SAF GROUP

Energy Tidbits

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EU Fuel Co's Warn EU Requires a Difficult Rethink of Long-held Assumptions How We Can Best Reach Climate Neutrality in 2050

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. EU auto, fuel companies & industry associations warn EU "*requires a difficult rethink of long-held assumptions how we can best reach climate neutrality in 2050"* (Click Here)

2. Oil's brutal week overshadowed Aramco CEO's mid-term reminder global oil declines at 6% (6 mmb/d) every year (Click Here)

3. BloombergNEF warns "*Its True, EIA Weekly Demand Data Has Gotten Worse*" (Click Here)

4. Worth following why a fire at 1 of 256 Tesla mega batteries has indefinitely shut PG&E's big Moss Landing 182.5 megawatt battery storage facility (Click Here)

5. No timeline yet for restart of bp's 160,000 b/d Toledo refinery that is supplied by Cdn crude oil (Click Here)

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

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

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Natural Gas – Natural gas injection of +103 bcf, storage now -197 bcf YoY deficit

The YoY storage deficit started last winter at -282 bcf YoY at Oct 31 and is now -197 bcf YoY. The EIA reported a +103 bcf build (+94 bcf expectations) for the Sep 16 week, which was above the 5-yr average build of +81 bcf, and above last year's injection of +76 bcf. The build is higher than the 5-year average during injection season as the US looks to ramp up injections in lower storage levels before the winter months. Storage is 2.874 tcf as of Sep 16, decreasing the YoY deficit to -197 bcf from -300 bcf last week and is -332 bcf below the 5-year average vs -349 bcf below last week. Below is the EIA's storage table from its Weekly Natural Gas Storage Report [LINK].

YoY storage at -197 bcf YoY deficit

Figure 1: US Natural Gas Storage

	Stocks billion cubic feet (Bcf)				Historical Comparisons: Year ago (09/16/21)		Historical Comparisons: 5-year average (2017-21)	
Region	09/16/22	09/09/22	net change	implied flow	Bcf	% change	Bcf	% change
East	690	661	29	29	748	-7.8	784	-12.0
Midwest	844	809	35	35	900	-6.2	907	-6.9
Mountain	168	163	5	5	196	-14.3	199	-15.6
Pacific	237	235	2	2	240	-1.3	278	-14.7
South Central	935	904	31	31	986	-5.2	1,038	-9.9
Salt	199	187	12	12	226	-11.9	253	-21.3
Nonsalt	736	717	19	19	760	-3.2	786	-6.4
Total	**2,874**	**2,771**	**103**	**103**	**3,071**	**-6.4**	**3,206**	**-10.4**

Source: EIA

Natural Gas – Brutal week for Tellurian's 1.45 bcf/d Driftwood LNG project

We don't think there is any other way than to say it was a brutal week for Tellurian's 1.45 bcf/d Driftwood LNG project. Tellurian was hoping to produce first LNG in early 2026. No one knows what will happen next and over what time, but it's pretty clear the project is in limbo. (i) On Monday morning, Tellurian announced a public offering of 11.25% senior secured notes to support the Driftwood LNG construction. (ii) But on Monday after markets, Tellurian announced the withdrawal of the issues "*due to uncertain conditions in the high yield market*". (iii) On Tuesday, Tellurian posted a video "*Two Minutes with Charif Souki on Tellurian's business update*" [LINK]. CEO Souki noted the reason why they pulled the deal is that "*we were faced with doing a deal that we thought would jeopardize the balance sheet of the company, so we decided to pull it*". He then said "*however for Driftwood, it puts in jeopardy, the financial, the ability to deliver gas on the schedule that we were hoping to stick to*." Note, Souki said financial almost like a slip of the tongue as it wasn't a sentence. He noted they are focused on finding strategic partners for the equity in Driftwood that they started 6 to 9 months. Note there looked like some careful words that imply they are interested in Driftwood but that isn't what he said. Rather Souki said "*they have all indicated that they would like to participate in an American energy project*". Seemed like careful wording. (iv) On Friday morning, Tellurian shares were halted at the open and it filed a Form 8-K that said "*Termination of a Material Definitive Agreement. On September 23, 2022, Tellurian Inc. ("Tellurian" or the "Company") received a notice of termination from Shell NA LNG LLC ("Shell") with respect to the LNG Sale and Purchase Agreements 1 and 2 between Driftwood LNG LLC and Shell, each dated as of July 29, 2021, as amended (the "Agreements"). The terms of the Agreements are summarized in the Company's Current Report on Form 8-K filed with the Securities and Exchange Commission on July 29, 2021. Also on September 23,*

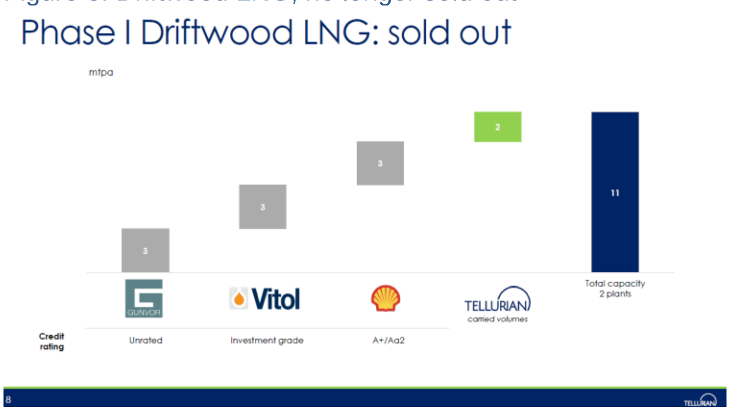
Tellurian's 1.45 bcf/d Driftwood LNG

2022, the Company delivered a notice of termination to Vitol, Inc. ("Vitol") regarding the LNG Sale and Purchase Agreement, dated as of June 2, 2021, by and between Driftwood LNG LLC and Vitol. The terms of that agreement are summarized in the Company's Current Report on Form 8-K filed with the Securities and Exchange Commission on June 3, 2021." Basically the two key LNG agreements for the Driftwood LNG offtake were terminated. The Shell deal was for 0.39 bcf/d and the Vitol deal was for 0.39 bcf/d. (iv) Tellurian shares closed last Friday Sept 16 at $3.95, and were down 41% this week to close at $2.34 on Friday Sept 23. Our Supplemental Documents package includes the Tellurian releases this week, the Form 8-K and some excerpts from their latest July 2022 corporate presentation.

Figure 2: Driftwood LNG 1.45 bcf/d

Source: Tellurian

Figure 3: Driftwood LNG, no longer sold out



Source: Tellurian

Natural Gas – Does Tellurian impact Shell's FID decision on LNG Canada Phase 2?

Shell loses 0.39 bcf/d of LNG supply

As noted above, Shell sent a notice of termination to Tellurian on their deal that would have seen Shell take 0.39 bcf/d of LNG from the Driftwood LNG project for 10 years. We had questions if we thought the Tellurian situation changed Shell's decision on FID for LNG Canada 1.8 bcf/d Phase 2. Shell owns 50% so its share would be 0.9 bcf/d. We tweeted [LINK] "*Think #Shell FIDs #LNGCanada 1.8 bcf/d Phase 2 is happening irrespective of $TELL. But doesn't hurt as Shell was taking 0.39 bcfd #DriftwoodLNG. Most of all, reminds why best operators like Shell focus on projects they operate - takes away operator execution risk. #NatGas #OOTT*." We don't think the Tellurian situation changes what Shell was planning do on LNG Canada Phase 2, but, we have always believed Shell is going to FID LNG Canada Phase 2 soon. So we don't think it makes it more likely. However, Shell has lost 0.39 bcf/d of LNG supply that It was counting on in the 2027 or so period for 10 years ie. It can't hurt. What we believe is the biggest impact is that it is a reminder why top LNG operators like Shell like to operate the projects – it takes away a lot of operator execution risk.

Will new Shell CEO Sawan recommend FID LNG Canada Phase 2 in Sept

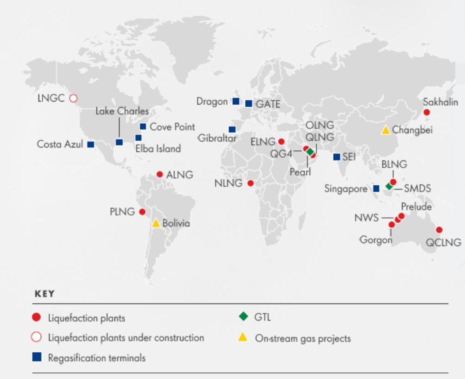
Last week's Energy Tidbits memo was titled "*Will New Shell CEO Sawan Move in Near Term on FID for LNG Canada's Brownfield 1.8 bcf/d Phase 2? We Think So.*" In that memo, we wrote "*There is only two weeks to go in September to see if our long standing call will turn out that we should see Shell FID 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 4: Shell Pre-FID LNG supply options – Indonesia, LNG Canada, Tanzania

INTEGRATED GAS PORTFOLIO & MAJOR PROJECTS



Project	Country	Shell share %	Peak production kboe/d	LNG capacity mtpa	Shell-operated
Under construction – Start-up 2022-2023					
Arrow - Surat Gas	Australia	50	backfill		
Colibri	Trinidad & Tobago	87	backfill		✓
Gorgon - Jansz	Australia	25	backfill		
QGC SW20+ Measure	Australia	62	backfill		✓
Oman Gas*	Oman	53	120		✓
Under construction – Start-up 2024+					
Gorgon - Jansz compression	Australia	25	backfill		
LNG Canada T1-2	Canada	40		14	
NLNG T7	Nigeria	26		7.6	
Pre-FID options					
Abadi	Indonesia	35	245	9.5	
East Med	Egypt	35	backfill		
LNG Canada Expansion	Canada	40		14	
Manatee	Trinidad & Tobago	100	backfill		✓
NWS - Browse	Australia	27	backfill		
Prelude - Crux	Australia	82	backfill		✓
Tanzania	Tanzania	25	[A]	15	✓

*FID of the project subject to the issuance of a Royal Decree by the government of the Sultanate of Oman confirming award of the Block 10 Concession Agreement.

Shell plc | February 21, 2022 Projects listed are a selection of our project portfolio. Peak production and LNG capacity are 100%. [A] to be confirmed. 16

Source: Shell

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

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 – Been 11.76 bcf/d of long-term LNG supply deals since July 1, 2021

11.76 bcf/d of long term LNG deals since July 1, 2021

LNG markets had dramatically turned long before Russia invaded Ukraine. The best indicator was how LNG buyers abruptly changed from spot purchases to committing to long term LNG purchases. We first highlighted this abrupt shift to long term LNG supply deals in our July 14, 2021 8-pg "*Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs".* We included a table of the deals done in that short two week period. We continue to update that table, which now shows 11.76 bcf/d of long term LNG deals since July 1, 2021. 64% of the deals have been by Asian LNG buyers, but we are now seeing rest of world locking up long term supply deals post Russia/Ukraine. The other big change in the past year is that the major LNG supply companies like Chevron, Equinor, Exxon, Shell and Vitol are locking up long term LNG supply to add to their portfolios for LNG supply to others. The now terminated Shell/Tellurian deal is one such example. Below is our updated table of Asian and Europe LNG buyers new long term supply deals since July 1, 2021. It does not include any volumes linked to the Tellurian/Vitol or Tellurian/Shell terminated deals.

Figure 5: Long Term LNG Supply Deals since July 1, 2021

Long-Term LNG Buyer Deals Since July 1, 2021							
Date	Buyer	Seller	Country Buyer / Seller	Volume (bcf/d)	Duration Years	Start	End
Asian LNG Deals							
Jul 7, 2021	CNOOC	Petronas	China / Canada	0.30	10.0	2022	2032
Jul 9, 2021	CPC	QatarEnergy	Taiwan / Qatar	0.16	15.0	2022	2037
Jul 9, 2021	Guangzhou Gas	BP	China / US	0.13	12.0	2022	2034
Jul 12, 2021	Korea Gas	QatarEnergy	Korea / Qatar	0.25	20.0	2025	2045
Sept 29, 2021	CNOOC	QatarEnergy	China / Qatar	0.50	15.0	2022	2037
Oct 7, 2021	Shenzhen	BP	China / US	0.04	10.0	2023	2032
Oct 11, 2021	ENN	Cheniere	China / US	0.12	13.0	2022	2035
Nov 4, 2021	Unipec	Venture Global LNG	China / US	0.46	20.0	2023	2043
Nov 4, 2021	Sinopec	Venture Global LNG	China / US	0.53	20.0	2023	2043
Nov 5, 2021	Sinochem	Cheniere	China / US	0.12	17.5	2022	2040
Nov 22, 2021	Foran	Cheniere	China / US	0.04	20.0	2023	2043
Dec 6, 2021	Guangdong Energy	QatarEnergy	China / Qatar	0.13	10.0	2024	2034
Dec 8, 2021	S&T International	QatarEnergy	China / Qatar	0.13	15.0	2022	2037
Dec 10, 2021	Suntien Green Energy	QatarEnergy	China / Qatar	0.13	15.0	2022	2037
Dec 15, 2021	SPIC Guangdong	BP	China / US	0.03	10.0	2023	2033
Dec 20, 2021	CNOOC Gas & Power	Venture Global LNG	China / US	0.26	20.0	2023	2043
Dec 29, 2021	Foran	BP	China / US	0.01	10.0	2023	2032
Jan 11, 2022	ENN	Novatek	China / Russia	0.08	11.0	2024	2035
Jan 11, 2022	Zhejiang Energy	Novatek	China / Russia	0.13	15.0	2024	2039
Feb 4, 2022	CNPC	Gazprom	China / Russia	0.98	30.0	2023	2053
Mar 24, 2022	Guangdong Energy	NextDecade	China / US	0.20	20.0	2026	2046
Mar 29, 2022	ENN	Energy Transfer	China / US	0.36	20.0	2026	2046
Apr 1, 2022	Guangzhou Gas	Mexico Pacific Ltd	China / Mexico	0.26	20.0	n.a.	n.a.
Apr 6, 2022	ENN	NextDecade	China / US	0.20	20.0	2026	2026
Apr 22, 2022	Kogas	BP	Korea / US	0.20	18.0	2025	2043
May 2, 2022	Gunvor Singapore Pte	Energy Transfer LNG	Singapore / US	0.26	20.0	2026	2046
May 3, 2022	SK Gas Trading LLC	Energy Transfer LNG	Korea / US	0.05	18.0	2026	2042
May 10, 2022	Exxon Asia Pacific	Venture Global LNG	Singapore / US	0.26	n.a.	n.a.	n.a.
May 11, 2022	Petronas LNG	Venture Global LNG	Malaysia / US	0.13	20.0	n.a.	n.a.
May 24, 2022	Hanwha Energy	TotalEnergies	Korea / France	0.08	15.0	2024	2039
May 25, 2022	POSCO International	Cheniere	Korea / US	0.05	20.0	2026	2036
June 5, 2022	China Gas Holdings	Energy Transfer	China / US	0.09	25.0	2026	2051
July 5, 2022	China Gas Holdings	NextDecade	China / US	0.13	20.0	2027	2047
July 20, 2022	PetroChina	Cheniere	China / US	0.24	24.0	2026	2050
July 26,2022	PTT Global	Cheniere	Thailand / US	0.13	20.0	2026	2046
July 27, 2022	Exxon Asia Pacific	NextDecade	Singapore / US	0.13	20.0	2026	2046
September 2, 2022	Woodside Singapore	Commonwealth	Singapore / US	0.33	20.0	2026	2046
Total Asian LNG Buyers New Long Term Contracts Since Jul/21				**7.63**			
Non-Asian LNG Deals							
Jul 28, 2021	PGNiG	Venture Global LNG	Poland / US	0.26	20.0	2023	2043
Nov 12, 2021	Engie	Cheniere	France / US	0.11	20.0	2021	2041
March 7, 2022	Shell	Venture Global LNG	US / US	0.26	20.0	2024	2044
March 16, 2022	NFE	Venture Global LNG	US / US	0.13	20.0	2023	2043
March 16, 2022	NFE	Venture Global LNG	US / US	0.13	20.0	2023	2043
May 2, 2022	Engie	NextDecade	France / US	0.23	15.0	2026	2041
May 17, 2022	PGNiG	Sempra Infrastructure	Poland / US	0.40	20.0	n.a.	n.a.
May 25, 2022	RWE Supply & Trading	Sempra Infrastructure	Germany / US	0.67	15.0	n.a.	n.a.
June 9, 2022	Equinor	Cheniere	Norway / US	0.23	15.0	2026	2041
June 21, 2022	EnBW	Venture Global LNG	Germany / US	0.20	20.0	2026	2046
June 22, 2022	INEOS Energy	Sempra Infrastructure	UK / US	0.18	20.0	n.a.	n.a.
June 22, 2022	Chevron	Venture Global LNG	US / US	0.26	20.0	n.a.	n.a.
June 22, 2022	Chevron	Cheniere	US / US	0.26	15.0	2027	2042
July 12, 2022	Shell	Mexico Pacific Ltd	US / Mexico	0.34	20.0	2026	2046
July 13, 2022	Vitol	Delfin Midstream	US / US	0.07	15.0	n.a.	n.a.
August 9, 2022	Centrica	Delfin Midstream	UK / US	0.13	15.0	2026	2041
August 24, 2022	Shell	Energy Transfer	US/US	0.28	20.0	2026	2046
Total Non-Asian LNG Buyers New Long Term Contracts Since Jul/21				**4.14**			
Total New Long Term LNG Contracts since Jul/21				**11.76**			
*Excludes Asian short term/spot deals							
*on Dec 20, CNOOC also agreed to buy an additional 0.13 bcf/d from Venture Global for an undisclosed shorter period							
Source: Bloomberg, Company Reports							

Source: Company reports, SAF Group

Natural Gas – Qatar names 1st partner in its North Field South LNG - TotalEnergies

Qatar starts naming partners in 2nd phase expansion

It shouldn't surprise that TotalEnergies is the first international partner named in Qatar's Phase 2 LNG expansion – the North Field South expansion that is to add 2.1 bcf/d to be operational in 2027. TotalEnergies was the first international partner named in the North Field East expansion (see our June 12, 2022 Energy Tidbits) that is to add 4.4 bcf/d for 2026. Yesterday morning, we tweeted [LINK] "*Reminder see 👇06/12 tweet Qatar LNG expansion is two Phases. Phase 2 North Field South adds 2.1 bcfd operational in 2027. Today, @V_Ratcliffe reporting #TotalEnergies will hold 9.375% in North Field South. Expect other* *partner announcements in coming days. #LNG #OOTT*." We referenced a Bloomberg report, but a little later TotalEnergies posted its release [LINK] "*Following its selection as the first partner for the 32 million ton per annum (Mtpa) North Field East (NFE) liquefied natural gas (LNG) project, TotalEnergies has again been selected as the first international partner in the 16 Mtpa North Field South (NFS) LNG project. Pursuant to the agreement, TotalEnergies will obtain a 9.375% participating interest in the NFS project – out of a total 25% interest available for international partners – while the national company QatarEnergy will hold the remaining 75%. Through its combined participating interests in NFE (6.25%) and NFS, TotalEnergies will add 3.5 Mtpa of LNG production to its growing worldwide LNG portfolio by 2028, in line with the Company's objective to increase the share of natural gas in its sales mix to 50% by 2030*." Our Supplemental Documents package includes the TotalEnergies release.

Qatar's LNG expansion is two Phases to add 6.5 bcf/d in total

Here is an excerpt from our June 12, 2022 Energy Tidbits. "*Our tweet this morning [LINK] reminded that Qatar's expansion is two phases. We tweeted We tweeted "Qatar names @TotalEnergies as 1st partner. Reminder Qatar's #LNG expansion is 2 phases. Phase 1 North Field East, adds 4.4 bcfd BY 2026. Phase 2 North Field South adds 2.1 bcf operational IN 2027. Current 10.1 reaches 16.6 bcfd. Thx @SimoneFoxman @V_Ratcliffe. #NatGas #OOTT". (i) Phase 1: North Field East: increases existing LNG capacity from 77 to 110 million tons by 2026 ie. operational in 2025. This is an increase of 4.4 bcf/d from current 10.1 bcf/d to 14.5 bcf/d. (ii) Phase 2: North Field South: increases then 110 million tons to 126 million tons but won't be finished until 2027 ie. operational in 2027. This is an increase of 2.1 bcf/d from then current 14.5 bcf/d to 16.6 bcf/d. (iii) So total expansion of 6.5 bcf/d from current 10.1 bcf/d to 14.5 bcf/d sometime in 2025, and then to ultimate 16.6 bcf/d sometime in 2027.*

Natural Gas – Shell Prelude 0.47 bcf/d FLNG resumes LNG exports

Shell Prelude FLNG 0.47 bcf/d

On Aug 24, we tweeted [LINK] "*Union says reached a deal with #Shell #PreludeFLNG 0.47 bcf/d. No details yet or when #LNG loadings can resume. But have to believe LNG cargos resume sometime in Sept. #NatGas #OOTT*." Last Sunday, Bloomberg reported "*LNG cargoes have resumed from Shell's Prelude Floating Liquified Natural Gas (FLNG) facility and production has restarted, the company says in an emailed statement."*

Figure 6: Shell Crux Project Overview

Source: Shell

Natural Gas – TotalEnergies says "not yet there" to restart its Mozambique LNG

TotalEnergies Mozambique LNG

Last week's (Sept 16, 2022) Energy Tidbits highlighted Mozambique President Nyusi's update on the security situation and "*"In this context, we expect that development activities will be resumed by the concessionaires of area 1," the consortium led by TotalEnergies and which suspended the construction of the gas liquefaction plant due to deteriorating safety conditions. Similarly, Nyusi advocated the final decision to invest in area 4, led by ENI and Exxon, "as soon" as possible."* 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*." Our Supplemental Documents package includes the Cabo Ligado Weekly.

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 – India August natural gas production -1.03% YoY to 3.30 bcf/d

One of the key themes for India in 2021 was that India's domestic natural gas production was returning to modest growth after a decade of declining domestic natural gas production. Up until the modest growth, India's increasing natural gas consumption meant that India had to increase LNG imports. India's domestic natural gas production peaked in 2010 at 4.6 bcf/d. But for 2022, it has mostly been a period of relatively flat YoY domestic natural gas production. On Tuesday, India's Petroleum Planning and Analysis Cell (PPAC) released their monthly report for August natural gas and oil statistics [LINK]. India's domestic natural gas production was down -1.03% YoY from 3.33 bcf/d in August 2021 to 3.30 bcf/d, up from 3.28 bcf/d in July. Our Supplemental Documents package includes excerpts from the PPAC monthly package.

Natural Gas – India Aug LNG imports down 17.95% YoY to 2.73 bcf/d, down 6.81% MoM

India LNG imports -17.95% YoY

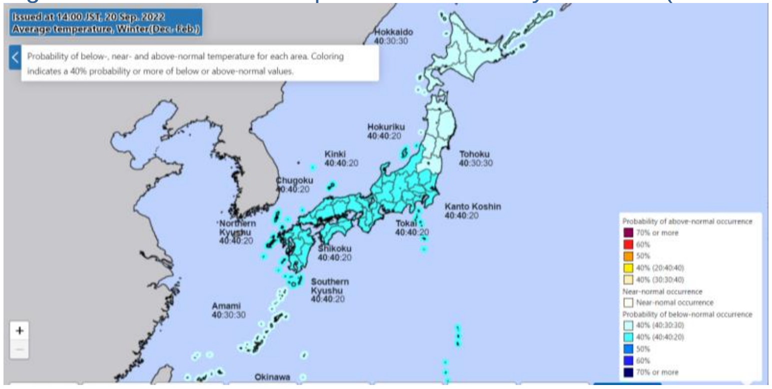
Normally, we would expect to see flat YoY India domestic natural gas production to point to flat YoY LNG imports. But, we have been highlighting how India is always viewed as an extremely price sensitive buyer in terms of its LNG imports. And how that has been particularly so in 2022 as India has been increasing its use of coal with the sky-high LNG prices. The India PPAC data was that India LNG imports were down MoM to 2.73 bcf/d, which was down 17.95% YoY.

Natural Gas – Cold winter forecast for Japan

JMA forecasts below average temps

On Tuesday, we tweeted [LINK] "*JMA winter forecast calls for colder than normal DJF forecast for Japan. But not likely to drive YoY increases in #LNG imports due to still sky-high prices. Winter 21/22 was cold but LNG imports down YoY due to then thought to be high prices. #NatGas #OOTT".* Winter is on the horizon and Japan expects below normal temperatures, much like last winter. On Tuesday, the Japan Meteorological Agency posted its seasonal forecast for the upcoming winter months and it is a positive indicator for electricity demand as residents look to heat their homes [LINK]. However, Japan, and other LNG importing countries (as noted later with Switzerland), are looking to coal and petroleum products, where possible, to substitute because of the sky-high international natural gas and LNG prices The JMA forecasts that most of the country should expect colder than average winter temperatures, especially in the southern regions of the island. Below is the current JMA forecast for Dec 2022 – Feb 2023.

Figure 7: JMA Winter Temperature Probability Forecast (Dec 2022 – Feb 2023)

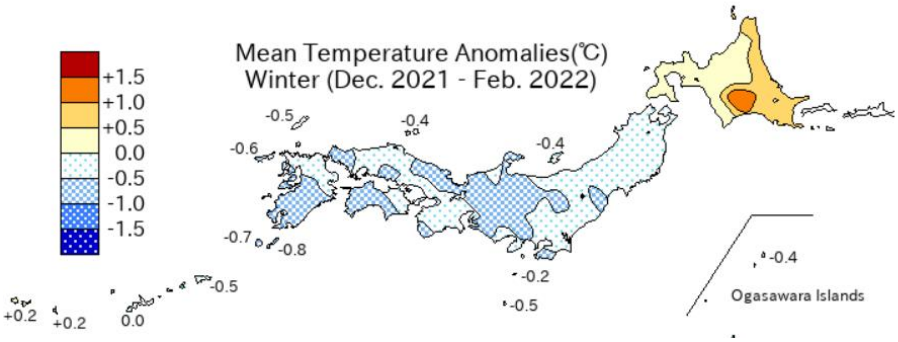


Source: Japan Meteorological Agency

Don't' expect higher winter Japan LNG imports due to sky-high LNG prices

Our tweet noted that last winter was also colder than normal, but LNG imports were also down YoY due to what was then thought to be high JKM LNG prices of approx. $15 last winter. Those prices pale in comparison to the current sky-high JKM prices. Currently the Dec contract for JKM futures is approx. $40. So even with another cold winter, our tweet noted that we don't expect to see higher YoY Japan LNG imports. Or at least, we have to believe Japan will continue to do what it can to minimize LNG imports. We went back to our Sept 26, 2021 Energy Tidbits memo and the JMA forecast for winter 2021-2022 turned out to be right on a colder than normal winter.

Figure 8: Japan Mean Temperature Anomalies Winter (Dec 2021 – Feb 2022)



Source: Japan Meteorological Agency

Figure 9: Japan LNG Imports

bcf/d	2015	2016	2017	2018	2019	2020	2021	21/20	2022	22/21
Jan	13.06	11.22	12.85	12.79	11.69	11.63	12.48	7.3%	10.51	-15.8%
Feb	13.26	12.30	13.36	14.23	12.61	10.99	13.84	25.9%	12.19	-11.9%
Mar	12.60	12.62	12.61	12.28	11.30	11.16	11.04	-1.1%	10.07	-8.7%
Apr	10.56	10.21	10.52	8.97	9.00	8.31	7.96	-4.3%	8.92	12.0%
May	8.91	8.55	9.66	9.92	8.62	7.09	7.67	8.1%	8.92	16.3%
June	10.61	10.02	9.90	8.88	8.32	8.42	9.13	8.5%	9.29	1.7%
July	10.77	10.19	10.19	10.55	10.56	9.35	9.58	2.5%	9.54	-0.4%
Aug	10.93	11.96	11.24	11.73	9.45	9.04	9.75	7.8%	9.71	-0.4%
Sept	11.06	10.67	9.31	10.04	10.30	10.41	8.66	-16.8%		
Oct	9.38	9.73	9.50	10.12	9.75	9.20	7.17	-22.1%		
Nov	10.71	12.07	10.26	10.15	10.03	9.63	9.38	-2.6%		
Dec	12.51	11.69	12.31	11.23	10.54	11.96	10.89	-8.9%		

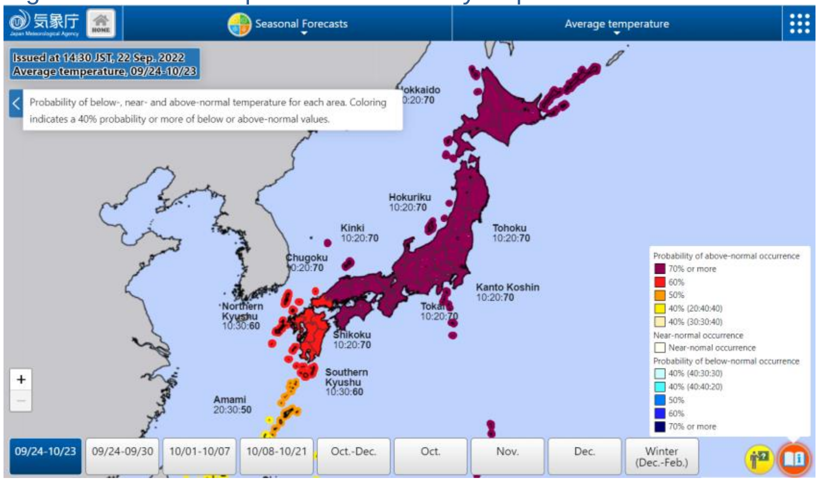
Source: Japan Ministry of Finance

Natural Gas – Continued hot weather in the shoulder season in Japan

Still above normal temperatures in Japan

It was a hot summer in Japan and the warm temperatures are forecasted to continue for the end of September and into October. The Japan Meteorological Agency (JMA) continues to expect much warmer than normal temperatures to begin October. Normally, warm weather in October isn't too hot, but AccuWeather forecasts daily highs for Tokyo for the next three weeks at generally around 30c with some in the low 30s. So there should be decent weather support for electricity generation. The JMA posted its September 24 to October 23 weather forecast [LINK] calling for much warmer than normal temperatures. Note the below map is for the next month, but the maps for each of the next two weeks is for even warmer than normal temps.

Figure 10: JMA Temperature Probability Sep 24 to Oct 23



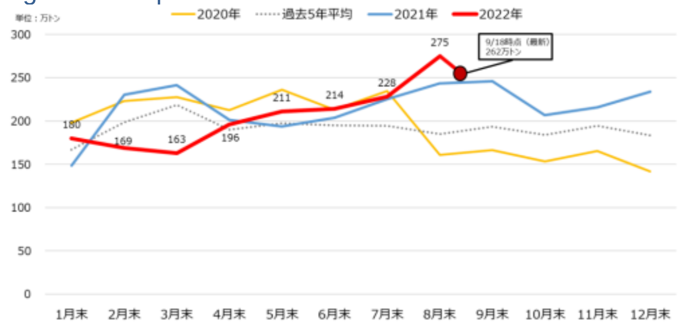
Source: Japan Meteorology Agency

Natural Gas – Japan's LNG stocks up +9.2% from last week

Japan LNG stocks +9.2% 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 18 were ~126 bcf, +9.2% WoW from 115 bcf and up from the 5-yr average of 118 bcf. Below is the LNG stocks graph from the METI weekly report.

Figure 11: Japan's LNG Stocks



Source: METI

Natural Gas – China's LNG imports -29% YoY in August

China LNG and pipeline imports

We have been warning that China's LNG imports will be less in 2022 for three key reasons - higher pipeline imports of cheaper Russian natural gas via Gazprom's Power of Siberia, increasing domestic natural gas production, and sky-high LNG prices are seeing China switch to coal where possible. China Customs posted it's August natural gas imports split by pipelines vs LNG. The customs data is at [LINK]. The customs data reports China August

LNG imports of 7.31 bcf/d, -29.0% YoY and -0.4% MoM. And China natural gas pipeline imports of 6.4 bcf/d, +9.0% YoY and +4.29% MoM. Below are our running tables of China LNG and pipeline imports.

Figure 12: China LNG Imports

bcf/d	2018	2019	19/18	2020	20/19	2021	21/20	2022	21/22
Jan	8.03	10.20	27.1%	10.31	1.1%	13.15	27.6%	12.10	-8.0%
Feb	6.84	7.46	9.1%	7.26	-2.7%	9.52	31.1%	8.34	-12.4%
Mar	5.04	6.28	24.8%	6.49	3.3%	8.74	34.6%	7.17	-17.9%
Apr	5.43	7.27	34.0%	8.16	12.3%	10.77	32.0%	6.96	-35.4%
May	6.39	6.87	7.6%	8.10	18.0%	10.89	34.4%	7.64	-29.9%
June	6.31	7.25	14.9%	9.27	27.8%	10.76	16.1%	7.72	-28.3%
July	6.40	7.56	18.1%	7.79	3.1%	8.78	12.7%	7.59	-13.6%
Aug	7.26	8.04	10.8%	9.23	14.8%	10.30	11.6%	7.31	-29.0%
Sept	7.00	8.16	16.7%	9.17	12.4%	10.81	17.8%		
Oct	7.13	4.09	-42.6%	7.78	90.0%	9.56	22.9%		
Nov	9.59	10.42	8.7%	10.58	1.6%	11.05	4.4%		
Dec	9.75	10.01	2.7%	11.76	17.5%	11.82	0.5%		
Full Year Avg.	7.10	7.80	9.9%	8.83	13.1%	10.51	19.1%	8.10	-22.9%
Note: Jan/Feb 2020 figures are averaged. Not applicable for YoY comparison									

Source: Bloomberg, China Customs

Figure 13: China Pipeline Imports

bcf/d	2018	2019	19/18	2020	20/19	2021	21/20	2022	22/21
Jan	4.0	5.0	24.9%	5.2	3.5%	4.9	-4.5%	5.4	8.8%
Feb	5.0	5.5	9.0%	5.7	3.8%	6.1	7.2%	6.4	3.9%
Mar	4.2	4.5	6.4%	4.2	-5.2%	4.8	12.8%	5.2	9.1%
Apr	5.5	5.0	-9.3%	4.2	-15.5%	5.5	30.1%	6.0	9.4%
May	5.1	4.8	-4.3%	4.0	-16.6%	5.1	26.2%	6.4	26.1%
Jun	5.3	4.8	-10.3%	4.1	-15.0%	5.6	37.4%	6.2	11.7%
Jul	4.7	4.7	0.0%	3.6	-23.3%	5.7	58.9%	6.1	7.9%
Aug	4.7	4.9	3.1%	5.3	7.9%	5.9	11.5%	6.4	9.0%
Sep	5.2	5.0	-4.2%	4.7	-6.0%	6.2	32.1%		
Oct	4.2	3.8	-8.1%	3.9	1.0%	5.0	28.0%		
Nov	5.1	4.7	-6.9%	4.1	-13.0%	6.1	48.9%		
Dec	4.6	4.7	3.9%	5.6	18.9%	6.2	10.7%		

Source: Bloomberg, China Customs

Natural Gas – US is safe from Russia using energy as a weapon, but not Europe

Russia using energy as a weapon.

Last Sunday, CBS 60 Minutes featured separate interviews with Biden and Raisi. We like listening to Biden when he is off script as he tends to say what he thinks, which is great for listeners but causes problems for his officials when he says things like he will send American troops to Taiwan. And then there are comments like in his 60 Minutes interview that aren't as bad, but really should have been said differently. Biden was asked about Russia using energy as a weapon and he rightly said it wouldn't work against the US as the US is energy strong. His answer likely reminded his European partners that they aren't in the same position as the US. We tweeted [LINK] "*It's EU not US at risk of power/#NatGas short. @ScottPelley re Putin using energy to break will on UKR. Biden "the US, are in much better shape than-- than anyone else is, and relative to RUS particularly. But-- he's been trying that for a while. He's not gonna succeed" #OOTT.*" 60 mInutes asked "*Vladimir Putin is going to try to break your will on Ukraine and use energy prices to do it.*" Biden replied "*Sure he is. But, you know, we, the United States, are in much better shape than-- than anyone else is,* *and relative to Russia particularly. But-- he's been trying that for a while. He's not gonna succeed."*

Natural Gas – Switzerland recommends switching from natural gas to fuel oil

Switzerland natural gas to fuel oil switch

The big energy theme in Europe has been trying to reduce natural gas consumption, which has happened from savings, industrial users being forced to shut down due the sky-high natural gas prices, and switching from natural gas to coal and petroleum products. The switching has also led to higher relative emissions in the switch to coal and petroleum products. We continue to see Europe try to prepare for a winter without natural gas. We say try as we still believe it's going to be tougher than most expect there is a very mild winter. On Friday, Switzerland's Federal Department of Economic Affairs, Education and Research (EAER) and the Federal Department of the Environment, Transport, Energy and Communications (DETEC) recommended "*switching from dual-fuel plants to heating oil operation from 1 October 2022. With the implementation of this recommendation, significant amounts of gas can be saved quickly. This will make a significant contribution to achieving the voluntary gas savings target of 15 percent, which Switzerland is aiming for from October 2022 to March 2023, in line with the EU."* Switzerland also reduced emissions standards to accommodate the switch from natural gas to fuel oil. And They also said they are going to release products stocks from their strategic reserves. Switzerland wrote "*In order to be able to continue to ensure the supply of mineral oil products, the compulsory stocks for automotive gasoline, diesel and heating oil as well as aviation petroleum will be released from 3 October 2022*." Our Supplemental Documents package includes the Switzerland release.

Natural Gas – TotalEnergies CEO says Europe won't get LNG on the cheap

TotalEnergies CEO Qatar comments

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 gets 1 LNG cargo for Q4/22, "a number" for 2023 from UAE

Germany gets LNG cargos from UAE

We have a 7am MT news cut off, which is 5pm UAE time. Germany Chancellor was in the UAE. Earlier this morning, we tweeted [LINK] *"#Scholz today. UAE to supply one #LNG cargo for late 2022 & reserving "a number" of further cargos exclusively for German customers in 2023. Would have been highlighted if "a number" was big. No post 2023 LNG supply deals. Every LNG cargo helps, so better than nothing. #OOTT*". UAE's official news agency had just reported "*UAE President and German Chancellor witness signing of new Energy Security and Industry Accelerator Agreement*" [LINK] and *"As part of the agreement, Abu Dhabi National Oil Company (ADNOC) has entered into an LNG supply agreement with RWE AG (RWE), with ADNOC providing an LNG cargo for delivery in late 2022, to be used in the commissioning of Germany's floating LNG import terminal at Brunsbüttel. In addition, ADNOC has reserved a number of further LNG cargos exclusively for German customers in*

2023." Every little bit helps. We don't know how many LNG cargos are being reserved in 2023, but we have to believe if it was any sort of larger numbers, it would have been highlighted in the release. Our Supplemental Documents package includes the WAM report.

Natural Gas – Potential for Germany/Qatar LNG deal? Qatar will shorten to 10-15 yrs

Qatar will do 10-15 yr deal

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.

Natural Gas – EIB President: EU will have to live with industrial demand destruction

Europe industrial demand destruction

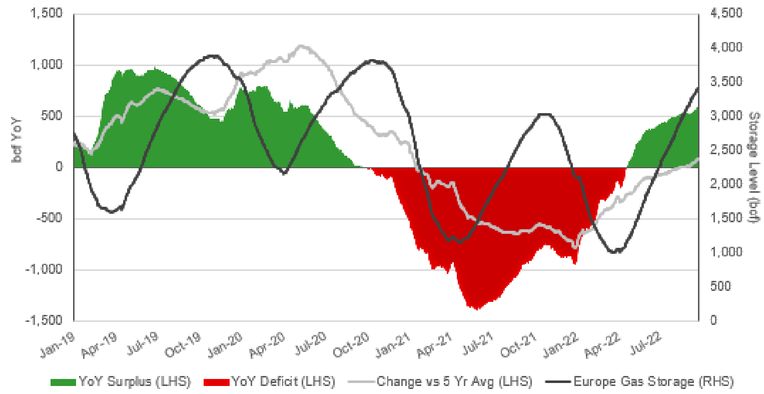
To the extend European Investment Bank President Werner Hoyer's view are in line with European leaders, we have to believe Europe industrial economy will never come back to anywhere near its pre-Covid levels and the cost of energy in Europe will be huge for at lest this decade. Hoyer is pretty clear, they know there is industrial demand destruction but Europe will have to live with it. Hoyer was interviewed by Bloomberg's Alix Steel and Guy Johnson on Sept 20, 2022. We created a transcript of the exchange between Johnson and Hoyer. Items in "*italics*" are SAF Group created transcript. At 2:15 min mark, Johnson "*in the meantime you are talking about reduced demand . that is industrial destruction in Europe. There are plenty of businesses in Germany, chemical factories, industrial sites that can't manage with the current price of energy. If we reduce demand, that's reduced jobs. That's problems in Europe this winter and potentially next. Mr. Hoyer, how do we solve that problem? we're not going to have a stable energy situation in Europe potentially for years to come*?" Hoyer "*that can very well be and will be terrible but we will then have to live with it. That means, we need to try to find alternative sources and we urgently need to reduce demand. When the whole thing began, I heard from industrial leaders that nothing would be possible, we couldn't achieve anything in terms of reduction of energy use. And now all of a sudden, it works quite well*."

Natural Gas – Europe storage is now +14.46% YoY ie. 86.67% full vs 72.21%

Europe storage now 86.67% 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 14.46%. 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 21 is at 86.67%, which is +14.46% greater than last year levels of 75.94% and are +1.90% above the 5-year average of 84.77%. Below is our graph of Europe Gas Storage Level.

Figure 14: Europe Gas Storage Level



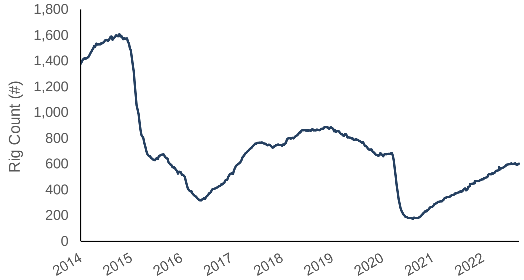
Source: Bloomberg

Oil – US oil rigs +3 to 602 oil rigs at Sept 23

US oil rigs +3 WoW

Baker Hughes released its weekly North American drilling activity data this morning. This week US oil rigs were +3 to 602 oil rigs. It looks like US oil companies are working towards a world of ~$90 oil instead of ~$100 oil. US oil rigs have been more or less rangebound for the past 14 weeks from 591 to 605 oil rigs. US oil rigs hit a 14-week low of 591 two weeks ago. US oil rigs are now +423 oil rigs since the Covid Sept 17, 2020 oil rigs of 179 oil rigs. And US oil rigs are +181 oil rigs YoY. US gas rigs were -2 WoW to 160 gas rigs with the declines coming in smaller basins and not the Haynesville and Marcellus. In the Permian we are seeing modest increases in the past two weeks.

Figure 15: Baker Hughes Total US Oil Rigs



Source: Baker Hughes

Oil – US frac spreads +1 to 288 spreads for the week ending Sept 23

Mark Rossano (C6 Capital Holdings) held his weekly US frac spread recap for the week ending Sept 23 on the Primary Vision network. YouTube video is at [LINK]. For the week ending Sept 23, US frac spreads at the high point in the week were +1 to 288 spreads. Rossano noted that this is part of the slow grind up in spreads. He has been expecting to see frac spreads push higher in Sept and Oct. Even as market melts, there is still demand for US products, exports are holding up. US frac spreads are starting to close in at the 300 level and he expects them to then hold in at that level. That level should be enough to keep the US on track for the 12.3 to 12.4 mmb/d of oil level to exit the year.

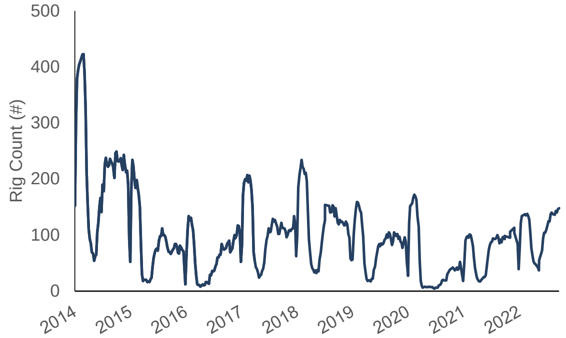
Frac spreads +1 to 288

Oil – Total Cdn rigs up +4 WoW to 215 total rigs, +53 rigs YoY

Total Cdn rigs were +4 to 215 rigs as of Sept 23, 2022. Cdn oil rigs were +2 to 148 oil rigs. Cdn gas rigs were +2 to 67 rigs. We have seen BC gas rigs up 2 in the past two weeks, which would tie to licenses being issued again in August. Total rigs are now +151 vs the comparable Covid period of 64 rigs on Sept 18, 2020. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 96 and Cdn gas rigs were 65 for a total Cdn rigs of 162, meaning total Cdn oil rigs are +53 YoY to 148 oil rigs and Cdn gas rigs are +2 to 67 gas rigs.

Cdn rigs up WoW

Figure 16: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production flat at 12.1 mmb/d

US oil production flat WoW

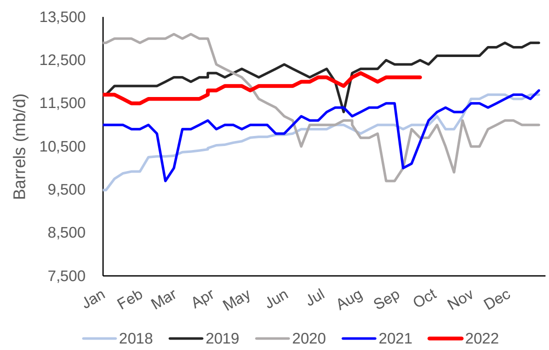
US oil production was flat at 12.1 mmb/d for the week ended Sept 16. US oil production has been range bound between 11.9 to 12.1 mmb/d for the past 19 weeks. Lower 48 production was flat WoW at 11.7 mmb/d this week and Alaska was also flat WoW at 0.4 mmb/d. US oil production is up YoY at +1.5 mmb/d, mainly attributed to last year's impact of Hurricane Ida, but is still down significantly at -1.0 mmb/d since the 2020 peak of 13.1 mmb/d on March 13.

Figure 17: EIA's Estimated Weekly US Oil Production

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-Month	End Date	Value	End Date	Value	End Date	Value	End Date	Value	End Date	Value
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				

Source: EIA

Figure 18: US Weekly Oil Production



Source: EIA, SAF

Oil – BP 160,000 b/d Toledo refinery could be down for longer than expected

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

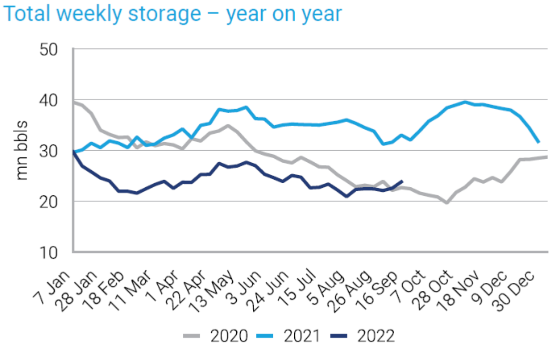
No surprise, Cdn WCS oil prices underperformed this week being down 11.2% WoW compared to WTI being down 7.0% WoW. The primary reason being the Tuesday fire that shut down the bp/Cenovus Toledo refinery that processes Cdn heavy/medium crude. As of our 7am MT news cut off, there is no indication for how long Toledo will be shut down. Although (i) On Wednesday, we tweeted [LINK] "*Too early for ETA on how long BP Toledo Refinery will be shut. Negative to Cdn #Oil differentials as Toledo processes 160,000 b/d of Cdn crude. 08/08/22, BP agreed to sell its 50% interest to its 50% JV partner, Cenovus. #OOTT*". Two workers were killed in the fire. (ii) On Friday morning, we tweeted [LINK] "*Sounds like @bp_America Toledo 160,000 b/d Refinery will down at least thru month end. Negative to Cdn #Oil differentials as Cdn crude supplies Toledo. Thx @barbarajpowell8. #OOTT."* Bloomberg reported "*BP Plc has told contract workers to stay out of the fire-damaged BP-Husky Toledo refinery at least through next week, people familiar with operations say."* (iii) On Friday afternoon, Bloomberg's update 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".*

Oil – Cdn oil storage +1.2 mmb WoW, likely still some BP Whiting residual impact

Cdn oil storage likely impacted by BP Whiting

On Thursday, NBF' Energy Sales Institutional Equities email (courtesy of Josh Ochman) included the below Wood Mackenzie estimate of Total Cdn oil storage with the explanation "*Now checking in on Canadian crude storage levels. According to the Wood Mackenzie weekly crude storage report Western Canada added 1.2 mmb to storage for the week ended September 16. The biggest gain was seen at Hardisty, which added roughly two-thirds of the total. • Notably, Western Canadian storage levels continue to hold in close to 2020 levels and well below the 2021 peak; • The latest weekly read on crude by rail volumes ticked up slightly on the week, adding 11 mb/d to average 103 mb/d and notching up a 3-week high while Canada-to-U.S. pipeline utilization rose to average 96%."* The estimates are for the September 16 week. We have to believe there was some residual impact on recognize that BP Whiting 430,000 b/d refinery restarted its refinery operations on Sept 12. BP Whiting went down on Aug 24 from a fire and there would have been crude oil enroute to Whiting. We have to believe Whiting's crude oil tanks were full to the brim when the refinery restarted on Sept 12. It is why we would expect there was likely some residual amount of crude backed up at Hardisty for the Sept 16 data point.

Figure 19: Total Cdn weekly oil storage - YOY



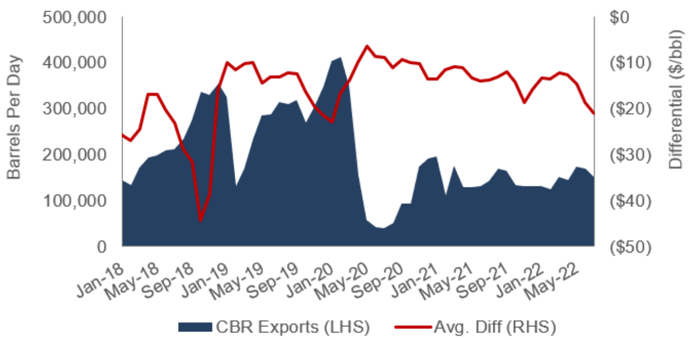
Source: Wood Mackenzie, NBF

Oil – Cdn crude by rail exports at 152,269 b/d in July, up 5.85% YoY

Cdn crude by rail exports

The Canadian Energy Regulator (successor to NEB) reported Canadian crude by rail exports were -17,965 b/d MoM in July to 152,269 b/d vs 170,234 b/d in June [LINK]. This puts July export volumes at +8,421 b/d YoY (+5.85%) vs July 2021 of 143,848 b/d. CBR volumes are +113,402 since the Covid July 2020 bottom of 38,867 b/d. July WCS-WTI differentials increased to -$21.06, which provides economic incentive to ship Cdn crude by rail into US markets. Below is our graph of Cdn crude by rail exports compared to the WCS–WTI differential.

Figure 20: Cdn Crude by Rail Exports vs WCS Differential



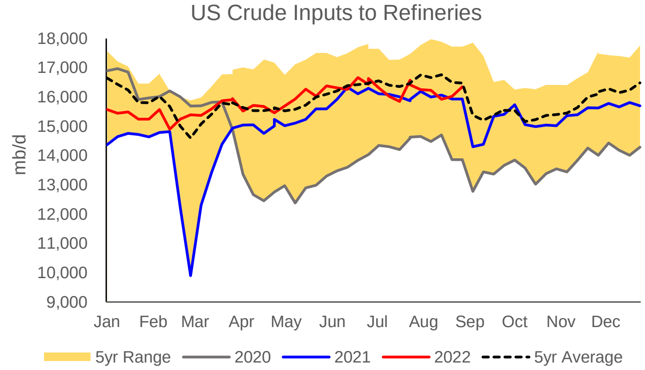
Source: Canadian Energy Regulator, Bloomberg

Oil – Refinery inputs +0.333 mmb/d WoW to 16.355 mmb/d

Refinery inputs up WoW

This is a bit of contrary seasonal move in crude oil inputs to refinery and we suspect it is due to the restart of the BP Whiting refinery. 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 Sept 16. We are now entering the season that normally sees increasing processing volumes every year, and the EIA reported crude oil inputs to refineries up 0.333 mmb/d to 16.355 mmb/d for the week ended Sept 16 and are +1.008 mmb/d YoY. Refinery utilization was up to 93.6%, which is +6.1% YoY. Total products supplied (i.e., demand) decreased WoW, down -0.376 mmb/d to 18.938 mmb/d, and Motor Gasoline was down -0.172 mmb/d at 8.322 mmb/d from 8.494 mmb/d last week. The 4-week average for Motor Gasoline was down -0.711 mmb/d YoY to 8.533 mmb/d. The 4-week average of Total demand was down -1.404 mmb/d YoY to 19.554 mmb/d.

Figure 21: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA

Oil – Phillips 66 Lake Charles 264,000 b/d refinery turnaround

US refinery turnaround season

The reason we include the above refinery graph is to show the seasonal trends. Sept/Oct is normally a period of large seasonal refinery turnarounds as refineries change over for winter fuel slates. We don't track the refinery turnarounds in details but another large refinery turnaround popped up on our screen to remind of this seasonal turnaround. On Monday, Bloomberg reported "*Phillips 66's Lake Charles refinery in southwest Louisiana has begun a multiunit turnaround that will include the largest of three crude units and the larger of two cokers, people familiar with operations say. * The work is scheduled to take just over 40 days, followed by another several days to a week to return units to normal operations * The maintenance includes the 125k b/d Crude 3, the 50k b/d Delayed Coker 2 and a vacuum distillation unit ** The crude unit was shut Sunday morning, according to Wood Mackenzie's Genscape * The 264k b/d refinery processes primarily heavy, high-sulfur and high-acid crude oils, along with some light sweet crude, according to co. ** It receives domestic Gulf Coast, U.S.-advantaged and foreign crude oils. * Lake Charles produces gasoline, diesel and aviation fuels mainly for distribution to the southeastern and eastern US, with the option of distributing into export markets through its marine terminal.*"

Oil – Exxon's France Gravenchon & Fos refineries shut down by strike

Exxon France refineries

Earlier we highlighted the BP Toledo refinery shut down from a fire. Refineries also get shut down by labor strikes. Yesterday, Bloomberg reported "*Exxon's Gravenchon and Fos refineries remain fully halted by strike, Christophe Aubert, an official at the CGT union, says by email. * Exxon was in process of halting Fos on Sept. 22, industrial action began at Gravenchon a day earlier ** NOTE: Gravenchon is home to a petchems site that was also affected by the strike * Fos has a capacity of about 131k b/d, Gravenchon 235k b/d * Halt is part of a salary dispute.*"

Oil – US "net" oil imports up 1.130 mmb/d WoW at 3.407 mmb/d

US "NET" oil imports were up 1.130 mmb/d to 3.407 mmb/d for the Sept 16 week. US imports were down 1.155 mmb/d to 6.947 mmb/d. US exports were relatively flat, up 0.025 mmb/d to 3.540 mmb/d. The WoW increase in US oil imports was driven by the restart of BP Whiting refinery and therefore saw a significant increase in oil imports from Canada. US's Top 10 imports by country which were up by 0.955 mmb/d WoW from these countries. Some items to note on the by country data. (i) Canada was up this week by +0.931 mmb/d to 3.868 mmb/d. (ii) Saudi Arabia was up +0.064 mmb/d to 0.489 mmb/d this week. (iii) Colombia was down -0.076 at 0.212 mmb/d. (iv) Ecuador was up +0.120 mmb/d at 0.319 mmb/d. (v) Iraq was down -0.223 mmb/d to 0.120 mmb/d. (vi) Mexico was up +0.371 mmb/d to 0.855 mmb/d.

US "net" oil imports up WoW

Figure 22: US Weekly Preliminary Oil Imports by Major Countries

(thousand b/d)	July 8/22	July 15/22	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	WoW
Canada	3827	3481	3308	3,673	3,351	3,455	3,834	3,093	3,538	2,937	3,868	931
Saudi Arabia	634	242	516	500	412	244	247	330	423	425	489	64
Venezuela	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	610	877	639	815	710	661	503	440	965	484	855	371
Colombia	213	405	150	328	174	214	143	289	261	288	212	-76
Iraq	302	454	165	369	181	163	225	401	222	343	120	-223
Ecuador	149	57	150	243	212	36	278	231	144	199	319	120
Nigeria	79	136	143	57	161	253	72	137	2	232	0	-232
Kuwait	0	0	0	0	0	0	0	0	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0	0	0
Top 10	5,814	5,652	5,071	5,985	5,201	5,026	5,302	4,921	5,555	4,908	5,863	955
Others	861	867	1,093	1,357	970	1,106	869	1,035	1,224	884	1,084	200
Total US	6,675	6,519	6,164	7,342	6,171	6,132	6,171	5,956	6,779	5,792	6,947	1,155

Source: EIA

Oil – Colombia oil production has been stuck for the past two years ~7.5 mmb/d

Colombia oil production remains stuck and really hasn't moved in the last two years and is still below pre-Covid levels despite stronger oil prices. Colombia oil production in July was down slightly, -4,000 b/d to 0.748 mmb/d vs 0.752 mmb/d in June. On Wednesday, Colombia Ministry of Mines and Energy released its July oil and gas production data [LINK]. The Columbian Ministry of Mines and Energy reported *"oil production during July of this year was 748,096 average barrels per day (bopd), 2.30% more than that registered in the same month of 2021 when it was 731,256 bopd."* The decrease in crude oil production was attributed to public order problems in the departments of Meta, Putumayo and Casanare, and electrical failures in the fields of the department of Arauca. The Colombia's Mines and Energy Ministry has expected to increase the oil production to 0.800 mmb/d in 2022, which were the same production goals the nation had entering 2021; now through the midway point of the year, we are skeptical that Colombia can reach this goal by year end. The ministry hopes that 60 exploration wells will be drilled in 2022, up from the 34 wells drilled from Jan-Nov. A total of 112 upstream contracts will be in the exploration phase with agreed investments close to $4.11bn in 2022. Our Supplemental Documents package includes the Google Translate version of the Colombia release.

Colombia July oil & gas production

Figure 23: Colombia Oil Production

mmb/d	2015	2016	2017	2018	2019	2020	2021	21/20	2022	22/21
Jan	1.036	0.986	0.860	0.860	0.899	0.884	0.745	-15.7%	0.740	-0.7%
Feb	1.030	0.955	0.864	0.823	0.893	0.878	0.746	-15.1%	0.740	-0.8%
Mar	1.023	0.917	0.804	0.856	0.885	0.857	0.745	-13.0%	0.751	0.8%
Apr	1.029	0.915	0.857	0.865	0.891	0.796	0.745	-6.4%	0.751	0.8%
May	1.027	0.904	0.851	0.866	0.895	0.732	0.703	-3.9%	0.746	6.1%
June	1.010	0.888	0.857	0.864	0.892	0.730	0.694	-4.9%	0.752	8.4%
July	0.947	0.843	0.856	0.860	0.869	0.735	0.731	-0.5%	0.748	2.3%
Aug	0.968	0.827	0.858	0.866	0.883	0.742	0.748	0.8%		
Sept	1.009	0.859	0.851	0.869	0.879	0.749	0.744	-0.7%		
Oct	1.005	0.846	0.864	0.879	0.883	0.751	0.740	-1.5%		
Nov	0.990	0.855	0.851	0.883	0.880	0.761	0.747	-1.9%		
Dec	0.999	0.837	0.870	0.889	0.882	0.759	0.745	-1.8%		

Source: Bloomberg, Colombia Ministry of Mines and Energy

Oil – Norway August oil production of 1.774 mmb/d, up +8.1% MoM

Norway oil production

The Norwegian Petroleum Directorate released its August production figures [LINK] of 1.774 mmb/d of oil, which is -2.2% YoY and +8.1% MoM from July of 1.641 mmb/d. August production was down -3.1% (-0.057 mmb/d) from the forecast amount of 1.831 mmb/d. The NPD does not provide any explanations for the MoM changes. The theme for Norway through 2021 was that Norway oil production returned to growth because of the Johan Sverdrup oil field, and tax breaks from the government allowing increased capex in the energy sector. Norway oil production was still expected up modestly in 2022.

Figure 24: Norway August 2022 production

		Oil mill bbl/day	Sum liquid mill bbl/day	Gas MSm³/day	Total MSm³ o.e/day
Production	**August 2022**	**1.774**	**1.998**	**347.7**	**0.665**
Forecast for	August 2022	1.831	2.075	332.8	0.663
Deviation from forecast		-0.057	-0.077	14.9	0.002
Deviation from forecaset in %		-3.1 %	-3.7 %	4.5 %	0.3 %
Production	July 2022	1.641	1.871	350.6	0.648
Deviation from	July 2022	0.133	0.127	-2.9	0.017
Deviation in % from	July 2022	8.1 %	6.8 %	-0.8 %	2.6 %
Production	August 2021	1.813	2.091	307.8	0.640
Deviation from	August 2021	-0.039	-0.093	39.9	0.025
Deviation in % from	August 2021	-2.2 %	-4.4 %	13 %	3.9 %

Source: Norwegian Petroleum Directorate

Oil – Increasing uncertainty on what's next for Russia with Putin mobilisation

Russia calls up 300,000 reservists

We have to believe that no one expected Ukraine to be at this point of forward momentum going into the winter. And this is especially so for Putin, which means there is increasing uncertainty/risk on his next moves on energy, the war, domestic policy, domestic civil unrest and anything else for that matter. On Wednesday, we tweeted [LINK] "*Putin escalates: partial mobilization to defend RUS, sovereignty, territorial integrity. In event of a threat to the territorial integrity of our country & to defend Russia & our people, we will certainly make use of all weapon systems available to us.This is not a bluff #OOTT*". Russians, in particular, didn't expect this mobilization, which ended up being a call up of 300,000 reservists. We say this because it immediately led to a rush of Russians trying to leave the country to avoid being caught up. And Russia had to move to try to stop the exodus. All this means is that there is increasing uncertainty/risk to what Putin does next, including on energy.

Oil – OPEC and non-OPEC ministerial meeting (ONOMM) is Wed Oct 5

OPEC+ meeting Oct 5

The 33rd OPEC and non-OPEC Ministerial Meeting (ONOMM) is planned for Wednesday October 5, 2022 and is to be via video conference once again. The next planned in-person meeting isn't expected until the December meeting at the OPEC offices in Vienna.

Oil –Aramco CEO wake up call on the energy crisis forgotten by market crash

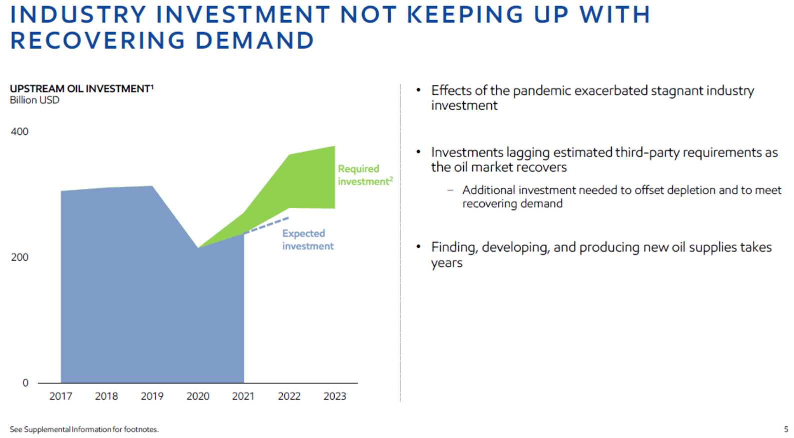
Aramco CEO wake up call on the energy crisis

There was a stark warning from Saudi Aramco CEO Nasser's speech on Tuesday that was shoved to the back page as the oil story this week became all about the economic outlook and any positive oil stories were more than overshadowed by the negative economic outlook, especially following FED Chair Powell's Wed press conference. (i) We tweeted [LINK] "*Wake up call. @aramco CEO headlines will be "little hope of ending the #EnergyCrisis anytime soon", global #Oil capacity ~1.5% of demand will be eliminated as demand recovers. Overlooked? global oil fields decline ~6% each year, that's every year! see 👇 06/23/19 blog. #OOTT;"* (ii) The headlines were on his warning there is little hope of ending the energy crisis anytime soon. His speech is a reality check that the energy transition plan isn't working. Got to love his opening sentence "*This week, however, autumn begins, and the global energy crisis promises a colder, harder winter, particularly in Europe. Unfortunately, the response so far betrays a deep misunderstanding of how we got here in the first place, and therefore little hope of ending the crisis anytime soon."* (ii) Some of the other headlines were on his comments that global spare capacity is down to about 1.5% of global oil demand and "*But when the global economy recovers, we can expect demand to rebound further, eliminating the little spare oil production capacity out there*." (iii) Everything really got overlooked after Powell spoke on Wednesday, but one of the overlooked factors will be his "*Equally concerning is that oil fields around the world are declining on average at about 6% each year, and more than 20% in some older fields last year. At these levels, simply keeping production steady needs a lot of capital in its own right, while increasing capacity requires a lot more*." We have been highlighting this theme since well before Covid and it's a reminder that the world has to add ~6 mmb/d of new production capacity just to offset declines every year. There is much more in the Nasser speech. Our Supplemental Documents package includes the Nasser speech. [LINK].

> **Exxon reminded global oil production supply base declines ~7% per year**
> Here is what we wrote in our July 31, 2022 Energy Tidbits. "*There was a great reminder from Exxon's Q2 call presentation of one of the reasons why oil looks good for the 2020s. Everyone has been made well aware of the underinvestment in the oil and gas sector, whether it be from industry, OPEC countries or pro-climate change agencies like the IEA. But most have overlooked the biggest challenge for the oil sector – the existing production supply base declines every day. This is very bullish for oil in the 2020s. We were reminded of this in the Exxon Q2 call prepared remarks. Exxon posted the remarks shortly before their Q2 call and we tweeted [LINK] "Bullish for #Oil. #Exxon reminds #Oil #NatGas supply declines at ~7% per year ie. need to replace 7% to stay flat. not a new argument, see 👇SAF 06/20/19 blog ""Exxon's Math Calls For Overall Global Oil Decline Rate of ~7%, A Very Bullish Argument For Post 2020 Oil Prices" #OOTT." On an existing oil supply base of 100 mmb/d, that is*

approximately 7 mmb/d of annual declines. Note that Exxon said for oil and natural gas and they have previously suggested the oil decline rate was lower ie. below 6%. So that is 6 mmb/d of declines. Exxon said "As a depletion business, large annual investments in oil and gas production are needed to offset the decline in supply – roughly a 7% per year reduction. Even more investment is required to grow net production. As the world began to recover from the pandemic, demand for all but jet fuels recovered far faster than the time required to bring on new investments. As a result, the industry hasn't been able to meet the recovery in demand."

Figure 25: Industry Investment Not Keeping Up With Recovering Demand

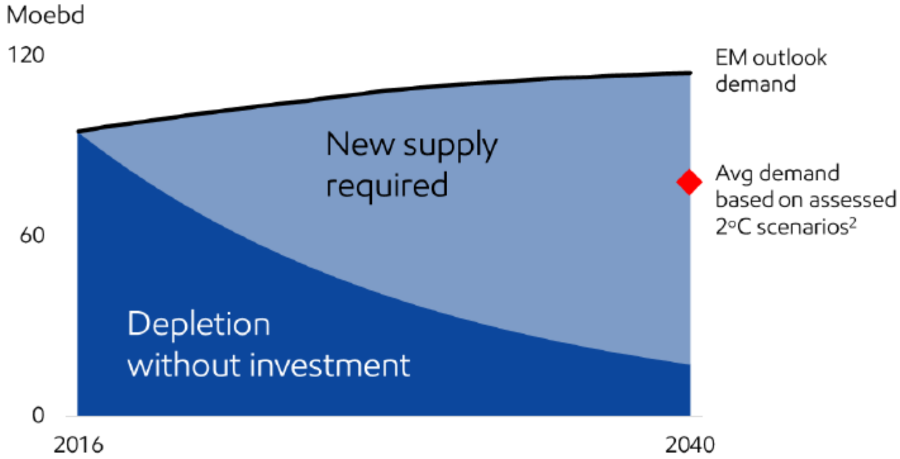


Source: ExxonMobil

Exxon was warning on oil declines before Covid

Our July 29, 2022 tweet referenced above reminded that Exxon's warning on global oil decline rates was not new. Rather, they highlighted this pre-Covid in June 2019. And that warning was the reason for our SAF Group June 19, 2019 blog "*Exxon's Math Calls For Overall Global Oil Decline Rate Of ~7%, A Very Bullish Argument For Post 2020 Oil Prices"* [LINK]. Exxon presented at a sellside conference that week in June 2019 and then thought Exxon presented a very bullish argument for oil prices beyond 2020 which was overlooked because most readers only flip thru a slide deck and don't listen to or read transcripts of management's spoken words. Exxon's spoken words highlighted one of the forgotten (and perhaps most important) oil supply/demand concerns for post 2020 – the mid term challenge to replace increasing rate of overall global oil declines. And what was eye opening was Exxon's estimated overall global oil decline rate, which is way higher than any we could then ever remember seeing. Our blog said *"Its impossible to tell from the small oil supply/demand graph in the slide deck, but Exxon's spoken words says long term oil demand is 0.7% per year and then "When you factor in depletion rates, the need for new oil grows at close to 8% per year and new gas at close to 6% per year." Exxon may not specifically say what the global decline rate is, but their math is that the world needs new oil supply to grow annually at close to 8% to meet the 0.7% annual increase in oil demand and offset declines ie. an overall global decline rate of approx. 7%. This is an overall global oil decline rate for OPEC and non-OPEC"*. At that time in 2019, BP's estimate of overall global oil decline rate is 4.5% and we expect most are probably assuming something around 5%, certainly not above 6%. No one should be surprised by the increased decline rate given that high decline US shale and tight oil have increased by ~2.5 mmb/d in the last ~2 years. But an implied ~7% overall global oil decline rate is way higher than expectations. There is a big difference between needing to offset oil declines of ~7 mmb/d vs declines of ~4.5 mmb/d ie. an additional 2.5 mmb/d of new oil supply every year. Even if the implied difference was to 6%, it would still be an additional 1.5 mmb/d of new oil supply and that would also be very bullish for post 2020 oil. At that time, we said we recognized that the 2019/2020 oil supply demand story is the need for OPEC+ to keep cuts thru 2020, but Exxon's math implying ~7% overall global oil decline rate sets up a very bullish view for oil post 2020. We believe the reality to replace oil declines post 2020 is overlooked. Our Supplemental Documents package includes our June 19, 2019 blog.

Figure 26: Exxon Estimated Oil Supply/Demand, June 2019 slide deck

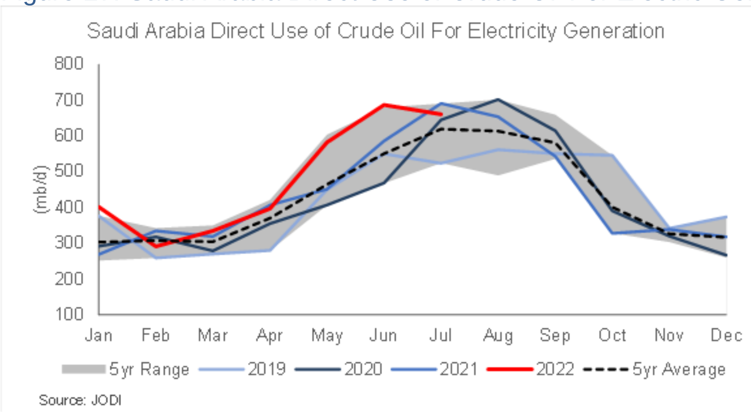


Source: ExxonMobil June 2019

Oil – Saudi used 661,000 b/d of oil for electricity generation in July

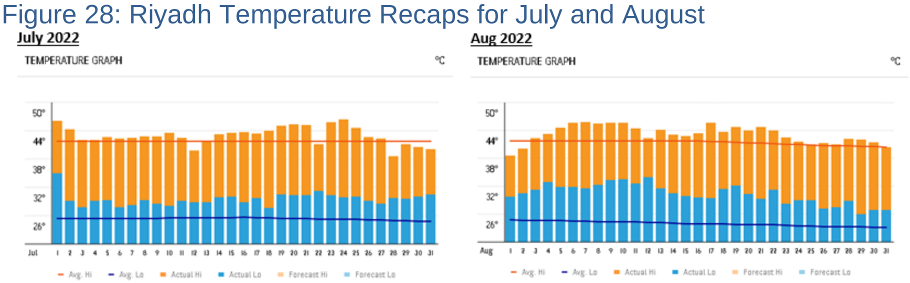
Reminder that Saudi Arabia use of oil for electricity peaks in July/Aug, which means that there will be more oil freed up for exports. For the last several years, we have highlighted this reminder that Saudi Arabia uses more than twice as much oil for electricity in the summer vs the winter. This means that increased production in the summer months doesn't mean increased oil exports. The ramp up really cranks up in May, June, with the peak normally in July or August. The JODI data for Saudi Arabia oil supply and demand for July was updated on Monday. Saudi used less oil for electricity in July vs June. This is attributed to the milder temperatures experienced throughout July. July saw varying temperatures that were below average for most of the month. July's direct use for electricity was 661,000 b/d (vs July 2021 of 691,000 b/d) and June was 687,000 b/d (vs June 2021 of 586,000 b/d). July was above the latest 5 yr average of 619,000 b/d. Below are the AccuWeather Temp maps for Riyadh for July and August. Careful they are different scales but look for oil for electricity to decrease as we move out of peak season. We believe the Saudi use of oil for electricity would have been even higher but for the increased imports of Russian fuel oil noted in the July 17, 2022 Energy Tidbits.

Figure 27: Saudi Arabia Direct Use of Crude Oil For Electric Generation



Source: JODI

Figure 28: Riyadh Temperature Recaps for July and August



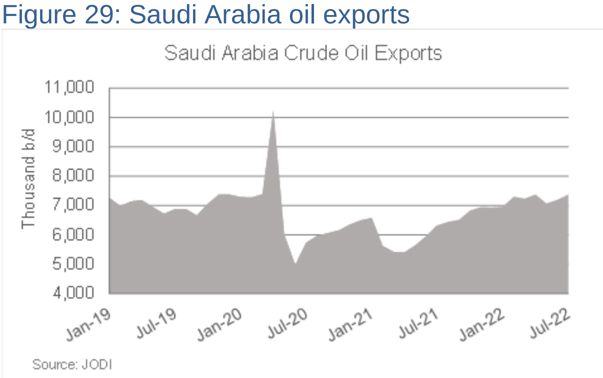
Source: AccuWeather

Oil – Saudi oil exports up 2.6% to 7.384 mmb/d in July

Saudi Arabia oil exports in July were 7.384 mmb/d, which was +2.6% MoM from 7.196 mmb/d in June. The increase in exports is basically in line with the MoM increase in Saudi oil production. But Saudi oil exports were at the highest levels since April 2020, and June and July were up from the recent dip down to 7.050 mmb/d in May.

Saudi oil export data for July

Figure 29: Saudi Arabia oil exports



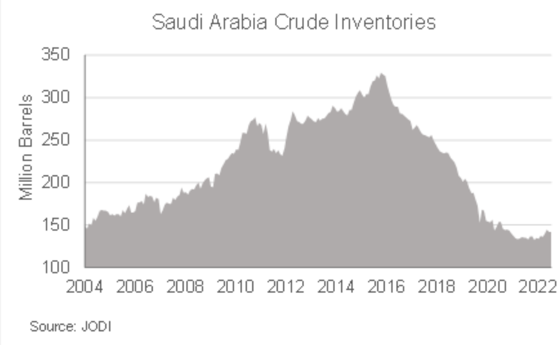
Source: JODI

Oil – Saudi oil inventories basically flat at up 0.211 mmb MoM

Saudi oil inventory was basically flat at +0.211 mmb MoM to 142.1 mmb at July 31. A 211,000 barrel change in inventory is basically flat on 142.1 million barrels. The recent high was 144.4 million barrels at May 31. Inventories still remain at relatively low levels staying below 150 mmb.

Saudi oil inventory data

Figure 30: Saudi Arabia Crude Oil Inventories (million barrels)



Source: JODI

Oil – Biden's UN speech seemed bland on a return to the JCPOA

Biden made his address to the UN General Assembly on Wednesday and included some bland sentences with a bland delivery on potential for a return to the JCPOA. Biden said "*And while the United States is prepared for a mutual return to the Joint Comprehensive Plan of Action if Iran steps up to its obligations, the United States is clear: We will not allow Iran to acquire a nuclear weapon. I continue to believe that diplomacy is the best way to achieve this outcome."* One of the interesting aspects of the US position is that they doesn't seem to be a sense of urgency given that Iran continues to advance its nuclear development. Last week's (Sept 18, 2022) Energy Tidbits memo noted our view that we have to believe Biden's increasing poll numbers and momentum for the Democrats into the mid-terms is giving him more political capital to try to get a win on JCPOA that he can clearly say is the win he wanted. And not be portrayed as settling just to get a deal done. The US has moved off their talking points from the summer that the big issues were resolved and they were getting close to the goal line. Rather, they have reverted to the position that there was an acceptable deal put to Iran in the spring and it is up to Iran to make the move to meet those acceptable terms. Our Supplemental Documents package includes the Biden UN address.

JCPOA still seems stuck

Oil – Was Raisi signaling Iran would take a Biden guarantee he would stay in JCPOA?

We have been noting how it feels like Biden seems to feel more in a position of relative strength in the JCPOA discussions. Last Sunday night, CBS 60 Minutes ran separate interviews with Biden and Iran President Raisi, and it was interesting to see how the JCPOA was handled in the separate interviews. In the Biden interview, there were no comments on the JCPOA. But CBS brought up JCPOA. We tweeted [LINK] "*#JCPOA. Iran Raisi "It needs to be lasting. There needs to be guarantees. If there were a guarantee, then the Americans could not withdraw from the deal". He must know the best he can get is Biden saying US will stay in during his term. Is that enough? Kudos @LesleyRStahl #OOTT."* This issue of

Iran President Raisi on 60 Minutes

guarantees has been around for months and surely Iran knows that the Biden can't guarantee the US will never not withdraw from the deal again and that the best guarantee Raisi could hope to get is that Biden says the US won't withdraw as long as he is President. It felt like Raisi hoping the US will take this bait or the the Europeans will try to push this opening at the US. The 60 Minutes transcript wrote "*Lesley Stahl: Can we start with the negotiations on the nuclear deal. Do you want to- have that deal renewed? Because you know, there are some American officials who are beginning to think that you don't. President Ebrahim Raisi (translation): If it's a good deal and fair deal, we would be serious about reaching an agreement. It needs to be lasting. There needs to be guarantees. If there were a guarantee, then the Americans could not withdraw from the deal. Lesley Stahl: But you can pull out of the deal I mean, just as well as we could pull out of the deal. President Ebrahim Raisi (translation): You see, the Americans broke their promises. They did it unilaterally. They said that, "I am out of the deal." Now making promises is becoming meaningless. Lesley Stahl: Are you saying that you cannot trust the Americans? President Ebrahim Raisi (translation): We cannot trust the Americans because of the behavior that we have already seen from them. That is why if there is no guarantee, there is no trust."*

Oil – Best indicator no JCPOA? Iran reported discounting floating storage barrels

Iran discounting floating barrels?

On Monday, we tweeted [LINK] *"#JCPOA. best indicator Iran doesn't see a deal in near term - Iran is ready to cut prices on #Oil in floating storage instead of waiting for sanctions relief & selling on market prices reports @straits_times Luke Pachymuthu. #OOTT."* We wouldn't think Iran would be discounting oil barrels in floating storage offshore Asia if they expected a near term JCPOA. On Monday, the Straits Times (Singapore) reported [LINK] "*Iran is ready to cut prices of its sanctioned crude stored on ships anchored in international waters just off Singapore, in a bid to defend its market share in China, industry sources tell The Straits Times. Teheran faces fierce competition from Russia, which has in recent months emerged as the top crude oil supplier to China, according to data by Refinitiv, a unit of the London Stock Exchange Group. The Straits Times understands that Iran is offering the crude in tankers anchored in Malaysia and Indonesian waters at discounts of around US$5 to US$7 to Russian cargoes. "The amount of Iranian oil sitting on water in Asia is a good indication of how optimistic Teheran might have been over the revival of the nuclear deal," said Ms Vandana Hari, founder of Vanda Insights, a provider of global oil markets macro-analysis. "Trying to get rid of it by offering steep discounts is the clearest signal that it has given up the hope of being relieved of US sanctions, at least for the time being."* Our Supplemental Documents package includes the Straits Times report.

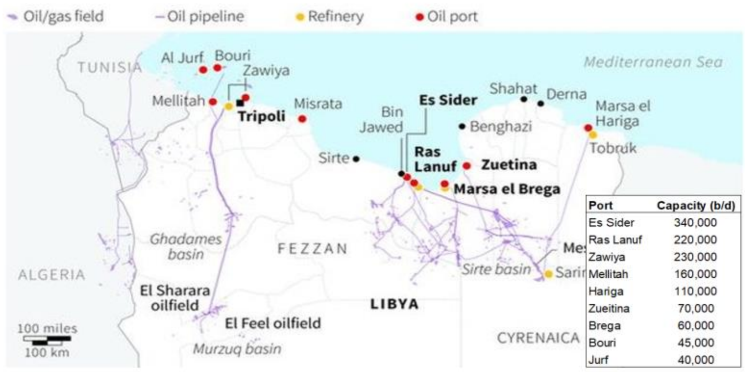
Oil – Libya oil production is down small, now <1.2 mmb/d on Wednesday

Libya now <1.2 mmb/d

Libya oil production is down small over the past 10 days. It was over 1.2 mmb/d at 1.211 mmb/d, but, on Thursday, Alwasat reported [LINK] "*Libya's oil production is running at 1.186 million barrels per day, the National Oil Corporation (NOC) said in a statement on Thursday, an increase of 3,000 barrels compared to the previous 24-hour period. Condensate production amounted to 50,000 barrels during the past 24 hours. The NOC added that the total domestic consumption of natural gas amounted to 1.166 billion cubic feet during the past 24 hours, an estimated increase of 44 million cubic feet over the previous 24-hour period."*

Figure 31: Libya Ports, Major oilfields and Terminals map

SAF Group Compiled Libya Ports & Terminals Status



Source: Bloomberg, HFI Research, SAF

Source: SAF Group

Oil – A brutal week for oil prices driven by Powell's outlook, interest rates, inflation

Powell drives markets down

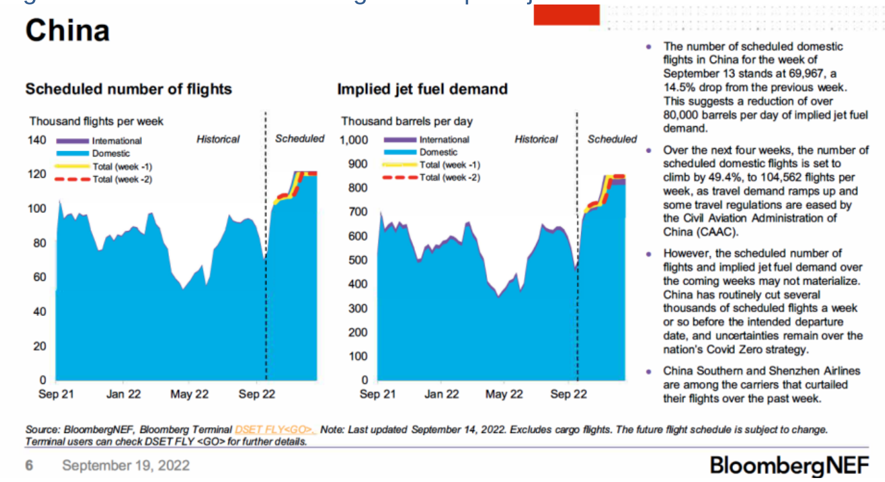
The oil story this week was all about the economic outlook and any positive oil stories were more than overshadowed by the negative economic outlook. It was a brutal week for markets including oil prices as markets look at weaker global economies driven by interest rates, inflation and Powell's blunt warnings at his Wednesday press conference. WTi was down 7.07% WoW to close at $79.17. But oil wasn't alone, the Dow Jones was down 4.0% WoW, Nasdaw down 5.1% WoW, and copper down 5.3% WoW. FED Chair Powell's Wed press conference gave a clear warning on what the FED sees is ahead, not just in terms of rising interest rates. A few of Powell's quotes were "*In addition, the chances of a soft lending -- landing are likely to diminish to the extent that policy needs to be more restrictive or restrictive for longer. Nonetheless, we're committed to getting inflation back down to two percent because we think that a failure to restore price stability would mean far greater pain later on." "if we want to set ourselves up, really - really light the way to another period of a very strong labor market, we have got to get inflation behind us. I wish there were a - a painless way to do that. There isn't. So what we need to do is get rates up to a - to the point where we're play - putting meaningful downward pressure"e on inflation, and that's what we're - that's what we're doing." "If the -- if the concept of high inflation becomes entrenched in people's economic thinking about their decisions then – then sort of getting back to price stability, the cost -- the cost of getting back to price stability just rises. And so we want to avoid that. We want to -- we want to -- we want to act aggressively now and get this job done and keep at it until it's done."* Our Supplemental Documents package includes the Powell press conference transcript.

Oil – Chinese airlines are planning for a reopening from Covid sooner than later

Big jump up in Chinese scheduled air flights

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 the Sept 19 report graph. Our Supplemental Documents package includes the last several weeks of graphs.

Figure 32: China scheduled flights & implied jet fuel demand



Source: BloombergNEF

Oil – Vortexa crude oil floating storage 105.37 mmb as of Sept 23, +10.04 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 18 at 4pm MT. (i) As of 1pm MT yesterday, Bloomberg posted Vortexa crude oil floating storage estimate for Sept 23 was 105.37 mmb, which is +10.04 mmb WoW vs revised up big Sept 16 of 95.33 mmb. Note Sept 16 was revised up +13.4 mmb vs the 81.93 mmb posted on Bloomberg as of 4pm MT on Sept 18. (ii) Note that, other than the Aug 26 week, the last several weeks were all revised up vs the estimates posted on Bloomberg at 4pm on Sept 18. Sept 16 revised +13.4 mmb. Sept 9 revised +4.99 mmb. Sept 2 revised +3.83 mmb. Aug 26 revised -0.52 mmb. Aug 19 revised

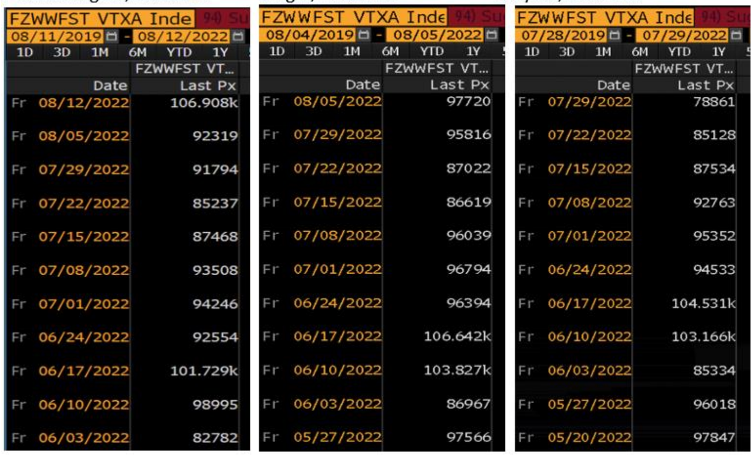
+4.04 mmb. Aug 12 revised +2.34 mmb. Aug 5 revised +0.71 mmb. (iii) With the revisions, other than the Aug 26 and Sep2 weeks, the other weeks were 95 to 109 mmb ie. More like > 100 mmb as opposed to the 85-90 mmb range seen in last week's estimates. (iv) Also remember Vortexa revises these weekly storage estimates on a regular basis and we do not track the revisions through the week. (v) Sept 23 estimate of 105.37 mmb is -119.64 mmb vs the posts Covid peak on June 26, 2020 of 225.01 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 23 estimate of 105.37 mmb is +53.36 mmb vs pre-Covid Sept 23, 2019 of 52.01 mm. Sept 23 estimate of 105.37 mmb is -7.28 mmb YoY vs 112.65 mmb on Sept 24, 2021. (vii) Below are the last several weeks of estimates made as of yesterday at 1pm MT, Sept 18 at 4pm MT, and Sept 10 at 2pm MT.

Figure 33: Vortexa Floating Storage posted on Bloomberg Sept 24 at 1pm MT

Source: Bloomberg, Vortexa

Figure 34: Vortexa Estimates Posted Sept 24 1pm MT, Sept 18 4pm MT, Sept 10 2pm MT

Posted Aug 13, noon MT | Aug 6, noon MT | July 30, noon MT



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

	Date	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

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

	Date	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

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

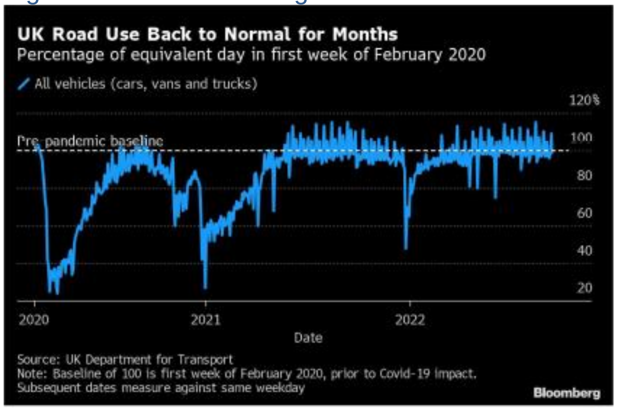
	Date	Last Px
Fr	07/29/2022	78861
Fr	07/22/2022	85128
Fr	07/15/2022	87534
Fr	07/08/2022	92763
Fr	07/01/2022	95352
Fr	06/24/2022	94533
Fr	06/17/2022	104.531k
Fr	06/10/2022	103.166k
Fr	06/03/2022	85334
Fr	05/27/2022	96018
Fr	05/20/2022	97847

Source: Bloomberg, Vortexa

Oil – Bloomberg Oil Demand Monitor: Fuel demand faulters as congestion increases

We recommend reading the Bloomberg terminal Oil Demand Monitor for a good recap of key oil demand indicators around the world. The key headlines this week are gasoline demand is below pre-covid levels in the UK, while it is higher in India; Airline seat capacity is down 5.6% MoM according to OAG data. Road congestion continues to remain elevated across the UK, but vehicles appear to be burning less fuel than recorded previously. The end of the Northern Hemisphere's summer typically indicates a decline in road and airline activity as summer travel plans slows and higher retail prices serve as a deterrent. Weak Chinese growth due to the repeated municipal lockdowns across the country and a slide in global oil prices have led some analysts to believe the global market is swinging from demand deficit to surplus. UK road use has been back to normal for many months now, overall. Vans and trucks are consistently used more than the pre-pandemic baseline in the Department for Transport's statistics. Car use is down slightly, coming in at 5% below the baseline in the latest figures for Sept 12. UK road usage continues to remain consistently below the pre covid levels indicating that there is a disconnect between the pickup in vehicle usage and the recovery in fuel demand. There's a similar long-term trend in Japan, where the trade ministry forecasts national demand for oil products will drop by 7.1% between fiscal 2021 and 2026. Gasoline product supplied in the US, a rough measure of demand, dipped below 8.5 mmb/d for the third time this summer. China's expected economic growth for the remainder of 2022 continues to look weak, despite an up-kick in economic activity, these gains are viewed to be temporary. Oil demand in China continues to be constrained and the IEA has stated China faces its biggest annual drop in oil demand in more than three decades. China's crude processing was 12.69 mmb/d in August showing a 0.9% gain from July but still 8% lower than August 2021. India continues to increase its Total Oil products consumption, up 1.1% MoM and up 4% vs August 2019. Inner-city congestion is growing stronger with the summer over, Taipei, New York, Los Angeles, London and Paris all showed congestion levels above 2019 for the first time since Nov 15, 2021. In general, the Atlantia road usage data still shows traffic levels have recovered to pre-pandemic levels. Spain was the only tracked country with road usage below that of August 2019. Passenger numbers at London's Heathrow dipped 4% in August to just over 6 million, ending six months of consecutive increases, though it is normal to see a slight decline from July to August. The seven-day average of the global number of commercial flights dipped 5.4% during the past month, and, as of Sep 19, was 16% lower than the equivalent period of 2019. Our Supplemental Documents package includes the Bloomberg Oil Demand Monitor.

Figure 35: UK Road Usage



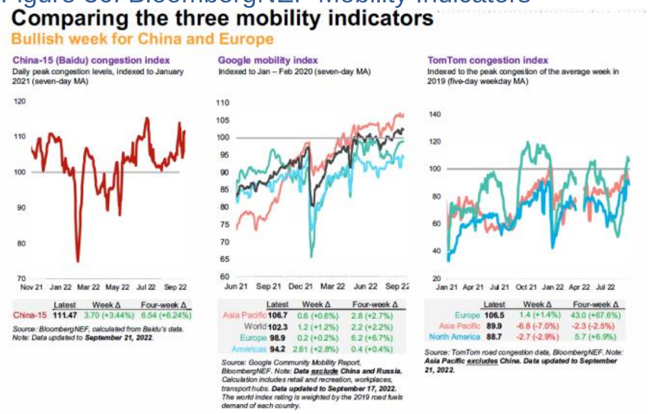
Source: Bloomberg

Oil – BNEF, mobility rises in China and Europe as North America falls

On Thursday, BloomergNEF posted its Global Road Traffic Indicators report which highlighted that Europe and China's mobility rose as North America's fell this week. TomTom congestion index showed Europe up 1.4%, China up 3.44%, while the rest of Asia Pacific down 7.0%, and North America down 2.9% from last week. Europe looks bullish, while it continues weekly upturns as levels in other regions fall. China data fluctuates depending on covid restrictions, which were relaxed in some areas last week such as the 20 million city Chengdu. Our Supplemental Documents package includes excerpts from the BNEF Global Road Traffic Indicators report.

Mobility rising in China and Europe

Figure 36: BloombergNEF Mobility Indicators



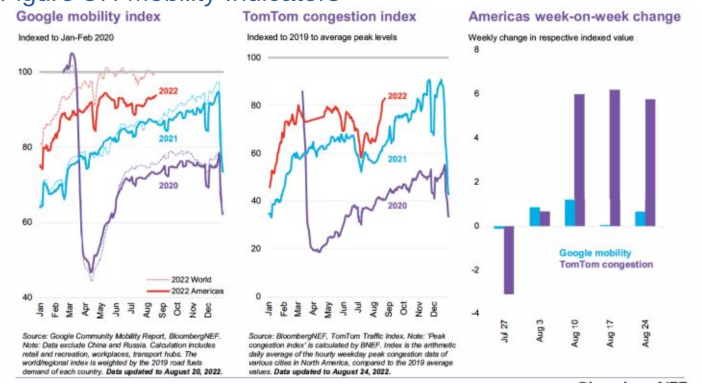
Source: BloombergNEF

Oil – US strong TomTom mobility indicator, but low EIA supplied gas volumes

US oil indicators weekly

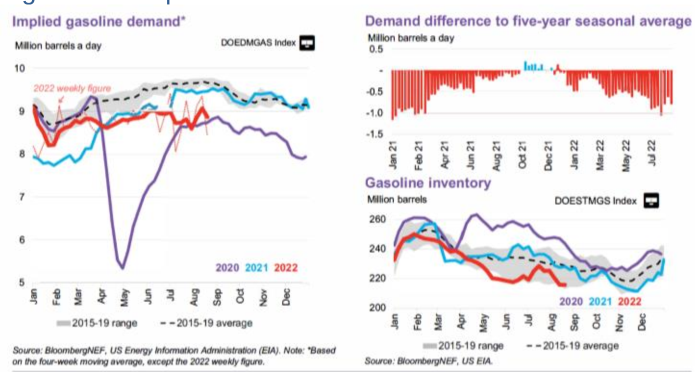
Last week's Energy Tidbits memo was posted on Friday Sept 16 and not our normal Sunday posting. We had our systems maintenance so were down on the weekend. One of the Sept 16 items that we did not includes was the BloombergNEF US Oil Indicators Weekly Sept 16. In that report, we continued to see the same mixed signals from the indicators for US gasoline consumption from BloombergNEF US Oil Indicators Weekly. It's the same issue as seen in the summer, where the mobility indicators like TomTom data point to more US driving, but the EIA gasoline supplied data to intermediaries point to less gasoline consumption. The issue this summer was that many mistook the EIA gasoline supplied data as representing gas station sales, when it doesn't. The EIA gives their estimate for gasoline supplied to intermediaries. . BloombergNEF's US Oil Indicators Weekly report showed a strong TomTom mobility indicator. The mobility data seems logical as the YoY comparable in TomTom congestions narrowed in May/June when gas prices went over $5, followed by a widening as gas prices dropped in August. The TomTom indicators look strong, but other mobility indexes like retail/recreation and grocery stores have dipped. And, the implied gasoline demand shows something different. BNEF had a couple of key messages. "*Gasoline demand continues to surprise with week after week of poor showings. It is now not only before its 2020 levels on a four-week basis, it has retreated to the lowest level since 1997" And* "*TomTom congestion levels in North America surpassed 90% of average peak levels in 2019, hitting highest level since index creation in 2020*." Our Supplemental Documents package includes excerpts from the BloombergNEF report.

Figure 37: Mobility Indicators



Source: BloombergNEF

Figure 38: "Implied" Gasoline Demand



Source: BloombergNEF

In Aug, EIA explained it's data is not how much gasoline is sold at gas stations
Here is what we wrote in our Aug 14, 2022 Energy Tidbits memo. "*It looks like the flak the EIA took (not justified in our opinion) led them to post a blog to explain their weekly gasoline supplied data. (i) We don't think it's the EIA's fault that most took their gasoline supplied data as representing retail gasoline sales at gas stations. We noted our views in last week's (Aug 7, 2022) Energy Tidbits. (ii) On Wednesday, the EIA posted a blog "EIA's Weekly Petroleum Status Report provides a snapshot of petroleum balances" [LINK] says clearly their numbers are not what people buy at gas stations in the case of gasoline. The EIA writes "In our WPSR, we do not estimate the ultimate consumption of petroleum products by consumers. Instead, we estimate the movement of products through the wholesale distribution system before they reach the ultimate point of sale, such as retail stations. We use product supplied as a proxy for consumption, which is calculated as follows: product supplied = production + imports - stock change – exports". (iii) What caught our attention was the EIA explaining their estimates. Their estimates are made up of estimates and samples, it's not actual data. For example, they note they sample 1/3 for their weekly of those surveyed for their monthly report. The EIA said they "collect data from about 1,200 respondents across the primary petroleum supply chain. The weekly survey respondents are a sample selected from more than 3,000 respondents who report on our monthly surveys for data published in our Petroleum Supply Monthly (PSM)." We recommend reading the blog. Our Supplemental Documents package includes the EIA blog."*

Difference between gasoline retail sales vs gasoline supplied to gas stations
Here is another excerpt from our Aug 14, 2022 Energy Tidbits on the EIA data. "*As noted above, we don't think the criticism on the EIA was fair just because most interpreted their gasoline product supplied data as being gasoline sales at gas stations. Here is what we wrote in last week's (Aug 7, 2022 Energy Tidbits. "We remind that we have to be careful to not read too much into two data points that are interpreted to be the same but are different. In this case, it's the difference between the EIA "motor gasoline product supplied" vs how much gasoline drivers are buying at the pump. (i) The controversy started with this week's EIA Weekly Petroleum Status Report [LINK] and its sentence "Over the past four weeks, motor gasoline product supplied averaged 8.6 million barrels a day, down by 8.8% from the same period last year." This is for the week ending July 29, 2022. The headlines then immediately jumped out on how this was even below the same period in 2020. And how this was interpreted as Americans are now driving less than they were in the same period during Covid. And we saw commentators on the business channels coming up with reasons such as increasing mileage efficiency of cars. (ii) The jumping to the conclusion of less driving than in 2020 is based on the reader assuming "product supplied" is the same as how much gasoline is being bought at the pump. When they are different numbers. The EIA product supplied is the amount of gasoline that is supplied to the gas stations ie. how much the gas stations are buying to put in their tanks at their gas station. (iii) The EIA product supplied is not the same as how much gasoline drivers are pumping into their cars. Most, including us, reference Gas Buddy estimates of how gasoline drivers are buying at the pump ie. how much gasoline we buy when we fill up our cars. Over time, these*

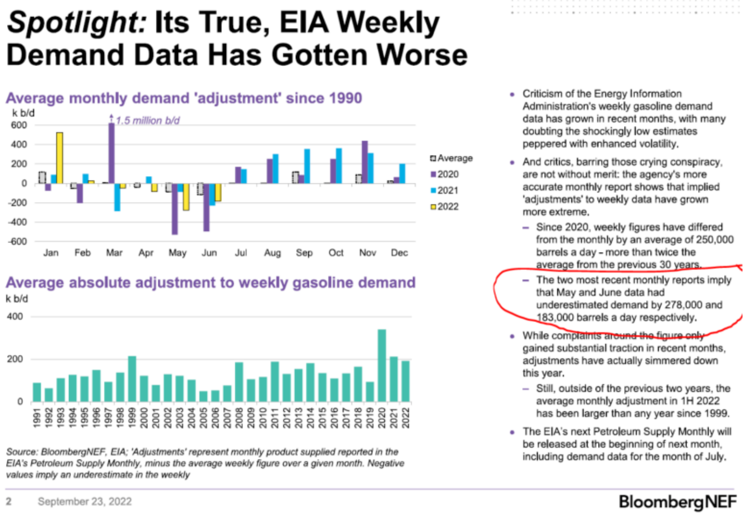
two different data points should work out to be the same ie. how much gasoline is supplied to the gas stations vs how much gasoline is sold by the gas stations. But, there will be periods when they are different. (iv) As of our 7am MT news cut off, we have not seen the Gas Buddy detail for the week ending July 31. But last Sunday, Gas Buddy Guy, Patrick DeHaan tweeted [LINK] "According to GasBuddy data, weekly US gasoline demand reached the highest level of 2022 for the week of 7/24, rising 2.0% from the prior week and was 3.0% above the rolling four week average, to 9.52mbpd." There is only a partial overlap to the EIA data, but the estimated retail sales of gasoline is strong and the opposite direction as the motor gasoline supplied to gas stations. (v) Is this possible? Yes. One possible explanation is that gas station owners see the declining oil price and are holding off, as much as possible, buying motor gasoline as they expect the prices to go lower ie. why buy higher priced gasoline that has to be resold to drivers. (vi) We are in the camp that finds it hard to believe Americans are driving less in Aug 2022 than in the first Covid summer in Aug 2020. However, we also believe that gasoline prices, even if down $1, are holding back some US driving or changing driving habits. This brings up the question if this is a turning point or is there just a lot more demand to come back if gasoline prices stay below $4/gallon?? And it's also why we the EIA motor gasoline product supplied data over the next couple reporting weeks will be closely scrutinized. "

Oil – BNEF "Spotlight: Its True, EIA Weekly Demand Data Has Gotten Worse"

EIA weekly demand data has gotten worse

BloombergNEF decided to spotlight that the EIA weekly demand data (noted in the above item) is underestimated. On Friday, we tweeted [LINK] "*Reminder, the #EIA weekly demand data has consistently underestimated demand. @BloombergNEF Danny Adkins estimates the demand was underestimated by 278,000 b/d in May and 183,000 b/d in June. #OOTT*." BloombergNEF's Sept 23 US Oil Indicators Weekly included the below Spotlight slide *"Its true, EIA weekly demand data has gotten worse"* and wrote that critics of the EIA's weekly gasoline supplied demand data are not without merit. BNEF wrote "*And critics, barring those crying conspiracy, are now without merit: the agency's more accurate monthly report shows that implied "adjustments" to weekly data have grown more extreme. Since 2020, weekly figures have differed from the monthly by an average of 250,000 barrels a day – more than twice the average from the previous 30 years. The two most recent monthly reports imply that May and June data had underestimated demand by 278,000 and 183,000 barrels a day respectively".*

Figure 39: BNEF "its true, EIA weekly demand data has gotten worse"



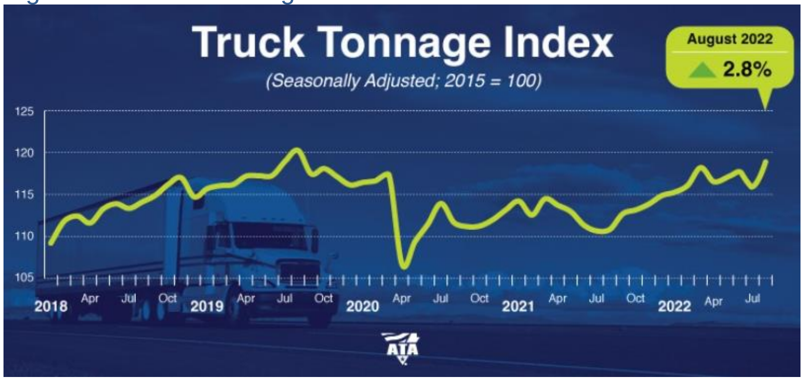
Source: BloombergNEF

Oil – August truck tonnage up 2.8% MoM, up 3.9% YoY

Truck tonnage index +3.9% YoY in August

Demand for truck haulage snapped back after a weaker than expected July, but supply shortages are still an obstacle for the industry. Truck tonnage was up 2.8%, but it is worth noting that the index fell by 4.6% from April to July so not quite back to the levels observed in 2020. The American Trucking Association released its seasonally adjusted Truck Tonnage Index for August on Tuesday [LINK]. August observed a 2.8% increase MoM from July, after decreasing 1.5% last month. Chief Economist Bob Costello noted, "*With the economy in transition to slower growth and changing consumer patterns, we may see more volatility in the months ahead. But the good news is that we continue to witness areas of freight growth in consumer spending and manufacturing, which is helping to offset the weakness in new home construction.*" The index is up 3.9% YoY from August 2021, with a twelfth consecutive YoY gain. Trucking serves as a barometer of the U.S. economy, representing 72.5% of tonnage carried by all modes of domestic freight transportation, including manufactured and retail goods. Trucks hauled 10.23 billion tons of freight in 2020. Motor carriers collected $732.3 billion, or 80.4% of total revenue earned by all transport modes. Our Supplemental Documents package includes the ATA release.

Figure 40: Truck Tonnage Index



Source: ATA

Oil & Natural Gas – Jamie Dimon's "road to hell for America" comments.

Jamie Dimon on capital hill

We didn't see it live on Wednesday, but we certainly saw the clips of JPMorgan Chase CEO Jamie Dimon in an exchange with Rep Rashida Tiaib (Dem) in a House committee meeting on Wed. We couldn't see the transcript on Bloomberg but made a transcript of the exchange. Tiaib asks *"… please answer with a simple yes or no. does your bank have a policy against funding new oil and gas products. Mr. Dimon*?" Dimon responded "*Absolutely not. That would be the road to hell for America."*

Oil & Natural Gas – Will Biden hoard LNG & products if US prices are high this winter?

Biden's UN address

On Wednesday, Biden made his address to the UN General Assembly and he had to make last minute changes to respond to Putin's national address. The headlines on his speech were his comments on Russia. But his comments no hoarding of food caught our attention given the recent Energy Secretary Granholm call on US oil companies to not increase exports. It's why we tweeted [LINK] "*Hmm! #Biden UN address "we're calling on all countries to refrain from banning food exports or hoarding grain while so many people are suffering" Will same concept apply to US #LNG #PetroleumProducts exports if supply is tight this winter? Or does 👇 @SecGranholm supercede? #OOTT."* Biden said "*And we're calling on all countries to refrain from banning food exports or hoarding grain while so many people are suffering. Because in every country in the world, no matter what else divides us, if parents cannot feed their children, nothing — nothing else matters if parents cannot feed their children."* Biden didn't have to say this in his speech, but, by doing so, we have to believe it will make it tougher for him to restrict exports of oil, petroleum products, natural gas or LNG this winter even if US prices go up or if there is a tight supply in places like the NE US for petroleum products.

In Aug, Granholm urged refiners build stocks/don't increase exports or else

Our tweet on Biden's UN speech referenced Granholm's Aug call on US oil companies in Aug; In our Aug 28, 2022 Energy Tidbits memo, we wrote *"On Friday morning, we tweeted [LINK] "Every man for himself! @SecGranholm urges US #Oil refiners to build inventories, not sell down stocks & further increase exports. Or, Admin need to consider added Fed requirements or other emergency measures.*

Excerpt 👇, worth reading full @WSJ opinion. #OOTT." We didn't see the WSJ opinion piece until early Friday morning and had to read it a couple times to make sure the WSJ was quoting Energy Secretary Granholm's letter and not interpreting her comments. But they were quotes from a Granholm letter to some refiners that wasn't made public. Her comments surprised us and others. It was a pretty clear warning to US refiners that the Biden Administration will take actions against refineries if they increase exports of petroleum products. The WSJ wrote "That's the message Energy Secretary Jennifer Granholm sent last week in a letter imploring seven major refiners to limit fuel exports. We obtained a copy of the letter, which the Administration didn't release publicly. Ms. Granholm warns that gasoline inventories on the East Coast are at a near-decade low, and diesel stocks are nearly 50% below the five-year average across the region. "Given the historic level of U.S. refined product exports, I again urge you to focus in the near term on building inventories in the United States, rather than selling down current stocks and further increasing exports," she writes. "It is our hope that companies will proactively address this need," she adds. "If that is not the case, the Administration will need to consider additional Federal requirements or other emergency measures." In New Jersey they call that an offer you can't refuse." Our Supplemental Documents package includes the WSJ opinion piece. [LINK]

Granholm says export ban "*not being considered at this time*"

We have to wonder if Biden's comments this week led to Energy Secretary Granholm having to come out on Friday to say that export bans are "*not being considered at this time."* We are always careful when we hear politicians use the "not at this time" if being asked if they are going to run for a higher office, or raise taxes or, in this case, ban petroleum products. After all, as noted above, Granholm raised this very issue with the oil companies. On Friday, Reuters reported [LINK] "*The Biden administration is not considering right now any restrictions on U.S. oil product exports, U.S. Energy Secretary Jennifer Granholm told reporters on Friday. Granholm late last month had urged U.S. refiners to build inventories of oil products like gasoline and diesel given high oil prices, warning that if it did not happen the administration would need to consider federal actions and emergency measures. "Restrictions are not being considered at this time," Granholm said when asked about any limits on U.S. oil product exports."*

Oil & Natural Gas – "*People are scared shitless about energy outside of America*"

Energy is a huge issue outside of US

There was a good reminder of two key investment questions/issues for energy and for markets overall for the mid and long term. Energy independent countries like Canada and the US don't appreciate the energy crisis faced by the rest of the world, and the world has moved from a period of calm to a world uncertainty. On Thursday, CNBC Squawk Box interviewed Palantir Co-Founder & CEO Alex Karp mostly for his Russia/Ukraine views as he was one of few who, at the start, called for Ukraine to surprise Russia in the war as it has so done. CNBC posted a clip [LINK] that was about 80% of his interview that focused on his views on where Russia/Ukraine goes next. It's worth a listen. But CNBC did not post the ending portion of the interview including his response if he thinks if a recession is inevitable. We tweeted [LINK] "*Buckle Up! "People are scared shitless about energy outside of America"* *"their enterprises are built for static unified world of peace" @PalantirTech CEO. reminds of 👇09/07 DeutscheBank CEO must read speech. Great interview @andrewrsorkin @BeckyQuick. #OOTT #NatGas."* We created a transcript of his comments. At 6:26am MT, Karp ".. *but what I do see is that people are scared shitless about energy outside of America. They're so scared about the macro, political conditions that no one wants to talk about it. Their enterprises are built for a static unified world of peace. And the balance sheets, obviously, are often not prepared for what is going to happen, which I think is going to be pretty bad the next couple years – politically, economically*".

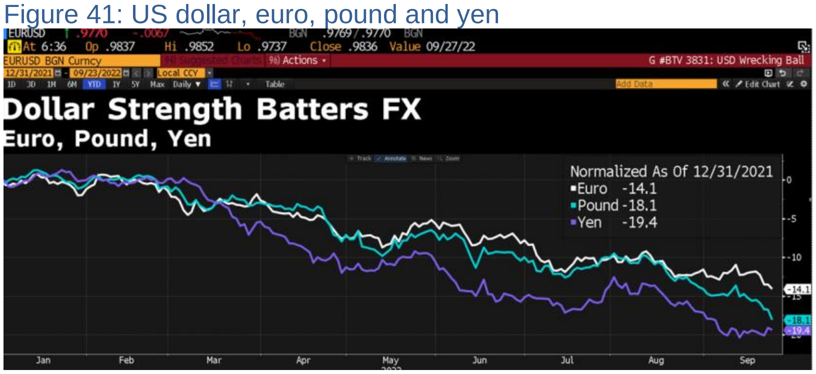
Karp's warning is much like the recent Deutsche Bank CEO keynote speech
We believe an overlooked critical theme for the 2020s is how the world has moved from decades of relative calmness for global economies to a world of massive uncertainty, risk and conflict. Karp's comments reminded of the recent Deutsche Bank CEO similar concerns. Here is what we wrote in our Sept 11, 2022 Energy Tidbits "*We weren't certain where to put this item, but we believe the Deutsche Bank CEO Christian Sewing views of the world, if correct, will be positive for oil and natural gas thru the 2020s. The headlines on his Wednesday comments were all about his warning a recession is coming for Germany. (i) We tweeted [LINK] "1/2. Must Read @DeutscheBank CEO. RUS/UKR "destroyed a number of certainties on which we build our economic system over the past decades". NEXT UP, "awkward question on how to deal with China" in light of increasing CN/US isolation/tension, reducing China dependency will .. #OOTT", and [LINK] "2/2.."require a change no less fundamental than decoupling from RUS energy". Globalization gone, labor a global bottleneck. Extremely expensive #Electricity #NatGas s a threat to economy. the longer inflation remains high the higher the potential for social unrest, etc. #OOTT.". (ii) As you can see from our tweets, there are many thoughts. We tend to agree with a lot of what he is saying unless there is a social revolt to say enough is enough. (iii) The real theme of his theme of his speech is excellent – the world has changed for the foreseeable future. The norms of the past decades are gone. Globalization gone. China dependency must be reduced. Global value and supply chains disrupted. Workforce a worldwide bottleneck. Electricity/natural gas will be expensive in EU for a long time.. The truth is that 30 years of presumed calm will now be followed by a period of heightened volatility with economic uncertainty, regular crises and geopolitical conflicts that are also likely to drag on for decades. Trouble spots are not cut off from the rest of the world; they impact other regions in a number of ways. (iv) And he doesn't say much about it, but says "But the longer inflation remains high, the greater the strain and the higher the potential for social conflict." We still wonder about social conflict and if there will be Arab Spring type revolt within Germany and other European countries to how people feel they are getting hit by the Russian sanctions. (v) His views are relevant to longer term capital allocation. It's not just Germany has a terrible economic outlook. He raises issues like we have noted about China is the next Russia type target even if they don't invade Taiwan. Germany affects more than itself. And think about it, if Germany can hold the line on Russian sanctions on energy, then it probably says most of Europe can hold the line other than a handful like Hungary, etc. (vi) There is much more in this short viewpoint. Our Supplemental Documents package includes the CEO viewpoint."*

Oil & Natural Gas – Stronger US $ makes oil, LNG imports more expensive

Strong US $

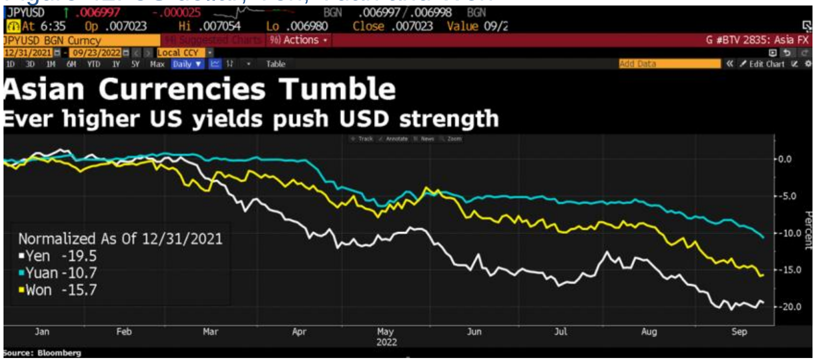
The other factor hurting demand is stronger US $ makes imports more expensive. It doesn't make a difference where you are in the world, everyone can't help but pay attention to the strengthening US dollar. It is hammering the cost of imports for any items that are US dollar priced such as oil and LNG. Early Friday morning, it was one of the stories on BloombergTV. We tweeted [LINK] "*Imported cost of US$ priced #Oil #LNG & other goods keeps getting hammered by stronger and stronger US$. @BloombergTV charts this morning. #OOTT.*" Our tweet included two of the graphs shown on BloombergTV on Friday morning.

Figure 41: US dollar, euro, pound and yen



Source: Bloomberg

Figure 42: US dollar, Yen, Yuan and Won



Source: Bloomberg

Oil & Natural Gas – Europe to focus on Africa for fossil fuel supply

Europe to look to Africa for oil and gas

On Thursday, European Commission President von der Leyen made a keynote address at Princeton University. Putting aside the always dominant comments on climate change and investing in renewables, the one Russian theme that was clear is that Europe will be looking at Africa for fossil fuels to replace Russian fossil fuels. Von der Leyen said "*So in sum, the era of Russian fossil fuels in Europe is coming to an end. And this is a big geopolitical shift, because if you look at the map, the demand and supply from Russia is coming to an end. This demand from the European Union will now switch towards the Global South. Because if we do it right, we are not only diversifying to other gas or fossil fuel suppliers, but we massively invest now in renewable energies, in regions where the resources are in abundance. If you look at the other side of the Mediterranean, in the European Union, it is the*

African continent: sun, wind, partially hydropower, in abundance. And if we invest in the infrastructure, we do not only gain freedom from the blackmail that we have experienced with Russia, but we are also fighting the right cause against climate change." Our Supplemental Documents package includes the von der Leyen speech. [LINK]

Oil & Natural Gas – TIPRO Texas oil natural and gas jobs up small MoM in Aug

Employment continues to increase in the Texas oil and gas sector. But based on the comments from the service sector calls, we suspect that the increases in hiring has been held back by the labor shortage. The Texas Independent Producers and Royalty Owners Association (TIPRO) updated their employment figures for the Texas upstream sector for August [LINK]. The release noted that employment for August totalled 201,700 marking an increase of 2,600 jobs from the July numbers. The release stated, *"Texas upstream employment for August 2022 totaled 201,700 an increase of 2,600 jobs from adjusted July employment numbers. Texas upstream employment in August 2022 represented an increase of 33,400 positions compared to August 2021, including an increase of 8,200 in oil and natural gas extraction and 25,200 jobs in the services sector."* There has been strong job posting data for August in upstream, midstream, and downstream sectors, showing a continued demand for talent in the Texas oil and natural gas industry. From the release *"TIPRO once again noted strong job posting data for upstream, midstream and downstream sectors for the month of August. According to the association, there were 11,909 active unique jobs postings for the Texas oil and natural gas industry in August, including 3,906 new job postings added in the month."* Our Supplemental Documents package includes the TIPRO release.

TIPRO August jobs update

Oil & Natural Gas – UN's Guterres calls for windfall profits tax on fossil fuel co's

We believe oil and gas companies in almost all countries should be prepared for higher government take. This can be positioned as paying fair share or an anti-climate change attack as seen this week in UN Secretary General Guterres address to the UN General Assembly. Guterres went after fossil fuels and is pushing all countries to implement windfall taxes on profits for all fossil fuels companies. Guterres said "*Our world is addicted to fossil fuels. It's time for an intervention. We need to hold fossil fuel companies and their enablers to account. That includes the banks, private equity, asset managers and other financial institutions that continue to invest and underwrite carbon pollution. And it includes the massive public relations machine raking in billions to shield the fossil fuel industry from scrutiny. Just as they did for the tobacco industry decades before, lobbyists and spin doctors have spewed harmful misinformation. Fossil fuel interests need to spend less time averting a PR disaster – and more time averting a planetary one. Of course, fossil fuels cannot be shut down overnight. A just transition means leaving no person or country behind. But it is high time to put fossil fuel producers, investors and enablers on notice. Polluters must pay. Today, I am calling on all developed economies to tax the windfall profits of fossil fuel companies. Those funds should be re-directed in two ways: to countries suffering loss and damage caused by the climate crisis; and to people struggling with rising food and energy prices."*

TIPRO August jobs update

Oil & Natural Gas –Tropical Storm Ian path is east of GoM oil, gas, LNG

Earlier this morning, we tweeted [LINK] "*Tropical Storm Ian, projected path still targets western Cuba and west side of Florida. Also still east of major GoM offshore #Oil #NatGas fields, and of major Gulf Coast refineries, export terminals incl LNG. Hope everyone stays*

Tropical Storm Ian

safe. #OOTT." Our tweet included the National Hurricane Center's 3am MT forecast path that shows Tropical Storm Ian hitting western Cuba and then the west coat of Florida. At least as of now, the path is east of the major offshore Gulf of Mexico oil and natural gas fields, and the major Gulf Coast refineries, oil/petroleum product/LNG export terminals and other infrastructure.

Figure 43: Tropical Storm Ian as of 3am MT today

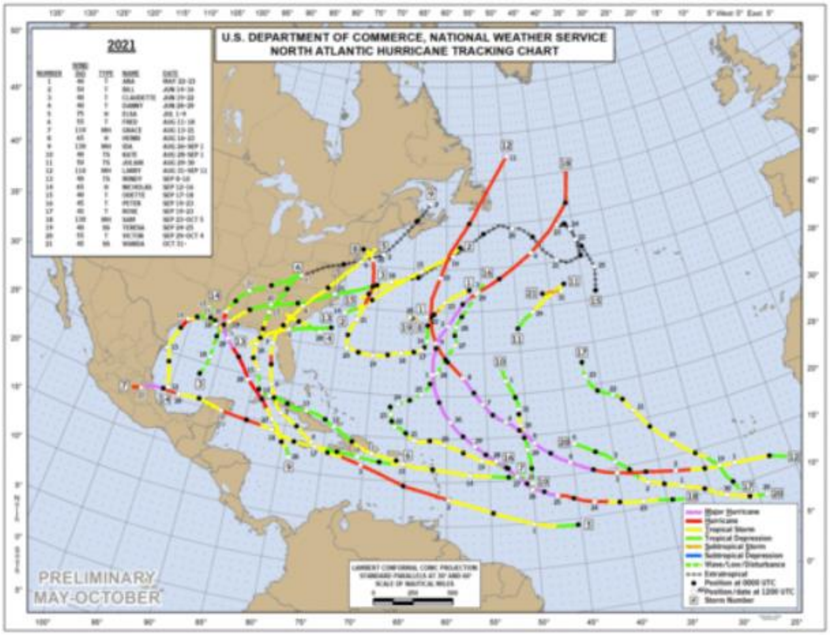
Source: NHC

Oil & Natural Gas –Ian reminds Puerto Rico is a good marker for GoM hurricane risk

Hurricane risk GOM vs Atlantic

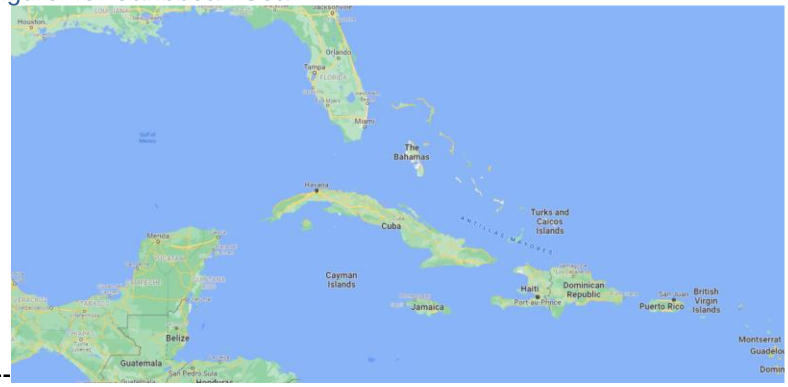
Tropical Storm Ian is the first tropical storm or hurricane to come into the Gulf of Mexico in almost two months. Rather the activity has been in the Atlantic side. Tropical Storm Ian is also a reminder that a good indicator for storms/hurricanes to come into the Gulf of Mexico is Puerto Rico and the Dominican Republic. Here is what we wrote in the Dec 5, 2021 Energy Tidbits "*Is normally not a perfect correlation but the 2021 Atlantic hurricane season was for the early indicator for risk to the GoM oil and gas being if the tropical storm/hurricane hits north of Puerto Rico or not. This year, all the storms/hurricanes that were north of Puerto Rico went into the Atlantic and all that were south of Puerto Rico went into the GoM. Below is NOAA's 2021 tracking map*."

Figure 44: North Atlantic Storm Tracking Map in 2021



Source: National Hurricane Center

Figure 45: Caribbean Sea



Source: Google Maps

Energy Transition – EU "requires a difficult rethink" of its emissions assumptions

EU needs a different rethink of emissions assumptions

We wouldn't go as far to use the old adage "garbage in, garbage out", but it is true that there can be well intentioned but very wrong decisions made if the assumptions are wrong. This has been the big concern on the Energy Transition plans – the assumptions for the plan have been wrong. Will the European Commission listen to the latest views that their Energy Transition plan isn't working and need to be changed? Or will the EC decisionmakers just keep believing they need to accelerate their emissions reductions actions? On Thursday, we tweeted [LINK] "*EU's self-inflicted #EnergyCrisis. "current situation requires a difficult rethink* *of long-held assumptions how we can best reach climate neutrality in 2050" says all EU auto co's, fuels manufacturing co's & industry associations. Fits 👇12/09/21 tweet #2022Predictions. #OOTT."* There were some blunt statements from a large group of automotive companies, fuels manufacturing companies and industry associations that the EU needs big changes to its assumptions to reduce emissions. FuelsEurope posted the joint letter [LINK] that included a number of specifics that are really tough to argue. And some of these have been highlighted by the IEA in its warnings over the past two years. But most of all, the message to the EC is "*our concerns are growing that the limited pathway provided by the Commission's proposal for a regulation on "strengthening the CO2 emission performance standards for new passenger cars and new light commercial vehicles in line with the Union's increased climate ambition", with its current test and certification protocol, creates unnecessary risks; industrial, economic, social and in terms of delayed GHG reductions."* And "*The current situation requires a difficult rethink of long-held assumptions how we can best reach climate neutrality in 2050 while ensuring a just transition of the EU industry. In this light, all solutions that are able to deliver a reduction in GHG emissions should be considered."* There is much more in the joint statement. Our Supplemental Documents package includes the joint statement.

Assumption: Kerry said 50% of emissions cuts to come from future technology

The above joint statement highlights the need for a difficult rethink of long-held assumptions. We don't think the old adage "Garbage In, Garbage Out" is fair, rather we believe the politicians had good intentions. However, the joint statement was a polite way of saying bad assumptions = bad decisions. On Thursday, we tweeted on one key example of a bad assumption [LINK]. "*Unfortunately, bad assumptions = well intentioned bad decisions. See 👇 linked 05/16/21 tweet @ClimateEnvoy "50% of the reductions we have to make to get to net zero are going to come from technologies that we don't yet have. That's just a reality" #OOTT [LINK]."* Would anyone commit to a huge stretch goal with the risk of a decade long energy crisis on the hope that a technology answer will be found? A good example of going all-in on a key assumption for the US emissions reduction plan was from US Special Presidential Envoy for Climate, John Kerry, admitting that 50% of the emissions reductions in their plan will come from future technologies that the US didn't have. But even with that assumption, the US led the world charge to commit to emissions reductions. Here is what we wrote in our May 16, 2021 Energy Tidbits. "*We recognize that the Energy Transition is going to happen, but we just wish that the politicians would at least warn people that its going to take longer, be bumpy and be more expensive for energy. People have to understand the Energy Transition is not a plan, its an aspiration and governments do not know how it will be accomplished. No one expects them to have a 100% plan, but the reality is that, at best, they have a 50% plan. Could you imagine committing to any project delivery not know how 50% of the project will be accomplished? We say 50% at best because the reality is that politicians tend to overestimate the positive. This is what US Special Presidential Envoy for Climate said a month ago at the Biden global leaders climate summit – 50% of the planned emissions cuts will have to come from technologies not yet developed. Earlier this morning the Guardian reported [LINK] on Kerry's comments in the UK. After seeing the Guardian report, we tweeted [LINK] "#JohnKerry "I am* *told by scientists that 50% of the reductions we have to make to get to net zero are going to come from technologies that we don't yet have. That's just a reality". This means other reality is will need #NatGas #Oil for longer. #OTTT" His comments on the reality check and that governments are setting real targets without knowing how it will accomplish is a reality check that the demise of natural gas and oil won't be as fast as the Energy Transition aspirations."*

Energy Transition – Is PG&E's battery storage fire/shut down the tip of the iceberg?

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

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 46: PG&E Moss Landing Tesla Battery Storage

Source: CBS News

Energy Transition – Beam Suntory putting in high efficiency boilers and scrubbers

We have to give companies credit for writing in a way that doesn't give credit where credit is due and infers there is a great contribution of green actions to reducing emissions. And they don't want to give credit to normal operating actions that reduce emissions – they just don't say very exciting. Beam Suntory's announcement last week "*Beam Suntory, a world leader in premium spirits, will invest more than $400 million to expand production at its Booker Noe distillery in Boston, KY, which produces Jim Beam®. This expansion will increase capacity by 50%, while reducing the distillery's greenhouse gas emissions by the same percentage, through the use of anaerobic digestors that will produce renewable natural gas to power the facility*." The press release doesn't mention other items in this $400 mm capex that are helping to reduce the emissions. Rather there is a clear statement that the 50% reduction in emissions is "*through the use of anaerobic digestors*….." When we read something that doesn't make sense, we like to see if it's true. No surprise, we found a Bourbon Review report that says the $400 mm capital program includes some normal ways of reducing emissions – putting in high efficiency gas boiler and scrubbers. Using a high efficiency gas boiler reduce emissions just like high efficiency fridges or any appliance or furnace. The Bourbon Review wrote "*In addition to capacity expansion, the investment includes land, warehouses, and 51 new local jobs. Further, this project allows the distillery to invest in high-efficiency gas boilers to make maximum use of renewable natural gas, use scrubbing technology to remove carbon dioxide from fermentation tanks, and following a purification process, facilitate the beneficial reuse of more than 100,000 metric tons of high-purity carbon dioxide annually*." Our Supplemental Documents package includes the Beam Suntory announcement [LINK] and Bourbon Review report [LINK]. .

Beam Suntory's emissions reductions

Energy Transition – EIB, the cost will be "enormous" to move to hydrogen economy

Earlier, we noted European Investment Bank President Hoyer's comments that Europe will have to live with industrial demand destruction. In his Bloomberg TV interview on Tuesday, he also spoke on Europe is moving very quickly into a hydrogen economy and that the cost will be "enormous". We don't think there are very many people who would say Europe is moving very quickly into a hydrogen economy. And we hope it's another bad assumption that ends up costing Europe big money for years. On Tuesday morning, we tweeted [LINK] "*EU #EnergyTransition is going to be very $$$$ with lots of casualties. @EIB President - cost to move to #Hydrogen economy "will be enormous", re Industrial destruction in EU - ".. will be*

Europe moving very quickly to hydrogen economy?

terrible but we will then have to live with it". Thx @GuyJohnsonTV @adsteel. #OOTT." We created a transcript of his comments. *At 3:50 min mark, Hoyer "… we're moving, in my view, very quickly into a hydrogen economy. And that requires enormous investments. The problem right now is in times of crisis, in times of war, the first thing that suffers is investment. And this is why, as an investment bank in service of the public good, we need to make sure that we can foster and strengthen investments in Europe also in this very field." Johnson "how long is it going to take and how much is it going to cost?" Hoyer "The cost of course, at first glance, will be enormous. There is no doubt about that. But on the other hand, we will arrive at an energy situation that will be cheaper than we have today".*

Energy Transition – Norway wealth fund, need a new energy transition plan

Norway's 2025 Climate Action Plan

More confirmation, albeit subtle, that Norway realizes there needs to be a new energy transition plan. It reinforces our view that oil and natural gas will be stronger for longer. On Tuesday, we tweeted [LINK] "*Hmm! Norway subtle but admitting need to have a better #EnergyTransition plan. 👇12/21 tweet: zero use/worry re an "orderly" transition. today's new climate plan has 7 mentions of "orderly" #EnergyTransition. [LINK] Stronger for longer #Oil #NatGas. #OOTT*. (i) It will be overlooked that there is a major admission and shift in Norway's views on the Energy Transition. Norway has been a leader in Europe and around the world on energy transition and reducing emissions. On Tuesday, Norges Bank Investment Management is the manager for Norway's Wealth Fund and released its "2025 Climate Action Plan: Driving our Portfolio Companies Toward Net Zero 2050". (ii) The title is really an acknowledgement of their big change they made at the end of 2021 to not sell oil and gas. Rather they adopted a purpose of helping companies lower emissions and move towards Net Zero. That is clear in the report title. And it emphasized multiple times in today's report. And they highlight this theme in their first page overview "*It is the goal of our responsible investment management for our portfolio companies to align their activities with global net zero emissions in line with the Paris Agreement. On this basis, our ambition is for our portfolio companies to achieve net zero emissions by 2050. This document describes our approach to managing climate risks and opportunities. It sets out the actions we aim to take over the period 2022-2025. These actions are targeted at improving market standards, increasing portfolio resilience, and effectively engaging with our portfolio companies. At the heart of our efforts is driving portfolio companies to net zero emissions by 2050 through credible targets and transition plans for reducing their scope 1, scope 2 and material scope 3 emissions*." (iii) This theme of helping companies reduce emissions and not selling oil and gas stocks was the big announcement made late last year. We highlighted this in our Dec 26, 2021 Energy Tidbits memo that was titled "Norway's Wealth Fund is Another Major Investor, Like CPPIB, to Keep Investing in Oil & Gas Stocks". (iv) The subtle but major shift/admission in today's report is an indirect admission that the energy transition plan wasn't well thought out, it wasn't credible. In today's report, they noted a number of times the need for an "*orderly transition'* ie. "*The current decade is crucial for achieving an orderly climate transition in line with the goals of the Paris Agreement*." And, at the market level not the company level, they highlighted "*the establishment of credible transition pathways*". There are other examples. (v) We say this is different from their Dec 21, 2021 release, which does not use the words orderly or credible. Cleary, Norway doesn't want to say it, but they really are saying that the world needs an orderly transition because it doesn't have such a plan today. Our Supplemental Documents package includes the Norges Bank 2025 Climate Action Plan.

Dec 2021, Norway's wealth fund decided it wasn't selling oil & gas

Our tweet this week retweeted our Dec 21, 2021 tweet on Norway wealth fund's announcement of a changed position on oil and gas stocks. We titled our Dec 26, 2021 Energy Tidbits memo "*Norway's Wealth Fund is Another Major Investor, Like CPPIB, to Keep Investing in Oil & Gas Stocks*". Here is what we wrote in the Dec 21, 2021 Energy Tidbits memo "*We believe there is the case for multiple expansion for oil and gas stocks in 2022 as investors realize more significant institutional investors, especially pension funds, won't be selling down oil and gas stocks. The predictable is happening – more long term investors realize that the demise of oil and gas is many years further away than the Net Zero aspirations and that they will need oil and gas stocks for their returns. We expect to see more of these types of announcements/news over the next couple weeks. History has shown that the Xmas period is the time for announcements to be made to get the minimum attention. On Tuesday, we tweeted [LINK] "Multiple expansion for #Oil #NatGas stocks? Norway wealth fund has #MacronMoment & follows @cppib to slow play #EnergyTransition, won't sell, rather be a driving force for their equity investments to "adjust to #NetZero emissions over time". Less sellers is always good. #OOTT." Norway's sovereign wealth fund may be saying it a little differently but has come to a similar conclusion as CPPIB last week – they aren't selling oil and gas. They don't say it specifically but we also believe they won't be hesitating to buy . On Tuesday, Norway outlined its view on capital allocation [LINK] that had a number of key items. (i) High emissions sectors including oil and gas make up 14% of Norway's equity portfolio. These are companies that Norway believes must be restructured significantly to manage transition risk. (ii) "But that is not our approach, nor is it the expert group's proposal. Instead of selling ourselves out, we will through active ownership be a driving force for the companies to adapt. In order to influence, we must actually be owners." (iii) They want to be invested in all sectors. "If we are to achieve the best balance between expected return and risk, we must spread the investments widely and own a little of everything in the market. There is a solid professional basis for this approach." (iv) Priority to those that have the largest emissions ie. where they can effect change. "Going forward, we will increase ownership activity on climate, both in scope and depth. We will give particular priority to ownership activity towards the companies that have the largest emissions, towards those that have not published their own climate plans or have inadequate climate reporting." Our Supplemental Documents package includes the speech."*

CPPIB's "new" Dec 2021 investment approach calls oil & gas a strategic sector

Our Dec 19, 2021 Energy Tidbits memo highlighted CPPIB's Dec 15 "new" investment approach. In that memo, we wrote "*There was a significant positive to oil and gas investing this week and one that we expect others to follow, and this will lead to more long term investor capital allocation to oil and gas. On Wednesday, CPPIB announced its "new" investment approach in its release "CPP Investments highlights importance of decarbonizing hard-to-abate sectors in addressing climate change". [LINK] This is a significant change for a couple of reasons and one that we have been expecting based on the feedback we hear from long term investors. CPPIB calls it a "new investment approach" including on oil and gas. (i) CPPIB is a leader and is providing the messaging framework that we expect others to follow. Big long* *term investors like CPPIB have mostly all come out plans on how they taking their investment strategy to Net Zero. But, in discussions, more are realizing the Energy Transition isn't happening as fast as expected so their challenge is how to slow play their capital allocation to Net Zero. CPPIB provide the messaging on how they will do so. (ii) CPPIB now calls oil and gas a "strategic sector" and one for capital allocation. CPPIB said "helping businesses decarbonize is critical to addressing climate change, according to a recent perspective published by Canada Pension Plan Investment Board (CPP Investments). The perspective, "Investing to enable an economy-wide evolution to a low-carbon future," highlights the opportunity decarbonization presents for long-term investors, noting the need to address a particularly serious obstacle to decarbonization: strategic sectors that are essential, high-emitting and hard-to-abate. The perspective also outlines CPP Investments' new investment approach which aims to identify, fund and support companies that are committed to creating value by lowering their emissions over time, consistent with CPP Investments' time horizon advantage. "High-emitting companies that successfully navigate the economy-wide evolution to a low-carbon future will preserve and deliver embedded value for patient long-term investors like CPP Investments," said Deb Orida, Global Head of Real Assets & Chief Sustainability Officer. "This new investment approach complements the Fund's ongoing commitment to investing in companies that have the potential to develop innovative climate technologies around the world and furthers our existing capabilities in technologies that enable the energy evolution." Strategic sectors that are essential, high emitting and hard-to-abate within this investment approach include agriculture, chemicals, cement, conventional power, oil and gas, steel and heavy transportation. The successful decarbonization of these sectors is not only essential to meet wider net-zero ambitions, but also to sustain economic growth, stability and a responsible transition." Our Supplemental Documents package includes the CPPIB announcement.*

Our #1 2022 Prediction – leaders like CPPIB/Norway have a #MacronMoment

Our Dec 12, 2021 Energy Tidbits highlighted our #1 2022 prediction that more Energy Transition leaders (politicians and capital providers) will come out of the closet and admit (most indirectly) that they need to change their energy transition plans as the energy transition is taking longer, be bumpy and will cost more. On Dec 9, we tweeted [LINK] "*Time for #2022Predictions. My #1 is more #EnergyTransition #NetZero leaders come out of closet, have a #MacronMoment ie. have "transition" not self inflicted shortage so 2021 energy crisis isn't every year. A return to #EnergySecurity = #Oil #NatGas #LNG strong thru 2030. #OOTT.*" A #MacronMoment can take three forms. (i) A direct #MacronMoment clearly saying it isn't working as planned. We aren't picking on Macron, but he recently said it the clearest when he warned the energy transition aspiration has to be modified/reduced or else there will be years of an energy crisis. The day before COP26 started, we tweeted [LINK] on Macron's comments to the FT [LINK] that was a clear view on higher fossil fuel prices for the foreseeable future. Macron said "on demand for fossil fuels isn't going away for the foreseeable future. Macron said "*What is happening now is ironic, because we are building a system where in the medium and long term fossil energy will cost more and more, that's what we want [to fight climate change]."*

he said." Japan is another calling for a pragmatic time frame ie a change in the plan. (ii) Japan now says must have a "*pragmatic time frame*" for decarbonization. No one should is surprised to see how Japan says their #MacronMoment. They use Japan-speak for the energy transition aspirations plan isn't working and needs to be changed. On Nov 9, we tweeted [LINK] on Japan's release [LINK] on its conference with IEA Executive Director Faith Birol. Japan wrote "*The two sides also exchanged views on acceleration of decarbonization efforts following COP26, and shared the importance on measures with pragmatic time frame based on individual circumstances that each countries face including its renewable energy potentials".* A pragmatic time frame or a go slow process, whatever you want to call it, it means the same thing – Japan doesn't want to get rid of fossil fuels too quickly. (iii) The US doesn't say its isn't work, just that there will be higher energy costs for years to come. US Energy Secretary Granholm has shown the third way of admitting the energy transition plan isn't working. She avoids saying the plan isn't working or needs to be changed, just that she puts on the record that high energy costs are here for years. We tweeted on her comments on MSNBC Morning Joe and created a transcript of her saying "*So the long term strategy is that. and yes we have a short term cost issue because the economy is still coming back on. we have a supply, demand that does not, the supply doesn't meet the demand. that is an issue we are going through. The president is all over this both in the short term and in the long term."*

Capital Markets – USDA consumer price index for food +11.4% YoY in August

USDA consumer price index for food

The USDA's official food price data keeps going up, but we continue to believe it is nowhere as much as what Americans feel when they go to the grocery stores in the US. This feels like what we heard last summer about inflation being transitory, the real food price increases are way higher than per government data. The USDA posted its consumer price index for food data for August on Friday [LINK], which is +0.8% MoM and +11.4 % YoY, compared to July at +10.9% ; while it is up over 10%, it still seems very low. Whenever we ask US friends what they think their grocery bills have increased YoY, we have never heard anyone say something like 11% YoY. Rather, most tend to think up at least 25%. The +11.4% YoY is for the overall food price index, which has a relative weighting for the various food categories. Some of the YoY % increases that just don't sound anywhere near reality are beef/veal +2.5% YoY, pork +6.8% YoY, fresh fruits & vegetables +7.9% YoY, and fish & seafood +8.7% YoY. We wonder what their forecasts are used for as they forecast overall food price escalation of 2.5% to 3.5% for 2023.

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

@Energy_Tidbits on Twitter

For new followers to our Twitter, we are trying to tweet on breaking news or early views on energy items, most of which are followed up in detail in the Energy Tidbits memo or in separate blogs. Our Twitter handle is @Energy_Tidbits and can be followed at [LINK]. We wanted to use Energy Tidbits in our name since I have been writing Energy Tidbits memos for over 20 consecutive years. Please take a look thru our tweets and you can see we aren't just retweeting other tweets. Rather we are trying to use Twitter for early views on energy items. Our Supplemental Documents package includes our tweets this week.

LinkedIn – Look for quick energy items from me on LinkedIn

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

Look for energy items on LinkedIn

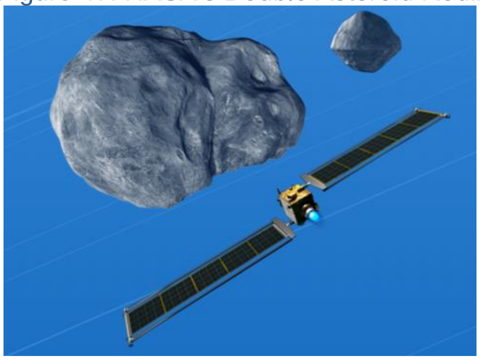
Misc Facts and Figures.

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

NASA's DART to collide this week into the asteroid Dimorphus

There will be some good TV tomorrow night for space fans when NASA's DART is estimated to hit its target asteroid. NASA's DART website [LINK] estimates "DART IMPACT: September 26, 2022, 7:14 p.m. EDT". Who hasn't seen the classic movies Armageddon or Deep Impact on how the earth will try to save itself from an asteroid hitting the earth. It may not be the movie version such as Armageddon where the earth tries to stop a Texas-sized asteroid by using planning nuclear bombs but this week, we will see the test of NASA's DART (short for "Double Asteroid Redirection Test"), which will crash into a 520-ft wide asteroid Dimorphos, which is orbiting around a larger 2,560-ft wide asteroid called Didymos. NASA will then see if there has been any change to the Dimorphos orbit. NASA describes it "*What is DART? DART is the first-ever mission dedicated to investigating and demonstrating one method of asteroid deflection by changing an asteroid's motion in space through kinetic impact."* Note this is a collision and not an explosion scenario like the movies. DART will be sending back images (1 every second) up until it collides into Dimorphos.

Figure 47: NASA's Double Asteroid Redirection Test "DART"



Source: NASA

Sept 28, 1972, Paul Henderson scores Game 8 winner in Summit Series

Fifty years ago were probably the three most memorable hockey games for most Canadian hockey fans. The 8-game Summit Series between Canada and the USSR was about to end. The first four games were in Canada and after the 1st game in the USSR, the series was USSR 3 wins, Canada 1 win and 1 tie with three games remaining all in Moscow. Game 6 on Sept 24, 1972 was a 3-2 Canada win with Toronto Maple Leafs Paul Henderson scoring the winning goal. Game 7 on Sept 26, 1972 was 4-3 Canada win with Paul Henderson scoring the winning goal at 17:54 of the 3rd period The series was tied. Game 8 on Sept 28, 1972 was a 6-5 Canada win with Paul Henderson scoring the winning goal at 19:26 of the 3rd period. Everyone can remember Henderson coming off the bench on a line change, flying for the front of the USSR net, taking a wild swing and falling behind the net. He gets up right away goes to the front of the net and is there to slap in the winner. And then to have the famous picture of Montreal Canadians Yvon Cournoyer bear hugging Henderson with his arms raised. For those that haven't seen it lately, there is a replay of Henderson's game 8 winning goal at [LINK].

Figure 48: Paul Henderson game 8 winner 1972 Summit Series

Source: CBC, NHL

Big TV day for Canadian golf fans with President's Cup singles

The US has a commanding 11-7 lead going into the singles matches today. But the Internationals have been battling back and there weren't many putts dropping for them on the first two days. The matches have been excellent golf to watch and remind how one shot, one lucky, one bad break or one great shot can win a match. There are 12 points up for grabs today (1 point for each singles match) and the US only needs to tie to retain the cup. The Canadians are in two tough matches today. Taylor Pendrith tees off at 11:02am MT vs 14th in the world Tony Finau. Pendrith and Finau were paired in the final round at the Rocket Mortgage Classic in July that Finau won and Pendrith ended up T2. Corey Connors tees off at 11:14am MT vs 5th in the world Xander Schauffele.

Trevor Immelman Korean golf Tom Kim – "he's just wired different'

It will be interesting to watch which of the relatively unknown pros springboard off the President's Cup to jump into big success in the coming golf season. Gotta believe two candidates are Australia's Cam Davis and Korea's Tom Kim. Tom Kim was the story yesterday, when he and partner Si Woo Kim beat the unbeaten US team, Patrick Cantlay and Xander Schauffele with a Tom Kim birdie on the 18th hole. Listening to Captain Trevor Immelman's press conference, what jumped out was how impressed he is with Kim and his description that "*he's just wired different*." Anyone who has competed in sports knows there are those special athletes that are wired different, they also know they will be great and deliver on that greatness especially by performing in pressure moments. Here is how Immelman described Kim on 18. "*I* *thought something that was so cool on the final hole today, he's about 240 yards out. He's probably 60 yards behind his opponents. He's over the ball. I look back, I see the who's who of American golf in golf carts behind him. I see Thomas, I see Spieth, I see Finau, I see Homa, I see Morikawa, all of them sitting on carts 15 yards from him. And this kid pures a 2 iron to 10 feet and makes the putt. To me, that's impressive stuff. No matter who you're rooting for, that made my heart warm right there. So extremely proud of him today. He went out. He did his job. He earned two points. And that is fantastic."*