberg*". On Monday, we tweeted [LINK] "*Hmmm! #CleanEnergy plans assume large-scale lithium-ion battery storage is about to start exponential growth phase. Will PG&E Tesla mega-battery storage shut down be high enough profile to cause a rethink of that assumption? If so, bullish for #NatGas. Thx @anjani_trivedi #OOTT".* Maybe our thoughts should be reversed? Maybe this will given an easier pass given the high profile nature of anything to do with Tesla and the critical role of lithium-ion storage in every clean energy plan?

Is PG&E's battery storage fire/shut down the tip of the iceberg?
Here is what we wrote in our Sept 25, 2022 Energy Tidbits on the fire and shutdown. "*Maybe it's nothing, but we have to wonder if there is more to the story behind why a fire at 1 of 256 Tesla mega batteries has reportedly led to an indefinite shut down of PG&E's 182.5 megawatt Moss Landing battery storage facility. On Friday, we*

tweeted [LINK] "Must read! @scsentinel reports #PGE big Moss Landing battery storage shut indefinitely post fire at 1 of 256 Tesla mega batteries. Any risk to battery storage potential limits #Wind #Solar non-peak contribution & creates need for #NatGas. #OOTT [LINK]." (i) We were surprised there wasn't more coverage of the fire at PGE's big Moss Landing battery storage facility in California that reportedly led an indefinite shut down of the facility. On Tuesday, one of the 256 Tesla mega batteries at the Moss Land battery storage facility caught fire. The fire reportedly burned out five hours after being reported. And reportedly the PG&E facility is shut down indefinitely. (ii) Santa Cruz Sentinel reported "Storage facility maintained by the utility and Tesla. The PG&E plant just opened in April and according to a utility spokesman, the facility is capable of storing enough energy to power 275,000 homes for up to four hours – about the number of homes in the city of San Francisco, for instance." (iii) the PG&E facility is located adjacent to another 400 megawatt battery storage site, which reportedly has had two overheating incidents in the past year that forced partial shut downs. (iv) We are surprised that no one seems interested in the fact that a fire in 1 of 256 Tesla mega batteries has led to an indefinite shut down of the 182.5 megawatt facility. That caught our attention. Maybe it's nothing, but it has to raise the question of safety of these mega battery pack storage facilities that are basically a large number of batteries. (v) Battery storage is crucial to every clean energy plan. It is not an option, it is an essential to these plans. Because without battery storage of electricity, clean energy's contribution will be limited to when the sun shines and the wind blows. Battery storage allows power from wind and solar to be store and deployed for when the sun isn't shining or the wind isn't blowing. Without battery storage, power grids will need natural gas generation. (vi) It seems clear battery storage works, but we have to wonder if this incident points to some lesser than expected capacity for battery storage. And any lesser capacity for battery storage is a bullish for natural gas. This certainly seems like an issue to follow as battery storage is critical to every clean energy plan. Our Supplemental Documents package includes the Santa Cruz Sentinel report."

Figure 38: PG&E Moss Landing Tesla Battery Storage

Source: CBS News

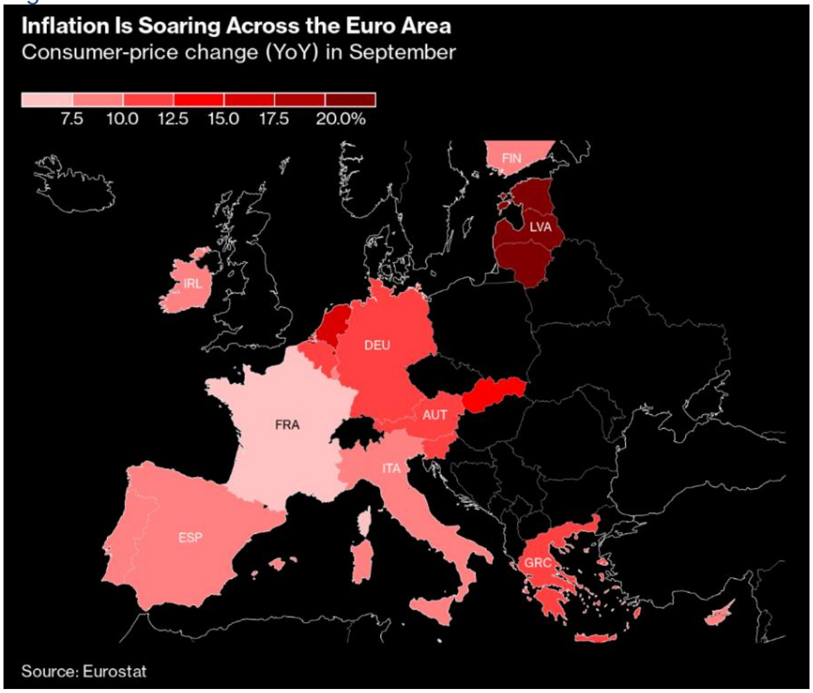
Capital Markets – Hardest hit EU countries are those most importing RUS oil & gas

One of the major market stories on Friday was that inflation in the Euro zone hit 10% for the first time. We tweeted [LINK] "*Euro-zone inflation hits 10% for 1st time ever. Also note*

EU inflation hits 10%

correlation of countries well above 10% inflation are those most dependent on Russia #Oil #NatGas. Reminder the EU sanctions on Russian oil start Dec 5, petroleum products Feb 5. Thx @CraigStirling. #OOTT." Bloomberg wrote "*Consumer prices surged 10% from a year ago in September, data from Eurostat showed Friday. That's more than the median forecast of 9.7% in a Bloomberg survey of economists, and marks the fifth straight month the result has exceeded consensus. Energy and food once again drove inflation, though an underlying measure that excludes them also topped estimates to reach an all-time high of 4.8%."* The Bloomberg report also included the below graphic that reminds the highest inflation EU countries are those most dependent on imports of Russian oil and natural gas such as Germany. This is different than countries such as France that did not give up its nuclear power.

Figure 39: Inflation rates across the Euro Area



Source: Bloomberg, Eurostat

Capital Markets – IFIC: Mutual funds and ETF assets -2.0% in August

Mutual Fund & ETF assets decrease MoM

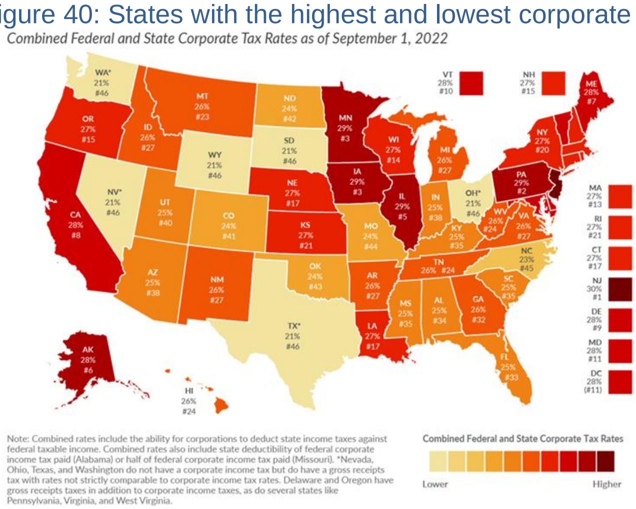
Last Friday the IFIC (Investment Funds Institute of Canada) reported [LINK] mutual funds and ETF sales for August. IFIC does not provide any commentary on the numbers. Market price decreases accounted for majority of the overall increase in net assets. For August, the IFIC reported "*Mutual fund assets totalled $1.827 trillion at the end of August 2022. Assets decreased by $37.6 billion or 2.0% compared to July 2022. Mutual funds recorded net redemptions of $3.1 billion in August 2022. ETF assets totalled $298.7 billion at the end of August 2022. Assets decreased by $5.0 billion or 1.6% compared to July 2022. ETFs recorded net sales of $1.5 billion in August 2022."* Our Supplemental Documents package includes the IFIC release.

Capital Markets – NJ, PA, and NY among the highest tax brackets in the U.S.

The Tax Foundation released the below graphic displaying the combined corporate tax rates across the United States [LINK]. The tax rates across the country range from 21% - 30% with New Jersey having the highest tax rate and, surprisingly, Washington at the bottom end of the range. Note: combined rates include the ability for corporations to deduct state income taxes against federal taxable income. Combined rates also include any state deductibility of federal of federal corporate income tax paid. Our Supplemental Documents package includes posting.

NJ has the highest combined corporate taxes, WA lowest

Figure 40: States with the highest and lowest corporate taxes in the U.S.



Source: Tax Foundation

Figure 41: States with the highest and lowest corporate taxes in the U.S.

Top 10		Bottom 10	
State	Tax Rate	State	Tax Rate
NJ	30%	WA	21%
PA	29%	TX	21%
MN	29%	NV	21%
IA	29%	WY	21%
IL	29%	SD	21%
AK	28%	OH	21%
ME	28%	NC	23%
CA	28%	MO	24%
DE	28%	OK	24%
VT	28%	ND	24%

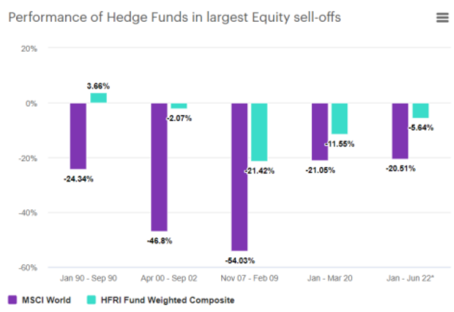
Source: Tax Foundation

Capital Markets – Hedge funds outperform in equity sell-offs

The hedge fund industry grabs headlines in a negative light more often than not. What is less captured in headlines is the strong performance of hedge funds and a pleasing evolution in segments of the industry in terms of transparency, delivering better value, and help to address emerging issues of asset owners. On Wednesday, WTW wrote a report [LINK] on the performance of hedge funds in periods of equity sell-offs. Highlighting that from Jan 1990 – Sep 1990 hedge funds outperformed by 28%, with subsequent outperformances of 44.73% during the tech bubble in 2000, 32.61% outperformance during the financial crisis in 2008, 9.5% outperformance during the COVID sell-off, and most recently a 14.87% outperformance from Jan – Jun 2022.

Hedge Fund Performance

Figure 42: Performance of Hedge Funds in largest Equity sell-offs



Source: WTW

Twitter – Look for our first comments on energy items on Twitter every day

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.

@Energy_Tidbits on Twitter

LinkedIn – Look for quick energy items from me on LinkedIn

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

Look for energy items on LinkedIn

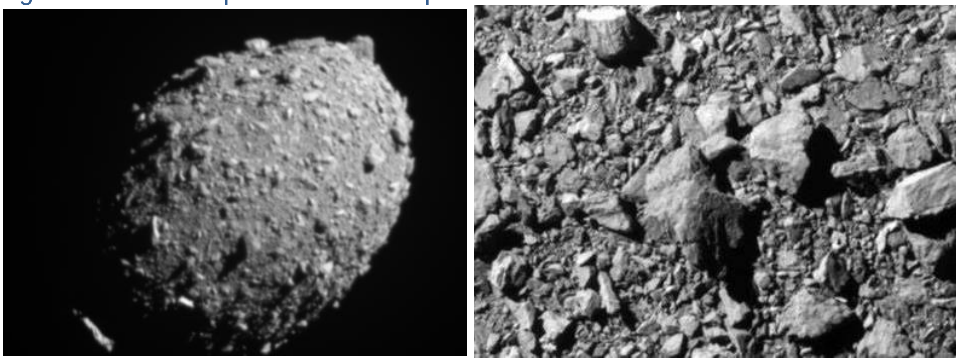
Misc Facts and Figures.

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

NASA's DART successfully crashes into the asteroid Dimorphos

On Monday afternoon, we retweeted [LINK] *"ICYMI, #NASA #DART impact right on target. Great pictures of asteroid. Kudos to @NASA DART team!."* It was a rewtwet of the NASA clip showing DART's pictures of the asteroid, Dimorphos. It doesn't feel like NASA's DART (Double Asteroid Redirection Test) crashing into its asteroid target, Dimorphos, on Monday night was a must watch TV event other than for those die hard space fans. After being launched 10 months ago, DART successfully crashed into its target asteroid. This was the purpose of the mission – it was a deliberate collision, to crash into an asteroid to see if the impact would cause a redirection in the asteroid's flight path. It was not to plant a nuclear bomb on the asteroid as is the norm in the movies about stopping an asteroid from hitting Earth. DART transmitted images of Dimorphos right up until impact. It doesn't look the moon, rather it looks like some smashed up rock on the surface. The test is still to come from monitoring Dimorphos – did it work? Will we be able to redirect an asteroid with a collision?

Figure 43: DART's pictures of Dimorphos



Source: NASA

Cdn pro golfers Maddie Szeryk and Mackenzie Hughes both in the hunt

One of the advantages of Saturday being a big work day is leaving TV on in the background and not having to worry about markets. So golf was on most of the afternoon. We watched an hour or so and didn't see any of Maddie Szeryk's shots even though she was just off the lead all day at the LPGA's The Ascendant LPGA Benefiting Volunteers of America. She is 5^{th} at -9, two shots off the lead. She will in the 2^{nd} last threesome with Lydia Ko and So Yeon Ryu. But we saw almost all of Mackenzie Hughes shots for the last five holes as he either co-lead or second. He birdied 18 to end up at -13, solo second two shots behind leader Mark Hubbard, so he will be in the final group today. We will be rooting for Szeryk and Hughes.

Jim Morris made his MLB rookie debut as a Texas Ranger pitcher at 35 yrs

Had BNNBloomberg on early Wed morning and a commercial comes on for the tv show The Rookie. Never seen the show, but it reminded of the 2002 movie "The Rookie", which was the true life story of Texas Rangers pitcher, Jim Morris. Morris was played by Dennis Quaid. Morris who was first drafted in the 18^{th} round by the New York Yankees in 1982 at the age of 18, then in the 1^{st} round by the Milwaukee Brewers in the 1983 secondary draft. Kicked around in the minors for five years never getting above Class A baseball. And went back to west Texas to be a high school teacher/baseball coast in small town (19,000 current population) Brownwood, Texas. In the 3 prior seasons, the best season was a 1 win season. Ends up coaching the team to a district championship and part of the deal he made with the team if he won would be that he would go to a pro baseball tryout to try to live out his dream of pitching in the majors. Ends up signing with the Texas Rangers, returns to start in the 1999 season in the minors (AA/AAA) before being called up to make his major league debut with the Rangers against the Tampa Bay Devils. His major league debut at 35! Ends up appearing in 21 games as a reliever for the Rangers before retiring in 2000. There was an excellent Goalcast report "*Jim Morris* **|** *The Unbelievable True Story of Baseball's Oldest Rookie*", which is basically Morris talking about his life and baseball. Morris ends saying "*My grandfather had this saying. Every day, I heard it for three years. "Remember who you are." It took me until years later to get what he meant. Remember who you are is simple. Don't do anything you wouldn't have anybody see you do. It's not what you do when you know people are watching that makes you who you are. It's what you do when nobody's watching at all. That makes you who you are. That's character. That's my grandparents. If you make it just about you, you're never going to go anywhere. It's when you make it about something bigger than you and be a mentor for somebody, be a dream maker, be a team player. Nothing is impossible in this world*." Our Supplemental Documents package includes the Goalcast report.

Tim's windbreakers with insulated pocket to keep breakfast sandwich warm

Apparently, the Tim Hortons' special Tims Runs merchandise sold out within minutes upon being offered for sale on Thurs. That's too bad as we wanted to see the specifically designed windbreakers for people to hit Tim Hortons for breakfast takeout order. They designed these windbreakers with have insulated front pockets to keep your breakfast sandwich warm, and with extendible sleeves to hold a hot cup of coffee.

Figure 44: Windbreaker with insulated pocket & extendible sleeves to hold coffee

Source: Toronto Star