Energy Tidbits

Aug 21, 2022

Produced by: Dan Tsubouchi

US Says JCPOA Big Issues Have Been Largely Settled, How Could Biden Walk Away Now?

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. Post Iran's response to EU's JCPOA text, the US said that the JCPOA big issues have been largely settled [LINK]
2. Gazprom to shut down Nord Stream Aug 31, will resume Sept 3 t 1.17 bcf/d *"provided that no malfunctions are identified"* [LINK]
3. AECO price hit are linked to April announced delays in NW/WC Alberta gas takeaway capacity additions [LINK]
4. BC's approval of 16 well licenses suggest an arrangement with Blueberry River First Nations [LINK]
5. Aramco CEO reminds "rest of world will not transition at the same speed as developed world. this is where most of humanity lives." [LINK]
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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Table of Contents

Natural Gas – Natural gas injection of +18 bcf, storage now -296 bcf YoY deficit....6
Figure 1: US Natural Gas Storage....6
Natural Gas – NOAA expects a warm start to a warmer than normal winter....6
Figure 2: NOAA OND Temperature Probability Forecast....6
Figure 3: NOAA DJF Temperature Probability Forecast....7
Natural Gas – La Nina winters correlations to cold winters are far from 100%....7
Figure 4: Winter (Dec-Feb) Temp in Strong, Moderate And Weak La Ninas 1950 - 2017....8
Natural Gas – EIA, US shale/tight natural gas breaking out, now >93 bcf/d....8
Figure 5: MoM Change – Major Shale/Tight Natural Gas Production....9
Natural Gas – More US LNG exports = less downside risk to HH prices from weather....9
Natural Gas – AECO getting hammered by delays in Alberta capacity additions....9
Figure 6: BC Wells, Rig Activity List, Excerpts....10
Natural Gas – Union tells Shell the deal breaker/maker for Prelude FLNG restart....11
Figure 7: Shell Crux Project Overview....12
Natural Gas – Australia La Nina winter brings supply risk to east coast LNG & coal....12
Figure 8: Australia Natural Gas/LNG....12
Figure 9: Australia Thermal Coal....13
Natural Gas – Above average weather demand for natural gas in July in Japan....13
Figure 10: Japan Mean Temperature Anomalies July 2022....13
Natural Gas – Continued hot weather forecast into September in Japan....14
Figure 11: JMA Temperature Probability Aug 20 to Sept 19....14
Natural Gas – Japan's LNG stocks up +1.3% from last week....14
Figure 12: Japan's LNG Stocks....15
Natural Gas – Japan LNG Imports hurt by LNG prices, down -0.4% YoY....15
Figure 13: Japan Monthly LNG Imports....15
Natural Gas – China's LNG imports -10.6% YoY in July....15
Figure 14: China LNG Imports....16
Figure 15: China Pipeline Imports....16

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Natural Gas – Nord Stream 3-day shut down on Aug 31 for servicing/maintenance 16
Natural Gas – Baker Hughes suspended all LNG equipment & services work in Russia 17
Figure 16: Novatek's LNG production platform, May 2021 19
Natural Gas – Crazy high European natural gas prices are >$400/boe 19
Natural Gas – Europe storage is now +13.09% YoY ie. 75.89% full vs 62.80% 19
Figure 17: Europe Gas Storage Level 20
Oil – US oil rigs flat at 601 oil rigs at Aug 19 20
Figure 18: Baker Hughes Total US Oil Rigs 20
Oil – US frac spreads -5 to 280 spreads for the week ending Aug 19 20
Figure 19: Baker Hughes Total Canadian Oil Rigs 21
Oil – US weekly oil production -0.1 mmb/d at 12.1 mmb/d 21
Figure 20: EIA's Estimated Weekly US Oil Production 22
Figure 21: US Weekly Oil Production 22
Oil – North Dakota June oil production 1.096 mmb/d, up MoM from 1.059 mmb/d in May 22
Figure 22: North Dakota Oil Production By Month 23
Oil – North Dakota crude by rail down MoM to 80,222 b/d in June 23
Figure 23: Estimated North Dakota Rail Export Volumes 24
Oil – EIA shale/tight oil forecast revised down for Aug 24
Figure 24: MoM Change – Major Shale/Tight Oil Production 24
Figure 25: MoM Change – Major Shale/Tight Oil Production 25
Oil – EIA DUC's worked down by 20 in July 25
Figure 26: EIA - Estimated Drilled UnCompleted Wells 25
Figure 27: Shale Oil Production vs Oil DUC Wells 26
Figure 28: EIA – Oil DUCs by Region 26
Figure 29: EIA – Gas DUCs by Region 26
Oil – DUCs do not tell the story as they don't include potential refracs 26
Figure 30: Conoco Eagle Ford Refrac 28
Oil – EIA either over-estimates US supply or under-estimates US demand by 0.5 mmb/d 28
Figure 31: "Crude Oil Adjustment" included in EIA STEO US oil supply/demand forecast 29
Oil – Santos FIDs 80,000 b/d Alaska Pikka oil development 29

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Oil – Refinery inputs -0.158 mmb/d WoW at 16.423 mmb/d 29
Figure 32: US Refinery Crude Oil Inputs (thousands b/d) 30
Oil – BNEF, 4.6 mmb/d of refinery capacity shut down Jan 1/2020 thru 2023 30
Figure 33: Scheduled global refinery closures 30
Oil – US "net" oil imports down -2.929 mmb/d WoW at 1.132 mmb/d 31
Figure 34: US Weekly Preliminary Oil Imports by Major Countries 31
Oil – Saudi used 687,000 b/d of oil for electricity generation in June 31
Figure 35: Saudi Arabia Direct Use of Crude Oil For Electric Generation 32
Figure 36: Riyadh Temperature Recaps for June and July 32
Oil – Saudi oil exports up 2.1% to 7.196 mmb/d in June 32
Figure 37: Saudi Arabia oil exports 32
Oil – Saudi oil inventories down -2.574 mmb MoM 32
Figure 38: Saudi Arabia Crude Oil Inventories (million barrels) 33
Oil – Aramco CEO says global spare oil capacity is <2 mmb/d & declining fast 33
Oil – Aramco CEO reminds on the reality check of the Energy Transition 34
Oil – JCPOA, US says deal is now closer than it was two weeks ago 34
Oil – US says JCPOA big issues are settled, how can the US now walk away? 35
Oil – Iran's oil would be a good crude quality replacement for Urals crude to Europe 36
Figure 39: Platts Specifications Guide Europe and Africa Crude Oil 37
Oil – Libya oil production was >1.2 mmb/d on Wednesday 37
Figure 40: Libya Ports, Major oilfields and Terminals map 38
Oil – China apparent oil consumption currently down ~1.6 mmb/d YoY 38
Oil – BNEF: global oil and product stocks deficit narrowed 38
Figure 41: Aggregate Global Oil and Product Stockpiles 39
Oil – Vortexa crude oil floating storage 104.63 mmb as of Aug 19, -6.94 mmb WoW 39
Figure 42: Vortexa Floating Storage as of Aug 12 posted on Bloomberg Noon MT yesterday 40
Figure 43: Vortexa Estimates Posted Aug 13 noon MT, Aug 6 noon MT, July 30 noon MT 40
Oil – Bloomberg Oil Demand Monitor: China outlook drops as US fills up on gasoline 40
Figure 44: China Oil Demand 41
Oil – Bloomberg: US and Europe weekly jet fuel demand declines 41

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Oil – BNEF, North American congestion climbed while China levels slipped 41
Figure 45: BloombergNEF Mobility Indicators 42
Oil – It took $5 gasoline to finally have a lower YoY US vehicle miles travelled 42
Figure 46: 2021 Individual Monthly Vehicle-Miles of Travel in Billions 42
Figure 47: US Retail Gasoline Prices 43
Oil – Rhine River water levels doubled this week, another double by Tues 43
Figure 48: Rhine River noting Kaub 43
Oil – Swiss to release more fuel oil due to the low Rhine River water levels 43
Oil & Natural Gas – BHP CEO reminds Russia impacts oil, LNG but not copper 44
Oil & Natural Gas – Puerto Rico tends to be a good marker for GoM hurricane risk 44
Figure 49: North Atlantic Storm Tracking Map in 2021 45
Figure 50: Caribbean Sea 45
Energy Transition – Will Dems Net Zero push be helped by Liz Cheney's loss 45
Figure 51: US Electricity Generation 46
Figure 52: Planned Solar Generating Capacity Reporting a Delay 47
Energy Transition – No surprise, Germany to keep nukes running 47
Figure 53: California electricity mix Aug 18 at 3:05pm PT 48
Capital Markets – Norway fund manager warns of several years of difficult markets 48
Capital Markets – Even oil & gas couldn't save Norway wealth fund's H1 performance 49
Figure 54: YTD equity performance by sector thru Aug 16, 2022 50
Capital Markets – US "college endowments post biggest losses since financial crisis" 51
Capital Markets – Largest decline in US labor productivity since 1948 52
Capital Markets – Higher income shoppers drove the Walmart Q2 results 52
Demographics – Now costs $300,000 to raise a child in US 53
Demographics – Increasing use of cash in UK as way to budget for rising costs 53
Capital Markets – Average monthly payment on US car loan is $702 and going higher 54
LinkedIn – Look for quick energy items from me on LinkedIn 54
Misc Facts and Figures 55

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Natural Gas – Natural gas injection of +18 bcf, storage now -296 bcf YoY deficit

YoY storage at -296 bcf YoY deficit

As low as the storage injection was this week, it could have been 15 bcf lower and almost a withdrawal if Freeport LNG wasn't shut-in. The YoY storage deficit started last winter at -282 bcf YoY at Oct 31 and is now -296 bcf YoY. The EIA reported a +18 bcf build (+32 bcf expectations) for the Aug 12 week, which was below the 5-yr average build of +47 bcf, and below last year's injection of +46 bcf. Storage is 2.519 tcf as of Aug 12, increasing the YoY deficit to -296 bcf from -268 bcf last week and is -296 bcf below the 5-year average vs -338 bcf below last week. Below is the EIA's storage table from its Weekly Natural Gas Storage Report [LINK].

Figure 1: US Natural Gas Storage

	Stocks billion cubic feet (Bcf)				Historical Comparisons: Year ago (08/12/21)		Historical Comparisons: 5-year average (2017-21)	
Region	08/12/22	08/05/22	net change	implied flow	Bcf	% change	Bcf	% change
East	571	564	7	7	643	-11.2	667	-14.4
Midwest	684	663	21	21	762	-10.2	758	-9.8
Mountain	151	148	3	3	188	-19.7	183	-17.5
Pacific	248	252	-4	-4	240	3.3	272	-8.8
South Central	866	874	-8	-8	983	-11.9	1,006	-13.9
Salt	185	193	-8	-8	244	-24.2	253	-26.9
Nonsalt	681	681	0	0	740	-8.0	753	-9.6
Total	**2,519**	**2,501**	**18**	**18**	**2,815**	**-10.5**	**2,886**	**-12.7**

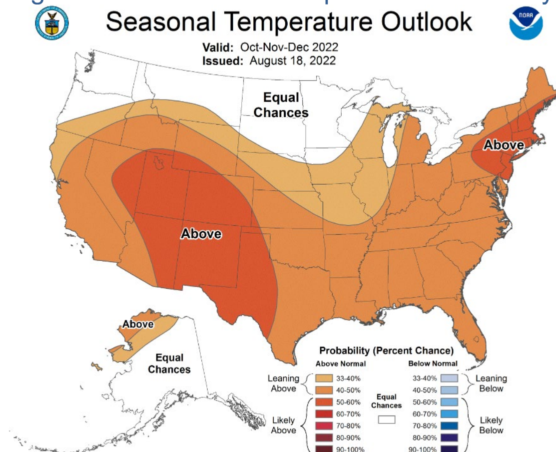
Source: EIA

Natural Gas – NOAA expects a warm start to a warmer than normal winter

NOAA forecasts a warm winter

On Thurs, NOAA updated its seasonal temperature forecasts for OND [LINK] and DJF [LINK]. NOAA's probability is for warmer than normal temperatures for most of the US to going into the winter (OND) and in the peak of winter (DJF). Warmer temperatures throughout the winter means less demand for natural gas. Below are the new NOAA temperature probability maps for Oct/Nov/Dec and for Dec/Jan/Feb.

Figure 2: NOAA OND Temperature Probability Forecast



Source: NOAA

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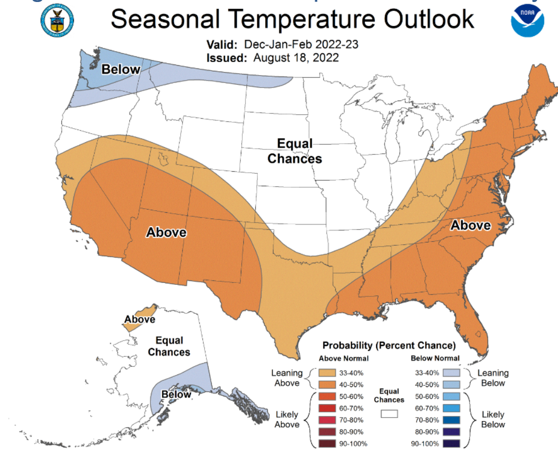
Figure 3: NOAA DJF Temperature Probability Forecast



Source: NOAA

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

La Nina winters are unpredictable

NOAA's continued call for warmer than normal winter is a good reminder that La Nina winters aren't always cold. Last week's (Aug 14, 2022) Energy Tidbits highlighted NOAA's call for a La Nina/Normal winter. And we included our normal comment that La Nina winters are more often normal to colder than normal than a warmer winter. But we remind of an Oct 6, 2017 NOAA brief *"Temperature patterns during every La Niña winter since 1950"*, which looked at all La Nina winters from 1950 thru 2016/17, classified them as strong, moderate or weak La Ninas, and then showed the average winter (Dec thru Feb) temperature map. The link still works [LINK]. The bottom line is that La Nina winters may slightly favor a normal to colder than normal winter, but there have some been near record high temperature La Nina winters. NOAA's new seasonal outlook doesn't call for record warm Dec/Jan/Feb, but does call for a warmer than normal winter. Below is the NOAA graphic.

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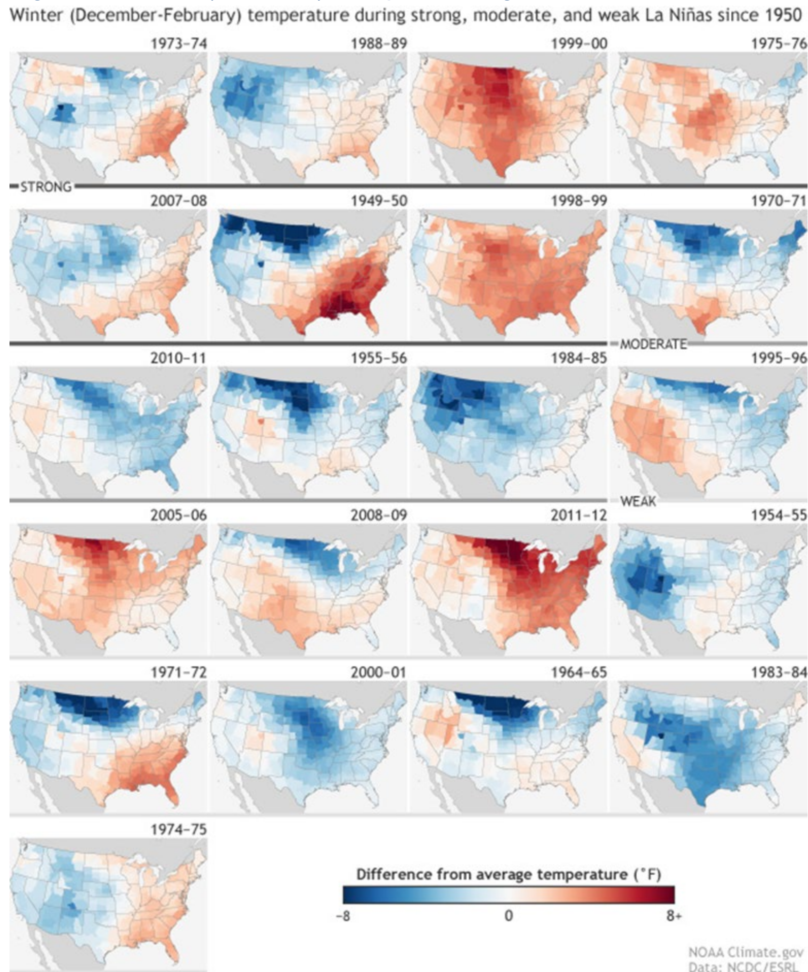
Figure 4: Winter (Dec-Feb) Temp in Strong, Moderate And Weak La Ninas 1950 - 2017



Source: CPC

Natural Gas – EIA, US shale/tight natural gas breaking out, now >93 bcf/d

Shale/tight gas production

EIA's updated Drilling Productivity Report Aug 2022 was released on Monday, and the key takeaway is that Sept is forecast to build on July and Aug growth which followed five months of basically flat shale/tight natural gas production. The DPR [LINK] is the EIA's forecast for oil and natural gas production from the major shale/tight oil and gas basins for the current month (in this case Aug) and the next month (in this case Sept). (i) Shale/tight natural gas is breaking out, as increasing US LNG export capacity out of the Gulf Coast is driving natural gas growth in Louisiana and Texas. July was the first month over 92 bcf/d at 92.271 bcf/d and Aug the first month over 93 bcf/d at 93.162 bcf/d. Sept is forecasted at 93.835 bcf/d. The challenge for gas is that Appalachia is basically flat. And growth is linked to LNG with Haynesville at 15.835 bcf/d in Sept vs 14.291 bcf/d in Feb. Eagle Ford (a more gassy oil play) at 7.101 bcf/d in Sept vs 6.176 bcf/d in Feb. (ii) The EIA forecasts Sept at 93.835 bcf/d

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which is +0.673 bcf/d MoM and up +6.951 bcf/d from the Nov/19 peak of 86.884 bcf/d. (iii) This month, all basins increased except for Anadarko (-0.001 bcf/d MoM). Bakken and Niobrara showed small increases, but were basically flat MoM. The largest increases came from Haynesville (+0.192 bcf/d MoM), Appalachia (+0.154 bcf/d MoM) and Permian (+0.167 bcf/d MoM). (iii) All basins except for the Bakken are up YoY, with the most notable YoY increases being Haynesville +2.420 bcf/d YoY and Permian +1.884 bcf/d YoY. Total US shale/tight natural gas production is +6.715 bcf/d YoY for Sept. (iv) Remember US shale/tight gas is ~90% of total US natural gas production. So whatever the trends are for shale/tight gas are the trends for US natural gas in total. Below is our running table showing the EIA DPR data for the shale/tight gas plays, and the MoM changes in major shale/tight natural gas production. Our Supplemental Documents package includes the EIA DPR.

Figure 5: MoM Change – Major Shale/Tight Natural Gas Production

mmcf/d	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Sept YoY	Sept YoY %	Sept less Aug
Anadarko	6,139	6,107	6,203	6,321	6,278	6,341	6,286	6,118	6,134	6,275	6,554	6,658	6,657	518	8%	-1
Appalachia	34,783	34,838	35,601	34,825	34,988	35,716	36,298	35,443	35,476	35,155	35,121	35,332	35,486	703	2%	154
Bakken	3,003	3,004	3,012	3,071	3,150	3,137	3,079	2,932	3,076	3,088	3,086	2,915	2,949	-54	-2%	34
Eagle Ford	5,990	5,994	5,950	6,012	6,118	6,176	6,288	6,298	6,394	6,538	6,671	6,985	7,101	1,111	19%	116
Haynesville	13,415	13,514	13,778	13,874	14,019	14,291	14,425	14,527	14,863	15,023	15,261	15,643	15,835	2,420	18%	192
Niobrara	5,090	5,183	5,308	5,329	5,339	5,293	5,196	5,254	5,187	5,195	5,205	5,212	5,223	133	3%	11
Permian	18,700	19,027	19,298	19,573	19,936	20,233	20,160	19,533	19,870	20,227	20,373	20,417	20,584	1,884	10%	167
Total	87,120	87,667	89,150	89,005	89,828	91,187	91,732	90,105	91,000	91,501	92,271	93,162	93,835	6,715	8%	673

Source: EIA, SAF

Natural Gas – More US LNG exports = less downside risk to HH prices from weather

US LNG exports +2.63 tcf in last 3 years

There was a good reminder this week of how US natural gas prices are less at risk from weather than in the past because of the big ramp up in LNG exports. This is especially so with Europe's move to rid itself of Russian natural gas and US LNG exports being one of the preferred substitutes. As a result, it means that ~12 bcf/d of US natural gas production is spoken for and is leaving the US. Whereas prior to this change, an outlook for a warm start to winter and a warm winter would be a negative to HH gas prices. This week, NOAA came out with its warm start to winter and warm winter forecast and HH gas went up. It's why, on Thursday, we tweeted [LINK] "*Good thing US #LNG exports are >4.5 tcf in 2022 amidst global LNG crisis. Otherwise HH #NatGas prices would be crashing, not ~$9.25, given @NOAA call for a warm start to a warm winter. Think about it, US LNG exports +2.63 tcf in last 3 yr vs storage now 2.52 tcf at Nov 12. #OOTT.*" Our tweet highlighted the size of US LNG exports have increased +2.63 tcf in the last years, which is huge relative to storage, which is currently 2.52 tcf at Nov 12.

Natural Gas – AECO getting hammered by delays in Alberta capacity additions

AECO differentials hit

The big natural gas story in Canada this week has been how AECO gas prices have been getting hammered at the same time as Henry Hub prices are $9. AECO being hit this summer was to be expected given the April announced delay to adding TC Energy USJR capacity. On Wednesday, we tweeted [LINK] "*unfortunately, the hit to #AECO #NatGas prices has played out as warned by my SAF Group partner @GregSheaWorkBee in April. See 👇 below 04/19/22 thread. #OOTT.*" We pointed to our April 19, 2022 tweet [LINK] "*Expect #AECO price hit as unexpected #NatGas will be forced into storage this summer. @TCEnergy likely case delays in USJR capacity addition in-service for ~0.9 bcf/d, most for ~5 mths, small % to early Q1/23. Thx @GregSheaWorkBee for flagging. #OOTT [LINK].*" In our April 24, 2022 Energy Tidbits, we wrote ""*Natural Gas –~0.9 bcf/d of new NGTL capacity adds delayed for ~5 months. We were a little surprised that TC Energy's advising of delays for new NGTL gas*

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capacity expansion in 2022 was going to be late didn't get any real attention. As soon as we saw the NGTL customer notice [LINK] on Tuesday night, we tweeted [LINK] "Expect #AECO price hit as unexpected #NatGas will be forced into storage this summer. @TCEnergy likely case delays in USJR capacity addition in-service for ~0.9 bcf/d, most for ~5 mths, small % to early Q1/23. Thx @GregSheaWorkBee for flagging. #OOTT". NGTL was supposed to put into service 1.3 bcf/d of new capacity in the Upstream James River Receipt area (USJR) in west-central and north-west part of Alberta ie. the primary growth area for Alberta natural gas. Producers were working on the assumption that 1.3 bcf/d was to be put into service in late April and throughout May. However, on Tuesday, NGLT advised to delays of most of this new capacity. Our tweet noted that ~0.9 bcf/d of this new capacity was being delayed, most of it for ~5 months and a small % delayed until early Q1/23. This delay did not impact current production takeaway, but it was being counted on by producers for the capacity to move the primary natural gas growth areas (ie. for the Montney) into the NGTL Alberta gas system and down to export markets."

Natural Gas – New well licenses suggest an arrangement with Blueberry River

A BC deal with Blueberry River First Nations?

We checked again yesterday afternoon and could not see any announced on the BC Oil & Gas Commission website for any indication of an arrangement reached with the Blueberry River First Nations that has been holding back new well licences since Oct. However, it looks like there must some sort of arrangement since we saw 16 new well licenses posted on Wednesday on the BCOGC's Rig Activity List at [LINK] – 5 licenses for Arc, 2 for Ovintiv, and 9 for Petronas. It has now been over ten months since what looked to e good news when, on Oct 7, British Columbia and Blueberry River First Nations announced they had reach an interim agreement [LINK] that is the first step agreement. We had assumed the interim agreement was a clear first step given the impression that they could reach final agreements. There has been no deal and no indications of an update until Wednesday, when we saw these new well licences. They certainly suggest some sort of arrangement has been met.

Figure 6: BC Wells, Rig Activity List, Excerpts

WA #	Well Name	Proj TD De	Activity Date	Activity Type
43618	ARCRES HZ SUNRISE I02-35-078-18	4283	16-Aug-22	LOCATION
43619	ARCRES HZ SUNRISE J02-35-078-18	4531	16-Aug-22	LOCATION
43620	ARCRES HZ SUNRISE K02-35-078-18	4983	16-Aug-22	LOCATION
43621	ARCRES HZ SUNRISE L02-35-078-18	5515	16-Aug-22	LOCATION
43622	ARCRES HZ SUNRISE M02-35-078-18	4706	16-Aug-22	LOCATION
43734	OVV HZ SUNRISE S13-33-078-17	4535	16-Aug-22	LOCATION
43735	OVV HZ SUNRISE T13-33-078-17	6337	16-Aug-22	LOCATION
44089	PETRONAS HZ TOWN A-B066-J/094-B-16	3933	16-Aug-22	LOCATION
44090	PETRONAS HZ TOWN A-C066-J/094-B-16	3801	16-Aug-22	LOCATION
44091	PETRONAS HZ TOWN D-G066-J/094-B-16	3858	16-Aug-22	LOCATION
44092	PETRONAS HZ TOWN D-H066-J/094-B-16	3888	16-Aug-22	LOCATION
44093	PETRONAS HZ TOWN D-I066-J/094-B-16	3761	16-Aug-22	LOCATION
44094	PETRONAS HZ TOWN D-J066-J/094-B-16	3888	16-Aug-22	LOCATION
44095	PETRONAS HZ TOWN D-K066-J/094-B-16	3924	16-Aug-22	LOCATION
44096	PETRONAS HZ TOWN D-L066-J/094-B-16	3797	16-Aug-22	LOCATION
44097	PETRONAS HZ TOWN D-M066-J/094-B-16	5059	16-Aug-22	LOCATION

Source: BC Oil & Gas Commission

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On July 27, Trican seemed to hint something was happening
Our July 31, 2022 Energy Tidbits highlighted comments from Trican in their Q2 call on July 27. We noted that Trican seemed to hint a deal with the Blueberry River First Nations was happening. At that time we wrote "*We couldn't help note Trican's comments on LNG Canada especially their comment that "LNG Canada is point seven of a BCF a day, short on their commitments. And, of course, they can always buy the gas from other, other companies operating in the basin. So be careful not to imply too much from that information." Trican didn't blame it on the lack of a BC/Blueberry River First Nations deal, but, in their Q2 call on Wednesday, highlighted how the lack of drilling in the NE BC Montney area. However, Trican also hinted that something may be happening to allow more drilling. (i) Trican didn't blame the lack of BC deal for the lack of drilling so far, but kind of hinted something may be happening as they expect LNG drilling to do nothing but increase. It's vague but we are hopeful. Mgmt said "It's important to note, LNG activity has started in the field from a drilling perspective, I think we're I think we're all expecting LNG facility and get them out to be on stream, I think in 2025 and the drilling activity now has sort of officially started and from what we understand LNG Canada is behind on their gas production and so we expect that as the months go by the LNG related drilling activity will do nothing but increase."*

Natural Gas – Union tells Shell the deal breaker/maker for Prelude FLNG restart

Shell Prelude FLNG 0.47 bcf/d

The one thing that is clear about the shut-in of Shell's 0.47 bcf/d Prelude FLNG offshore NW Australia is that, from the outside, it's hard to tell how much longer it will last. The latest this week is that the union has reported extended its industrial action to Sept 1, which means that there will be no LNG cargos until at least early September assuming a deal can be reached. The last LNG cargo was July 6. Last week, we thought the bottle was half full because the union didn't continue their messaging warning about the potential for a long term shut-in of Prelude FLNG. And when we looked at the union's Wednesday posting saying they have drawn a line in the sane on job security ie. not outsourcing of union jobs, we saw this as negotiating. We tweeted [LINK] "*Did union give clear deal maker/breaker to #Shell to get its 0.47 bcf/d Prelude FLNG back loading #LNG cargos? "Our Prelude members have drawn a line in the sand on job security" ie. no outsourcing union jobs to contractors. Last loading was July 6. #NatGas #OOTT*." The union's message seemed to be a clear identification for Shell of the deal maker or breaker for the union dispute. The union seems to be giving a pretty clear market for Shell to decide if they want to give in on this item and move to clear up the other lesser items. The union wrote [LINK] "*Our Prelude members have drawn a line in the sand on job security and have this week supported the extension of Protected Industrial Action until our bargaining claims are resolved. The Offshore Alliance and ETU will go one day longer and one day stronger*." Our Supplemental Documents package includes the Union Aug 17 Facebook post.

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Figure 7: Shell Crux Project Overview

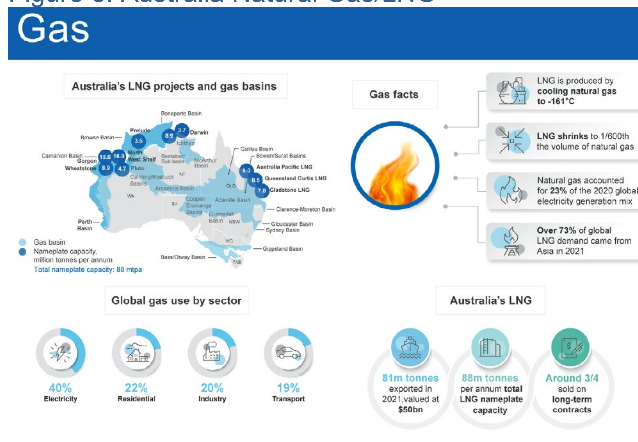
Source: Shell

Natural Gas – Australia La Nina winter brings supply risk to east coast LNG & coal

Australia La Nina risk

On Tuesday, Australia's Bureau of Meteorology moved from a 'La Niña WATCH' to 'La Niña ALERT' with the likelihood of La Niña returning this spring increasing to around 3 times the normal risk. [LINK]. The Bureau also warned "*La Niña refers to changes in sea surface temperatures in the tropical Pacific Ocean, with waters in the eastern Pacific being cooler than normal, and waters in the western tropical Pacific being warmer than normal. Trade winds strengthen, increasing the water moisture in the air, which usually brings rainfall to eastern and central Australia and a wetter start to the northern wet season.*" And "*With wet soils, high rivers and full dams, and the outlook for above average rainfall, elevated flood risk remains for eastern Australia.*" Eastern Australia is the big area for Australia coal exports and also big for coalbed methane gas that supplies the eastern Australia LNG exports. The flooding brings risk to the port export facilities as well as flooding in the field and for rail bring coal to the coast. Below are Australia's gas/LNG and thermal coal maps from its recent Resources and Energy Quarterly June 2022. Our Supplemental Documents package includes the Bureau's La Nina warning.

Figure 8: Australia Natural Gas/LNG



Source: Australia Resources and Energy Quarterly

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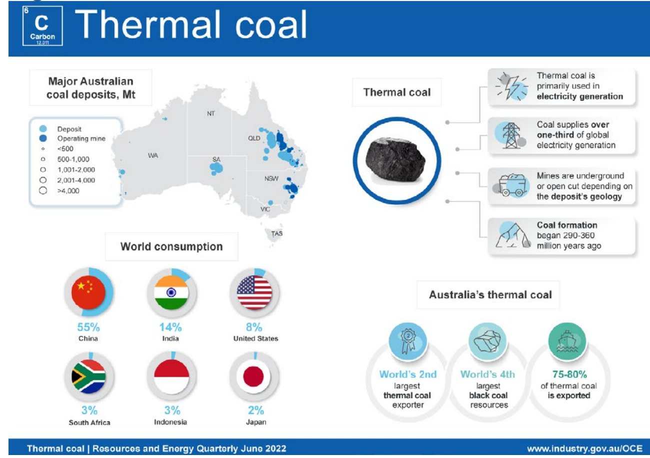
Figure 9: Australia Thermal Coal



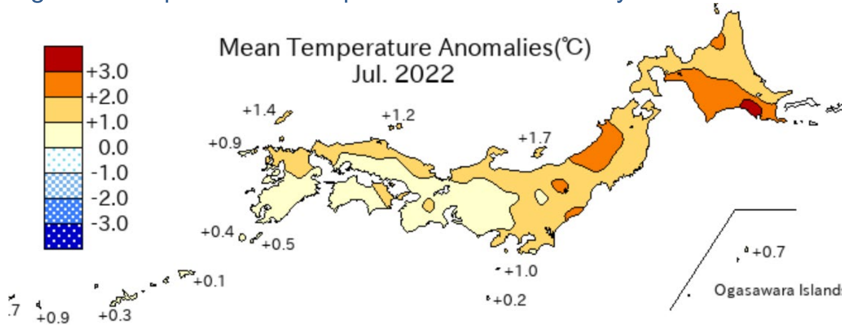
Source: Australia Resources and Energy Quarterly

Natural Gas – Above average weather demand for natural gas in July in Japan

Japan July temperatures

The Japan Meteorological Agency recap of July temperatures in Japan were that there were above normal temperatures for most of Japan ie. providing continuing support for weather related natural gas consumption ie. hot enough to justify air conditioning. On Wednesday, the Japan Meteorological Agency posted its recap of July weather [LINK] and their mean temperature anomalies map (below) shows the mean temperature breakdown for the month. Their recap noted, "*Monthly mean temperatures were above normal nationwide and especially significantly above normal in northern Japan, because warm-air covered from northern to western Japan mainly in early July and Okinawa/Amami after mid-July.*"

Figure 10: Japan Mean Temperature Anomalies July 2022



Source: Japan Meteorological Agency

Japan/Tokyo was early in natural gas conservation and it looks to have worked

Its been very hot in Japan but it hasn't had the normal impact on LNG demand in part due to Japan's early push to cut back on natural gas consumption. Here is what we wrote in our May 15, 2022 Energy Tidbits. "*As noted It was interesting to see Tokyo make a big push on energy conservation, which is a focus we expect other*

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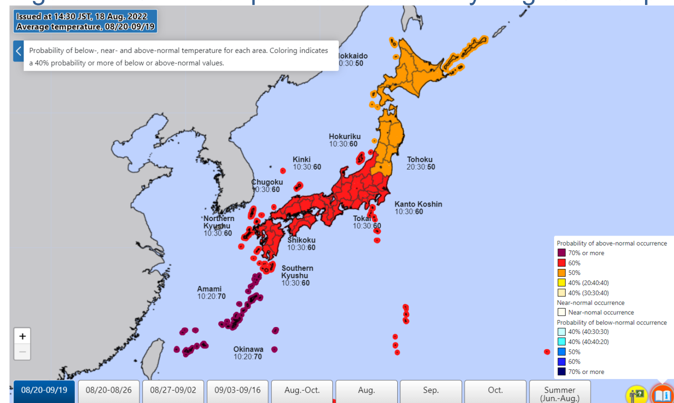
countries/regions to follow. The Tokyo Metropolitan Government [LINK] announced it "will strengthen and accelerate its efforts not only from the perspective of the climate crisis, but also from the perspective of ensuring stable energy over the medium to long term. The point is to reduce power consumption, create it, and store it. The keyword is HTT. From these three perspectives, we need to work together with the citizens of Tokyo and businesses in a total war." We tweeted [LINK] "Tokyo's energy conservation push 👇 will be followed by EU. Also reminds of business trips to Japan post Arab Oil Embargo with office temps set to >80F except it was suits & ties, no suggestion of wearng cool (temp not fashion) short sleeve shirts to work. Thx @shoko_oda #OOTT." A few of their energy saving guidelines were put air conditioning room temperature to 28℃ during cooling times, don't overload the refrigerator, set refrigerator setting to a warmer temp, and the one that got the most headlines was turn off toilet seat heating off. Tied to the warmer room setting, Tokyo also suggested "Cool Biz fashion" showing a picture of short sleeves shirts. There were many other energy saving ideas. Our tweet noted that the higher temperature under air conditioning is much what Japan did post the Arab Oil Embargo."

Natural Gas – Continued hot weather forecast into September in Japan

Still hot in Japan

The hot weather continues in Japan with JMA forecasting warmer than normal temperatures through Aug and into Sept. Hot weather in the summer is always a positive for power demand, but, this summer, the high cost of LNG has pushed Japan's utilities to try to maximize fuel oil and coal for power generation. But still hot weather is positive to Japan natural gas consumption. The Japan Meteorological Agency posted its August 20 to September 19 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 the same depicting hot weather.

Figure 11: JMA Temperature Probability Aug 20 to Sept 19



Source: Japan Meteorology Agency

Natural Gas – Japan's LNG stocks up +1.3% from last week

Japan LNG stocks +1.3% 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

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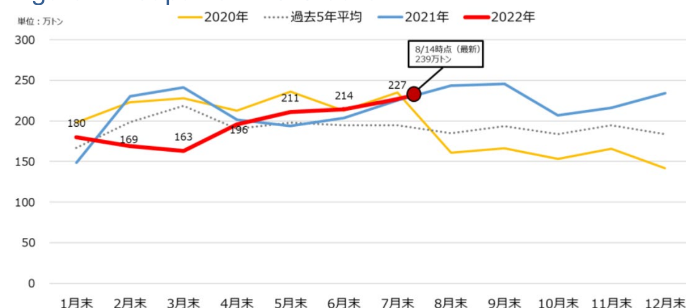
LNG imports that have ranged from 7 to 14 bcf/d since Jan 1, 2021. A cold winter or interruption in LNG imports could easily lead to a shortage. LNG stockpiles held by Japanese power producers have exceeded both last year's level and the 4-year average. Japan's METI weekly LNG stocks data was released on Wednesday [LINK]. LNG stocks at July 31 were ~115 bcf, +3.6% WoW from 111 bcf and slightly down from the 5-yr average of 117 bcf. Below is the LNG stocks graph from the METI weekly report.

Figure 12: Japan's LNG Stocks



Source: METI

Natural Gas – Japan LNG Imports hurt by LNG prices, down -0.4% YoY

Japan July LNG imports -0.4% YoY

Japan, in particular Tokyo, were leaders in pushing their citizens to reduce natural gas consumption. And we believe it has worked. In addition, we have seen Japan utilities try to maximize coal and petroleum products this summer because of very high LNG prices. It's worked. On Thursday, Japan's Ministry of Finance posted its import data for June [LINK]. The MOF reported Japan's July LNG imports were 9.54 bcf/d, down -0.4% YoY and up 2.8% MoM. Thermal coal imports for June were down -4.1% YoY. Normally, we would have expected the hot July and continued hot weather to lead to a big increase in LNG imports. But not this year due to the sky-high LNG prices. Below is our table that tracks Japan LNG import data.

Figure 13: Japan Monthly 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%		
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 – China's LNG imports -10.6% YoY in July

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 higher LNG prices. China customs posted

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China's July natural gas imports split by pipelines vs LNG. The customs data is at [LINK]. The customs data reports China July LNG imports of 7.85 bcf/d, -10.6% YoY and +1.7% MoM. And China natural gas pipeline imports of 6.1 bcf/d, +7.9% YoY and -1.74% MoM. Below are our running tables of China LNG and pipeline imports.

Figure 14: 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%	7.85	-10.6%
Aug	7.26	8.04	10.8%	9.23	14.8%	10.30	11.6%		
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%	8.25	-21.5%

Source: Bloomberg, China Customs

Figure 15: 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%		
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 – Nord Stream 3-day shut down on Aug 31 for servicing/maintenance

Nord Stream 3-day shut down

It's hard to argue with the operating logic for Gazprom's Friday tweet [LINK] "On August 31, 2022, the only gas compressor unit that is currently in operation, Trent 60, will be shut down for a three-day servicing and preventative maintenance period". And this means Nord Stream natural gas supplies will be suspended during the 3-day period Aug 31 to Sept 2. We tweeted the key question on everyone's mind – will it be restarted. We tweeted [LINK] *"Hmmm! #Gazprom says #NordStream to shut down on Aug 31 for 3 days and will resume #NatGas flows at 1.17 bcf/d "provided that no malfunctions are identified". wonder what the betting line is on more than 3 days! #OOTT."* Servicing and maintenance is proper operating procedures for pipelines and Gazprom said "*according to the technical specifications provided by Siemens, the unit must undergo technical maintenance every 1,000 hours*", which is every 41 days. Gazprom's notice closed "*upon the completion of maintenance operations, provided that no malfunctions are identified, gas transmissions will be resumed at the rate of 33 million cubic meters per day.*" The key qualifier being "provided no malfunctions are identified". Our Supplemental Documents package includes the Gazprom notice.

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Looks like Siemens has decided to continue maintenance on Nord Stream
There was a very significant sentence in the Gazprom notice that seems to infer that Siemens Energy (the Siemens affiliated company on Nord Stream) has made the decision to continue its maintenance program on the Nord Stream gas turbines. In its Q2 2022 call on Aug 8, Siemens Energy didn't say this. Rather, they continued to raise questions if they would continue maintenance on the gas turbines on Nord Stream. On Aug 8, mgmt said ""*And as you know, we immediately stopped all new business activities in Russia, and as of July 10th, we stopped almost all business activities in Russia. And I told you before that we are reviewing our business in Russia in light of the sanctions, and we have now decided on restructuring measures for our business in Russia. And we have taken concrete steps to reach an optimal solution by the end of fiscal year. We have pre-agreements in place and are currently finalizing required legal steps in Russia, really, to conclude the business, which means also, obviously, a discontinuation from our side. However, we might continue some existing activities in accordance with elements like, for example, the North Stream-1, maintenance pieces, what has been in discussion each and everywhere to ensure also secure gas deliveries to Europe."* It looks like the decision has been made. We do not believe Siemens would have made this decision without discussion with Germany and others. It's why we tweeted [LINK] "*Did you notice? #Gazprom says #NordStream compressor maintenance "will be performed JOINTLY with #Siemens". Who besides DE signed off on Siemens to do this? Why? Or is this just a test by Putin to see what he can get from the West? Sept 3 will be a day to watch. #NatGas #OOTT."* Gazprom is highlighting Siemens is directly involved. Siemens is a Munich based company, but we have to assume Siemens had discussions with Germany and possibly others. This certainly is a good way for Putin to see what he can get from the west and reaffirm to him that natural gas is a huge panic item for Europe, in particularly Germany. We think it is a reminder that Germany needs Russian pipeline natural gas as long as it can get it.

Natural Gas – Baker Hughes suspended all LNG equipment & services work in Russia

Baker Hughes suspends Russia LNG work

Well it looks like Siemens has decided to continue its maintenance on its gas turbines for Gazprom's Nord Stream gas pipeline. However, the Baker Hughes maintenance on its gas turbines for LNG projects is different and Baker Hughes has made clear comments that there was no maybe's, rather Baker Hughes is out. Here is what we wrote in our July 24, 2022 Energy Tidbits memo on Baker Hughes Q2 results on July 20. "*Baker Hughes reported Q2 on Wednesday. All the analysts focused on the impact of Russia on the financial results, but there didn't seem to be any real market concerns on what Baker Hughes suspension of all equipment and services contracts for LNG in Russia would mean to LNG markets. It is important to note Baker Hughes is clearly stating they have suspended work on all of their "equipment" and "services" contracts in Russia. Think about what is happening with Nord Stream and this is very similar. It's not just supplying new equipment for new LNG projects, but also servicing existing equipment in existing LNG projects. We remain surprised that this isn't a major LNG market focus. Baker Hughes LNG business is within its TPS group. In the Q2 call mgmt. said "In TPS we have suspended work on equipment and service contracts in Russia. As a result, these projects have been removed from RPO and second-quarter revenue was impacted by roughly $160 million but with minimal impact to TPS operating margins." And "So at the beginning of the year, we were expecting, around $300 million of*

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EBITDA for Russia this year and our Russian operations are generally quite accretive to our overall mix really due to the risk premium of operating there as well as some business mix primarily in TPS services as well as in some OFS product lines".

LNG game changer, Baker Hughes stops work on 6.2 bcfd RUS LNG

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

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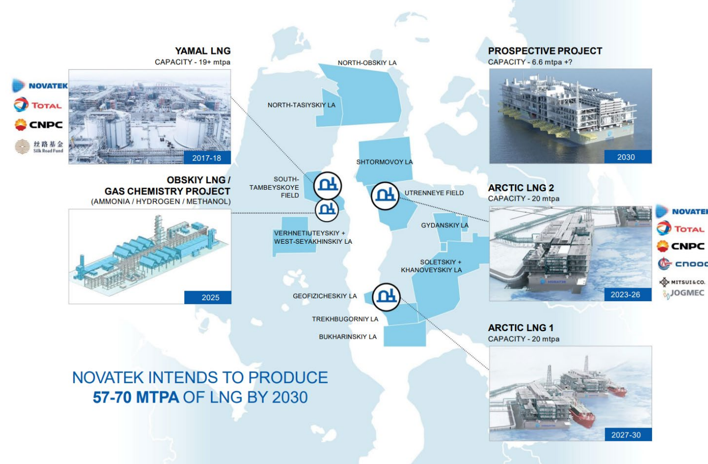
LNG 2 financing scheme, there are no problems with that." Our Supplemental Documents package includes the Kommersant report, and the TASS Friday report.

Figure 16: Novatek's LNG production platform, May 2021



Source: Novatek

Natural Gas – Crazy high European natural gas prices are >$400/boe

As high as the Europe natural gas prices have been, the futures contracts for October is now over $400 per boe (barrel of oil equivalent). Every morning, we look at Bloomberg's LNG Wrap as it includes the prior day's settle price for Dutch TTF natural gas prices (Title Transfer Facility in Netherlands) and JKM LNG price (Japan Korea Marker), which are the two major global natural gas and LNG price indices. On Friday, we tweeted [LINK] *"ICYMI. Dutch TTF #NatGas prices Thurs settle $72.08/mmbtu is >$400 per equivalent barrel of #Oil. This is for Oct shoulder season ie. not too hot/not too cold. Now panic time to cut consumption, switch where possible to #PetroleumProducts #Coal. Thx @MessageAnnKoh. #OOTT*."

Dutch TTF prices for Oct over $72/mmbtu

Natural Gas – Europe storage is now +13.09% YoY ie. 75.89% full vs 62.80%

It looks like the continued strong LNG imports and efforts to reduce consumption are having an 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 gap changed to a YoY storage surplus and it continues to build this week. Europe gas storage started the winter down 18.52% YoY and is now a YoY surplus of 13.09%. Inventories are rising all across Europe, as is normal during spring and early summer. Europe gas storage started last winter (Nov 1/20) at basically full levels at 94.66% and had dropped by 65.77% to be 28.89% at Apr 1/21. Europe storage levels bottomed in late Apr 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 Aug 17 is at 75.89%, which is +13.09% greater than last year levels of 62.80%

Europe storage now 75.89% full

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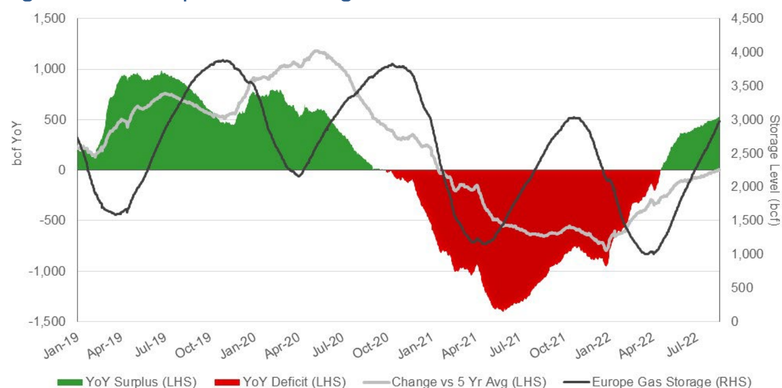
and are +0.11% above the 5-year average of 75.78%. Below is our graph of Europe Gas Storage Level.

Figure 17: Europe Gas Storage Level



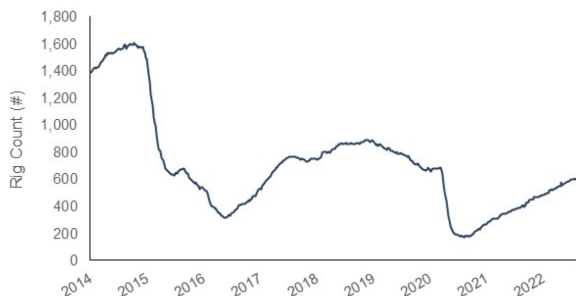
Source: Bloomberg

Oil – US oil rigs flat at 601 oil rigs at Aug 19

Baker Hughes released its weekly North American drilling activity data on Friday. This week US oil rigs were flat at 601 oil rigs. It looks like US oil rigs are in a pause with WTI ~$90 but $9 HH doesn't seem to bring out any more dry natural gas plays. Oil rigs are +429 off the bottom of 172 in Aug14/2020 week. US oil rigs hit their 2020 peak at 683 on March 13 and have since fallen by -82 to 598 oil rigs (-13%). US gas rigs were -1 WoW at 159 rigs as HH still continues to be above $8.

US oil rigs flat WoW

Figure 18: Baker Hughes Total US Oil Rigs



Source: Baker Hughes

Oil – US frac spreads -5 to 280 spreads for the week ending Aug 19

Mark Rossano (C6 Capital Holdings) held his weekly US frac spread recap for the week ending Aug 19 on the Primary Vision network. YouTube video is at [LINK]. For the week ending Aug 19, US frac spreads at the high point in the week were -5 to 280 spreads. Here are some of his comments on the week. It was fairly broad based in where the declines came, a lot of one-offs. He had been expecting an increase this week, but they reviewed the historical data and it should be this week to see an increase. Rossano doesn't expect a huge

Frac spreads -5 to 280

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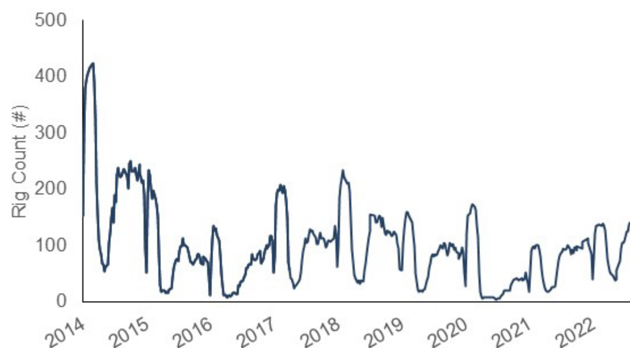
explosion in spreads but should see that pivot and the move back to 295 spreads as we get into September. He had expected to get to 300 to 305 spreads by the end of August, but now that level seems more like middle of September, And he sees that 300 to 305 as the "peak number". Refracs, sees this becoming a more mainstream process over the coming few quarters. Also with the decline in spreads the last few weeks, this should help build up some needed DUCs. My He still thinks current US oil production of 12.2 mmb/d gets to 12.3 mmb/d for the exit rate.

Oil – Total Cdn rigs flat WoW at 201 total rigs, +45 rigs YoY

Cdn rigs flat WoW

Total Cdn rigs were flat at 201 total rigs. Cdn oil rigs were flat at 137 rigs. Cdn gas rigs were flat at 64 gas rigs. It looks like Cdn rigs are in a bit of a pause with WTI ~$90 and the crashing in AECO. Total rigs are now +188 since the June 26, 2020 all-time low. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 95 and Cdn gas rigs were 60 for a total Cdn rigs of 156, meaning total Cdn oil rigs are +42 YoY and total rigs are +45 vs 2021.

Figure 19: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production -0.1 mmb/d at 12.1 mmb/d

US oil production -0.1 mmb/d WoW

US oil production was down -0.1 mmb/d to 12.1 mmb/d for the week ended Aug 12 after an increase last week. Lower 48 production drove total production and was -0.1 mmb/d at 11.7 mmb/d this week, with Alaska having immaterial change. US oil production is up YoY at +0.7 mmb/d, but is still down significantly at -1.0 mmb/d since the 2020 peak of 13.1 mmb/d on March 13. The EIA doesn't provide explanations, but we assume the decline was due to the temporary shut-in of some Shell/Chevron GoM production.

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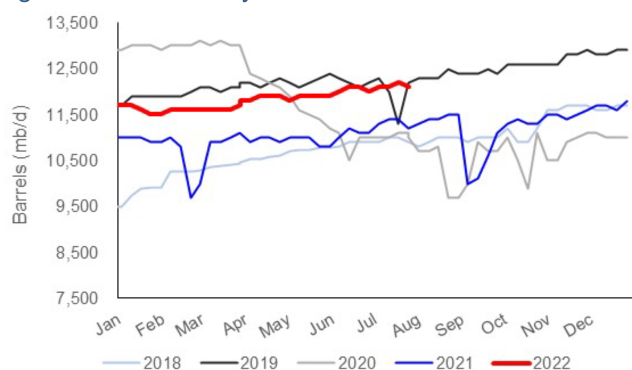
Figure 20: EIA's Estimated Weekly US Oil Production

Year-Month	Week 1		Week 2		Week 3		Week 4		Week 5	
	End Date	Value	End Date	Value	End Date	Value	End Date	Value	End Date	Value
2020-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						

Source: EIA

Figure 21: US Weekly Oil Production



Source: EIA, SAF

Oil – North Dakota June oil production 1.096 mmb/d, up MoM from 1.059 mmb/d in May

North Dakota oil production

On Tuesday afternoon, the North Dakota Industrial Commission posted its Director's Cut, which includes June oil and natural gas production data [LINK]. The headline on the June numbers was that North Dakota June oil production was 1.096 mmb/d, which was up 3.5% from May 2022 production of 1.059 mmb/d. YoY production was down -3.3% from June 2021 production of 1.133 mmb/d. The NDIC reports that well completions were up in July to 74, up from 27 in June and 33 in May. Our Supplemental Documents package includes excerpts from the Director's Cut.

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Figure 22: North Dakota Oil Production By Month

(b/d)	2017	2018	2019	2020	2021	2021/2020	2022	2022/2021
Jan	981,380	1,179,564	1,403,808	1,430,511	1,147,377	-19.8%	1,088,613	-5.1%
Feb	1,034,248	1,175,316	1,335,591	1,451,681	1,083,554	-25.4%	1,089,091	0.5%
Mar	1,025,690	1,162,134	1,391,760	1,430,107	1,108,906	-22.5%	1,122,640	1.2%
Apr	1,050,476	1,225,391	1,392,485	1,221,019	1,123,166	-8.0%	900,597	-19.8%
May	1,040,995	1,246,355	1,394,648	859,362	1,128,042	31.3%	1,059,060	-6.1%
June	1,032,873	1,227,320	1,425,230	893,591	1,133,498	26.8%	1,096,151	-3.3%
July	1,048,099	1,269,290	1,445,934	1,042,081	1,076,594	3.3%		
Aug	1,089,318	1,292,505	1,480,475	1,165,371	1,107,359	-5.0%		
Sept	1,107,345	1,359,282	1,443,980	1,223,107	1,114,020	-8.9%		
Oct	1,183,810	1,392,369	1,517,936	1,231,048	1,111,910	-9.7%		
Nov	1,194,920	1,375,803	1,519,037	1,227,138	1,158,622	-5.6%		
Dec	1,182,836	1,402,741	1,476,777	1,191,429	1,144,999	-3.9%		

Source NDIC, NDPA

North Dakota sees oil production ~1.2 mmb/d next year, ~1.4 mmb/d at peak

We always look to the local North Dakota oil media for extra insights from the monthly North Dakota Director of Mineral Resources Lynn Helms press conference on the monthly North Dakota production data. This week the Williston Herald [LINK] report had a number of good insights that aren't in the monthly Director's Cut report. (i) Helms is projecting production to grow to 1.2 mmb/d within the next year and to 1.4 mmb/d by end of 2020s. When asked about peak production, Helms stated "*no, we really believe that within the next year, production is going to grow to 1.2 million barrels a day. And looking a little bit further out, we think by the end of the 2020s, we can achieve and sustain 1.4 million barrels a day. So it's a slow growth curve."* (ii) The full potential of production continues to be held back by workforce and gas takeaway issues. The article highlighted *"Gas takeaway capacity continues to do well in the state, Helms said, with an average 94 percent capture rate statewide. But the state's oil production is bumping up against its ceiling on gas takeaway. That's a potentially big limiting factor for further Bakken production growth. Natural gas prices are on the one hand providing incentive for industry to continue adding gas takeaway infrastructure, but, in the short-term, it's also an incentive to limit oil production to get attractively priced gas to market. Another thing that's hampering the growth of Bakken oil production right now are continued workforce issues. It takes around two months to hire and train a crew, whether it's a drilling rig, hydraulic fracturing or workover rig crew."* Our Supplemental Documents package include the Williston Herald report.

Oil – North Dakota crude by rail down MoM to 80,222 b/d in June

North Dakota CBR down in June

The North Dakota Pipeline Authority posted its monthly update "*August 2022 Production & Transportation*" [LINK]. Please note that we always go to the backup excel sheets from the North Dakota Pipeline Authority for more detailed numbers of crude by rail out of North Dakota. The NDPA Monthly Update (graph below) report only provides rounded numbers, and these rounded numbers are not accurate enough to match the graphs. In the backup excel, the NDPA estimates crude by rail in June was a low of 65,222 b/d and a high of 95,222 b/d for an average of ~80,222 b/d. This is down from May's low of 80,863 b/d to high of 110,863 b/d for an average of ~95,863 b/d. Note that Junes' numbers were revised down this month. Below is a chart from the NDPA monthly update showing the crude by rail

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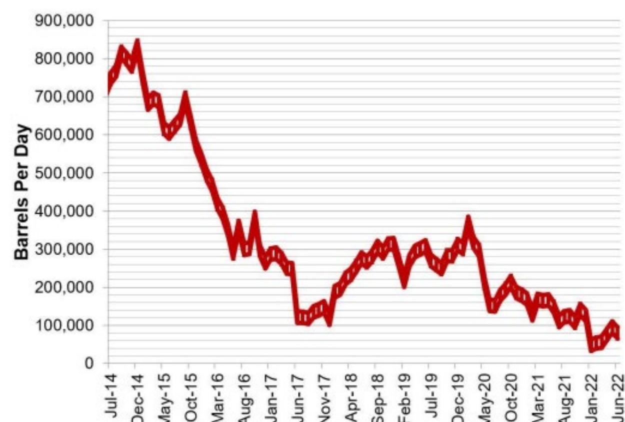
volumes since 2013. Our Supplemental Documents package includes excerpts from the NDPA monthly update.

Figure 23: Estimated North Dakota Rail Export Volumes



Source: North Dakota Pipeline Authority

Oil – EIA shale/tight oil forecast revised down for Aug

US shale/tight oil production

The EIA Drilling Productivity Report Aug 2022 [LINK] forecast for US shale/tight oil saw a downward revision to Aug, with resumed growth in Sept. On Monday, we tweeted [LINK] "*This is a change in a forecast, not actuals, but still notable @EIA revised down its #Permian shale/tight #Oil Aug production estimate from 5.445 mmb/d to 5.329 mmb/d. Have to wonder if they changed forecast assumption because the massive Texas heat wave in July/Aug. #OOTT".* The DPR is the EIA's forecast for production for the major shale/tight oil and gas basins for the current month (in this case Aug) and the next month (in this case Sept). (i) The EIA now forecasts total US shale/tight oil in Aug at 8.908 mmb/d and Sept at 9.049 mmb/d. (ii) The issue is that growth is basically only coming from the Permian basin, which saw the most significant increase of +141,000 b/d MoM to help move production up from the stagnancy forecasted in Aug. The Permian Sept is 5.408 mmb/d, vs 5.134 mmb/d in Feb. Eagle Ford is also up +26,000 b/d, benefitting from its higher natural gas ratio and the pull for natural gas for US LNG exports. (iii) Note that shale/tight oil is approx. ~75% of total US production, so whatever the trends are for shale/tight oil are normally the trends for US oil in total. Below is our table of running DPR estimates of shale/tight oil production and our graph of MoM changes in major shale/tight oil production. Our Supplemental Documents package includes the EIA DPR.

Figure 24: MoM Change – Major Shale/Tight Oil Production

Thousand b/d	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Sept YoY	Sept YoY %	Sept less Aug
Anadarko	369	363	366	378	389	393	399	398	391	406	413	425	431	62	17%	6
Appalachia	125	118	122	120	115	113	113	111	114	124	130	128	131	6	5%	3
Bakken	1,139	1,131	1,137	1,146	1,184	1,192	1,172	1,169	1,172	1,178	1,173	1,136	1,157	18	2%	21
Eagle Ford	1,053	1,076	1,078	1,090	1,104	1,122	1,123	1,140	1,149	1,152	1,180	1,204	1,230	177	17%	26
Haynesville	34	34	34	33	33	33	33	34	35	36	37	37	37	3	9%	0
Niobrara	576	594	608	615	615	611	613	610	627	630	632	649	655	79	14%	6
Permian	4,773	4,826	4,886	4,960	4,996	5,134	5,138	5,055	5,131	5,232	5,367	5,329	5,408	635	13%	79
Total	8,069	8,142	8,231	8,342	8,436	8,598	8,591	8,517	8,619	8,758	8,932	8,908	9,049	980	12%	141

Source: EIA Drilling Productivity Report

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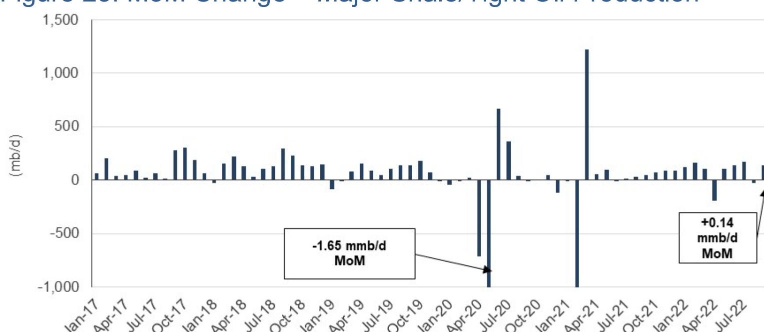
Figure 25: MoM Change – Major Shale/Tight Oil Production



Source: EIA Drilling Productivity Report

Oil – EIA DUC's worked down by 20 in July

DUCs continue to work down

We remind of our previously noted caveat that DUCs do not take into account potential refracs. Plus earlier in the memo, we noted Mark Rossano's comments on how the surprising recent decrease in frac spreads will help a build up of DUCs. But we still believe a key risk to how much US oil production can grow in 2022 and 2023 is the need to increase rig counts (not have less frac spreads) to replenish the inventory of Drilled UnCompleted wells at higher levels and the challenge for oilfield services to add capacity to increase frac spreads and completions. The biggest problem in the past with the EIA's Drilling Productivity Report [LINK] estimate of Drilled UnCompleted wells was that the data had been constantly revised and sometimes significantly. However, the DUC estimates provide a clear picture of the trend since Aug 2020, which is that DUCs continue to be worked down. It's why there is the need for drilling rigs to pick up to replenish the DUC inventory if the US is to have strong oil growth in 2022. (i) It is also important to remember that a portion of the DUCs will never be completed as there are drilled wells that don't look like they can justify the higher cost of completion. (ii) Drilled Uncompleted Wells are down another 20 MoM in July, meaning a total 4,597 DUCs were worked down since the Jun/20 peak of 8,874. The largest work downs are coming from the Permian (-1,052 YoY) and Eagle Ford (-300 YoY). With DUCs being worked down so significantly we will need to see rig counts go up to replenish DUCs in the near future. (iii) Note that shale/tight oil is approx. ~70% of total US production, so whatever the trends are for shale/tight oil are normally the trends for US oil in total. Below is our table of running DPR estimates of shale/tight oil production and our graph of MoM changes in major shale/tight oil production. Our Supplemental Documents package includes the EIA DPR.

Figure 26: EIA - Estimated Drilled UnCompleted Wells

Drilled UnComplete	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	July YoY	July YoY %
Anadarko	856	838	824	812	799	787	773	758	753	740	724	727	723	717	-121	-16%
Appalachia	595	590	588	557	537	513	565	457	473	471	497	526	524	516	-74	-13%
Bakken	619	590	566	541	516	485	464	436	426	426	429	425	427	426	-164	-31%
Eagle Ford	954	912	869	833	796	760	685	683	653	642	612	598	611	612	-300	-36%
Haynesville	399	402	406	396	392	386	372	369	371	395	419	441	466	477	75	20%
Niobrara	373	380	379	375	372	362	354	343	331	317	320	310	328	332	-48	-11%
Permian	2,419	2,249	1,994	1,812	1,669	1,537	1,444	1,482	1,380	1,302	1,294	1,244	1,218	1,197	-1,052	-51%
Total	6,215	5,961	5,626	5,326	5,081	4,830	4,657	4,528	4,387	4,293	4,295	4,271	4,297	4,277	-1,684	-31%

Source: EIA, SAF

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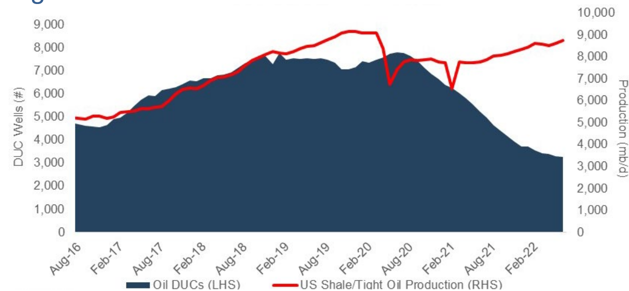
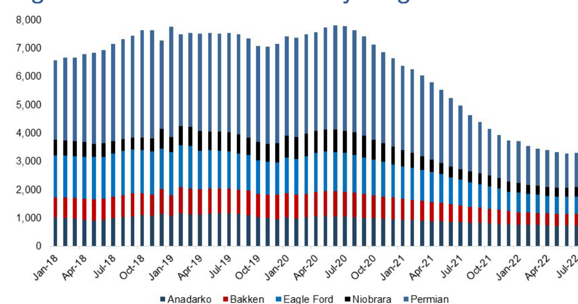
Figure 27: Shale Oil Production vs Oil DUC Wells



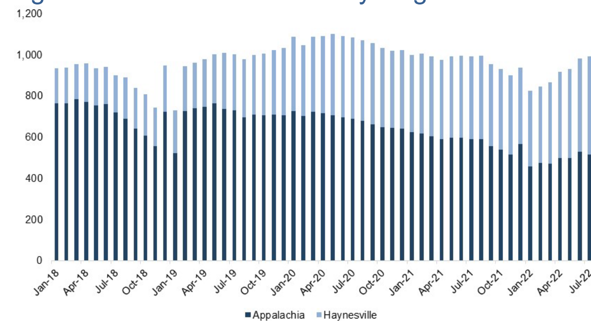
Source: EIA, SAF

Figure 28: EIA – Oil DUCs by Region



Source: EIA, SAF

Figure 29: EIA – Gas DUCs by Region



Source: EIA, SAF

Oil – DUCs do not tell the story as they don't include potential refracs

DUCs do not include potential refracs

Here is what we wrote in last week's (Aug 14, 2022) Energy Tidbits memo. "*We want to highlight that the declining DUCs (Drilled UnCompleted Wells) inventory really underestimate the potential oil production adds from already drilled wells because DUCs do not include potential refracs. Potential refracs are older horizontal producing wells that will be refrac'd. On Aug 9, we tweeted [LINK] "DUCs inventory don't tell the full story as don't incl existing wells that will be refrac'd. Devon's #EagleFord deal incl 350 locations + 150 refrac candidates. Refrac success is now new, see 👇SAF 10/27/19 Energy TIdbits, $CLB highlighted refac in #Bakken #EagleFord. #OOTT." We were reminded of this potential in*

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Devon's Eagle Ford acquisition on Tuesday. Devon's announcement noted "the transaction also adds 350 repeatable drilling locations in the core of the Karnes Trough oil window along with 150 high-quality refrac candidates. This highly economic inventory positions the company's Eagle Ford assets to sustain its high-margin production and free cash flow generation for several years.". The 150 high-quality refrac candidates are likely the 1st and 2nd generation multi-stage horizontal wells that have been drilled, completed and are on production or produced and are currently shut-in. These 150 refrac candidates are not considered DUCs. Our Supplemental Documents package includes excerpts from the Devon release and slide deck on the Eagle Ford acquisition.

Core Labs highlighted Eagle Ford & Bakken refrac success in 2019

Devon's highlighting refract potential shouldn't surprise, especially in the Karnes Trough part of the oil leg. Karnes County has always been considered the prime Eagle Ford oil area. And refrac success in the Eagle Ford (and Bakken) is not new. Here is what we wrote in our Oct 27, 2019 Energy Tidbits. "We were a little surprised that Core Labs Q3 call comments on refracking didn't get any traction. Perhaps its because the impact of refracking success won't really show up for years to come, But Core Labs had bullish comments on the industry refrack success in Eagle Ford and Bakken. We don't expect refrack success will lead to growth in these plays, but it should reduce mid term declines by increasing rate and recovery on old 1st and likely 2nd generation fracked wells. Mgmt said "Moving now to Production Enhancement. Core's Production Enhancement energetics team partnered with one of the world's largest independent E&P companies to develop a breakthrough perforating solution for their mechanically isolated recompletion programs in both the Eagle Ford and Bakken formations onshore U.S. This technology helped the operator minimize risk, improve recovery from existing wells and optimize their return on investment." "The operator has reported the ability to complete double the number of stages per day over conventional perforating techniques. The E&P company has also seen consistent and reliable frac -- fracs from stage to stage and well to well along with encouraging production results. Core's refrac technology breathes new life into the large fleet of older existing wells that were originally under-stimulated. High-quality reservoir rock and the intervals between the original stages can now be tapped, increasing oil recovery and significantly without the expense of drilling and completing an additional well." With respect to the significance to industry, it really doesn't' matter who is the company, But we believe the "one of the world's largest independent E&P companies" refers to ConocoPhillips. In theory, it could be big companies who in both plays like EOG Resources, Marathon Oil, but we think its Conoco even though Conoco has stated clearly Bakken is in plateau production and Eagle Ford is in late stage growth (see our Aug 4, 2019 Energy Tidbits on Conoco's Q2 call). Conoco's regular investor presentations do not mention refracking success, but Conoco held a Feb 19, 2019 "Shale Oil Technical Teach In" that had the below refrack Eagle Ford slide."

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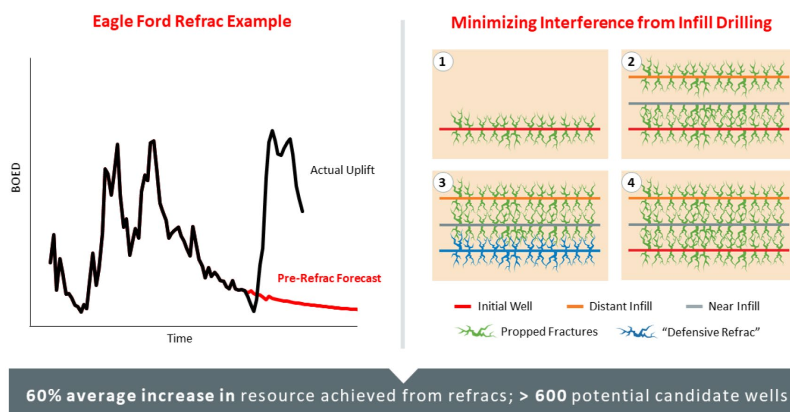
Figure 30: Conoco Eagle Ford Refrac



Source: ConocoPhillips

Oil – EIA either over-estimates US supply or under-estimates US demand by 0.5 mmb/d

US forecast plug is 0.5 mmb/d

The EIA's Drilling Productivity Report only forecasts shale/tight oil and not total US oil production, but, since shale/tight oil represents approx. 75% of total US oil production, it really is representative of total US oil production. It's why we think it is important to remember that the EIA actuals and forecasts for oil have ~0.5 mmb/d plug. Here is what we wrote in last week's (Aug 14, 2022) Energy Tidbits. "*One other reminder when we see any EIA forecast for oil production is that it looks likeIt looks like the EIA's SEO monthly forecasts for US oil supply/demand continue to either overestimate US oil supply or underestimate US oil demand, or a combination thereof by about 0.5 mmb/d. This is for their 2021 historical data and also for their 2022 forecast data. (i) One overlooked item from the EIA monthly Short Term Energy Outlook is their monthly plug to balance out US oil supply and demand. The EIA posted its Aug STEO on Tuesday. (ii) The EIA provides line by line split of crude oil supply items in their monthly forecast. Lines like Lower 48 oil production, Alaska, SPR net withdrawals, etc. There is also the line item "Crude Oil Adjustment (d)". And then a footnote "(d) Crude oil adjustment balances supply and consumption and was previously referred to as "Unaccounted for Crude Oil." (iii) This is a monthly plug item. A positive value means that either supply is over-estimated, demand is under-estimated, or a combination of the two. (iv) The plug for EIA's 2021 forecasts is around 0.50 mmb/d looking back at 2021 US oil supply/demand. The plug for 2022 forecasts was just increased to 0.48 mmb/d for 2022 US oil supply/demand. (v) The interesting part is that the EIA doesn't go back to the prior year to try to zero out the plug on a look back basis. Rather, it just leaves a lookback at the prior year with a plug line item. If you look at the 2021 STEOs in Oct, Nov, Dec, they had a lookback at 2020 with a 0.41 mmb/d plug. If you look at the 2022 STEOS, the lookback at 2021 has a plug of around 0.50 mmb/d. (vi) The other trend in the last two years is that the plug for the current year (ie. the 2021 plug in 2021 STEOs, and the 2022 plug in 2022 STEOs) tends to increase as we get into Q2 of each year. For the 2022 STEOs, the plug is now up to 0.48 mmb/d for 2022 forecast. (vii) The bottom line is that the EIA historical 2021 oil forecast either over-estimated US oil supply or under-estimated US oil demand by 0.5 mmb/d, and it looks*

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like the same factor for its current 2022 forecast. Below is the crude oil adjustment number that has been included in the EIA monthly forecasts going back to its Jan 2021 STEO and continuing to this week's Aug 2022 STEO."

Figure 31: "Crude Oil Adjustment" included in EIA STEO US oil supply/demand forecast

"Crude Oil Adjustment" Incl In EIA STEO US Oil Supply/Demand Forecast						
A positive value means supply is over-estimated or demand is under-estimated						
	2021 STEO			2022 STEO		
STEO Month	2020	2021	2022	2021	2022	2023
Jan	0.38	0.21	0.21	0.48	0.21	0.21
Feb	0.36	0.22	0.21	0.47	0.15	0.21
Mar	0.36	0.21	0.21	0.54	0.14	0.21
Apr	0.35	0.28	0.21	0.53	0.26	0.21
May	0.35	0.30	0.21	0.53	0.39	0.21
June	0.35	0.30	0.21	0.53	0.42	0.21
July	0.36	0.35	0.21	0.53	0.42	0.21
Aug	0.38	0.41	0.21	0.47	0.48	0.21
Sept	0.38	0.41	0.21			
Oct	0.41	0.45	0.21			
Nov	0.41	0.49	0.21			
Dec	0.41	0.47	0.21			
*Crude oil adjustment balances supply and consumption and was previously referred to as "Unaccounted for Crude Oil."						
Source: EIA Short Term Energy Outlook						
Prepared by SAF Group						

Source: EIA STEO

Oil – Santos FIDs 80,000 b/d Alaska Pikka oil development

Santos FID Alaska development

On Wednesday, Santos announced [LINK] a positive final investment has been taken to proceed with the US$2.6b gross (US$1.3b Santos-share) Pikka Phase 1 oil project located on the North Slope of Alaska. The development's expected production is 80,000 b/d with first oil anticipated in 2026. Santos' CEO stated "*Global oil and gas markets are seeing increased volatility and countries are looking to diversify their supply sources away from Russia, which according to the International Energy Agency, currently produces 18 per cent of the world's gas and 12 per cent of its oi. Low-carbon oil projects like Pikka Phase 1 respond to new demand for OECD supply and are critical for global and United States energy security, that has been highlighted since the Russian invasion of Ukraine".* Our Supplemental Documents package includes the Santos press release.

Oil – Refinery inputs -0.158 mmb/d WoW at 16.423 mmb/d

Refinery inputs down WoW

The EIA crude oil input to refinery data is for the week ended Aug 12. This is the season that normally sees increasing processing volumes in Q2 every year, and the EIA reported crude oil inputs to refineries down -0.158 mmb/d to 16.423 mmb/d for the week ended Aug 12 and are +0.417 mmb/d YoY. Refinery utilization was down to 93.5%, which is +1.3% YoY. Note that hurricane season in the US is here, with the official start of the season on June 1. Total products supplied (i.e., demand) increased WoW, up 1.747 mmb/d to 21.221 mmb/d, and Motor gasoline was up 0.225 mmb/d at 9.348 mmb/d from 9.348 mmb/d last week. The 4-week average for Motor Gasoline was down -0.402 mmb/d YoY to 9.064 mmb/d. The 4-week average of Total demand was down -0.662 mmb/d YoY to 20.155 mmb/d.

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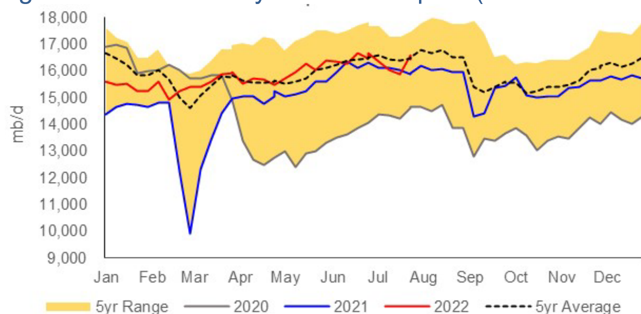
Figure 32: US Refinery Crude Oil Inputs (thousands b/d)



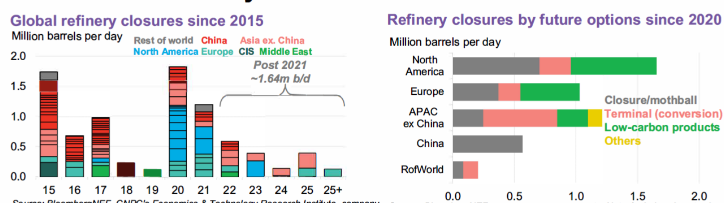
Refinery closures

Oil – BNEF, 4.6 mmb/d of refinery capacity shut down Jan 1/2020 thru 2023

We continue to believe a key oil challenge will be lack of refinery capacity to produce gasoline, jet fuel, diesel, etc. And that, in the near term, this has been made worse by refinery capacity shutdowns. We don't believe western politicians want to focus on the lack of refining capacity because they don't want to support the building of new refineries. It's why they focus on hammering home why doesn't OPEC release more or US drill more oil wells. Plus the closure of refineries in developed countries was driven by ESG pressures as these countries adopted reduced emissions goals. It's why Biden and others don't want to talk about adding needed refinery capacity. On Wednesday, we tweeted [LINK] "*Reminder of #Oil market stress for 2023 if demand recovers back to pre-Covid levels. Refinery capacity actual and planned shutdowns since Jan 1/2020 now 4.6 mmb/d driven by #ESG pressures. Thx @BloombergNEF Sisi Tang for updated list. #OOTT".* BloombergNEF posted a Refinery Closure Tracker that noted there has been 4.6 mmb/d of refinery capacity shut down since Jan 1, 2020. They included the blow graph that notes there is another 900,000 b/d of refinery capacity to shut down by the end of 2023.

Figure 33: Scheduled global refinery closures

Asia leads planned capacity closures, with 900,000 b/d set to shut down by 2025



Source: BloombergNEF, CNPC's Economics & Technology Research Institute, company announcements. Note: CIS refers to the Commonwealth of Independent States. Data include plans to close, convert and mothball. See attached database for more details.

Source: BloombergNEF, company announcements. Note: Includes plans to close, convert and mothball. See attached database for more details.

- More than 1.6 million barrels per day (b/d) of oil refining capacity has been earmarked for closure in the next few years, of which over 900,000 b/d will occur in the Asia-Pacific region. This is in addition to the 3 million b/d of refinery closures in 2020 and 2021, when global oil demand plummeted due to Covid-19.
- Closures in the past two years have led to the recent sky-high refining margins, with refiners like Valero and Marathon Petroleum bagging record profits in the second quarter. However, the short-term windfalls have not slowed down refiners' asset rationalization in the long term. The most recent example is LyondellBasell's 268,000 b/d Houston refinery in the US, which will cease operations by 2023.
- Asia accounts for over half of the planned capacity closures between 2022 and 2025, with more than 500,000 b/d happening in developed economies like Japan, Australia and Singapore due to declining demand and rising competition. China's downstream consolidation will add another 140,000 b/d to the list, making way for the buildout of a handful of megaprojects.
- More refining assets are up for sale as oil companies seek to optimize portfolios to achieve their net-zero targets. Shell and BP are looking to sell their joint venture Sapref, South Africa's biggest refinery. Marathon Petroleum is also in discussions to sell its Kenai refinery in Alaska as the company shifts away from fossil fuels and focuses on renewable fuels. Finding a buyer for refining assets has been increasingly challenging in recent years amid the global green push.

Source: BloombergNEF

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Oil – US "net" oil imports down -2.929 mmb/d WoW at 1.132 mmb/d

US "net" oil imports down WoW

US "NET" imports were down -2.929 mmb/d to 1.132 mmb/d for the Aug 12 week. US imports were down -0.039 mmb/d to 6.132 mmb/d. US exports were up 2.890 mmb/d to 5.000 mmb/d. The WoW decrease in US oil imports was driven by US's Top 10 imports by country which were down by -0.175 mmb/d from Top 10. Some items to note on the by country data. (i) Canada was up this week by 0.104 mmb/d to 3.455 mmb/d. (ii) Saudi Arabia was down -0.168 mmb/d to 0.244 mmb/d this week. (iii) Colombia was up 0.040 at 0.214 mmb/d. (iv) Ecuador was down -0.176 mmb/d at 0.036 mmb/d. (v) Iraq was down -0.018 mmb/d to 0.163 mmb/d. (vi) Mexico was down -0.049 mmb/d to 0.661 mmb/d.

Figure 34: US Weekly Preliminary Oil Imports by Major Countries

(thousand b/d)	June 3/22	June 10/22	June 17/22	June 24/22	July 1/22	July 8/22	July 15/22	July 22/22	July 29/22	Aug 5/22	Aug 12/22	WoW
Canada	3603	3394	3344	2887	3803	3827	3481	3308	3,673	3,351	3,455	104
Saudi Arabia	349	681	760	701	398	634	242	516	500	412	244	-168
Venezuela	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	711	608	374	743	702	610	877	639	815	710	661	-49
Colombia	143	292	228	215	213	213	405	150	328	174	214	40
Iraq	196	555	100	76	362	302	454	165	369	181	163	-18
Ecuador	259	227	124	59	142	149	57	150	243	212	36	-176
Nigeria	194	181	43	201	171	79	136	143	57	161	253	92
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	5,455	5,938	4,973	4,882	5,791	5,814	5,652	5,071	5,985	5,201	5,026	-175
Others	699	1,047	1,253	1,116	1,048	861	867	1,093	1,357	970	1,106	136
Total US	6,154	6,985	6,226	5,998	6,839	6,675	6,519	6,164	7,342	6,171	6,132	-39

Oil – Saudi used 687,000 b/d of oil for electricity generation in June

Saudi summer oil use for electricity

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 June was updated on Wednesday. Saudi used more oil for electricity in June vs May. This is attributed to the warmer temperatures experienced throughout June. June saw varying temperatures that were above average for most of the month. June was 687,000 b/d (vs June 2021 of 586,000 b/d) and May was 582,000 b/d (vs May 2021 of 451,000 b/d). June was above the latest 5 yr average of 551,000 b/d. Below are the AccuWeather Temp maps for Riyadh for June and July MTD. Careful they are different scales but look for oil for electricity to increase as we move further into 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.

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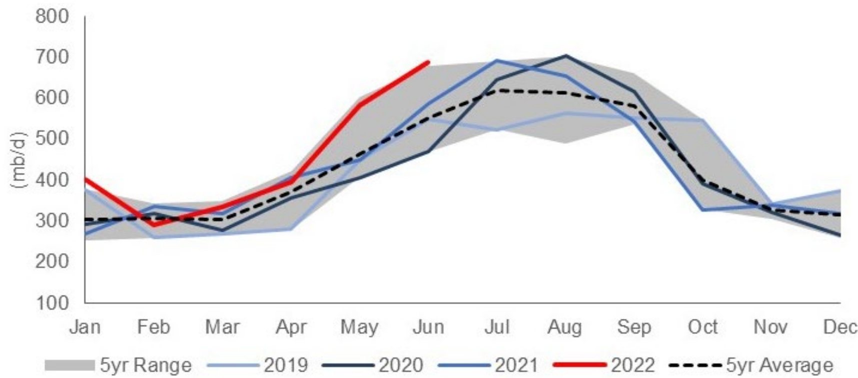
Figure 35: Saudi Arabia Direct Use of Crude Oil For Electric Generation



Source: JODI

Figure 36: Riyadh Temperature Recaps for June and July

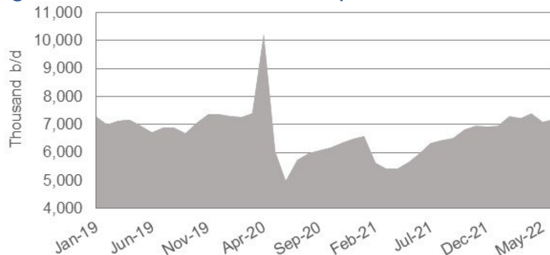
Source: AccuWeather

Oil – Saudi oil exports up 2.1% to 7.196 mmb/d in June

Saudi oil export data for June

The big headline from the JODI data for Saudi Arabia's oil production, export, oil used for electricity, refinery intake, and inventories were on the oil export data. Saudi oil exports in June were 7,196 mmb/d, up 2.1% from a four-month low of 7.050 mmb/d in May.

Figure 37: Saudi Arabia oil exports



Source: JODI

Oil – Saudi oil inventories down -2.574 mmb MoM

Saudi oil inventory data

Saudi oil inventory was -2.574 mmb MoM to 141.847 mmb at June 31, drawing back from May levels which were at their highest since Oct 31, 2020. Last month, our July 24, 2022

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Energy Tidbits memo noted that "*the MoM changes in production, oil used for electricity, oil input into refineries and exports should, in theory, led to inventories being +22,000 b/d for May or +0.682 mmb for the month of May. Yet the JODI reported inventory is +4.842 mmb MoM for May so a plug of 4.142 mmb (134,000 b/d) in May to correct April or March.*"

Figure 38: Saudi Arabia Crude Oil Inventories (million barrels)

Source: JODI

Oil – Aramco CEO says global spare oil capacity is <2 mmb/d & declining fast

Global spare oil capacity is <2 mmb/d

Saudi Aramco released its Q2 results and held its media call early last Sunday morning, but didn't hold its Q2 investor call until Monday morning. (i) We were able to include some Aramco comments in last week's (Aug 14, 2022) Energy Tidbits memo that we titled "*Saudi Aramco CEO Warns "Strained" Global Spare Oil Capacity is <2 mmb/d and "Declining Fast*". (ii) We also were able to get out a tweet early last Sunday [LINK] "*Buckle Up! Available #Oil capacity is declining fast. EU sanctions on RUS #Oil start in Dec. @ArgusMedia reports #Aramco CEO Nasser said "describing "strained" global spare capacity of less than 2mn b/d and "declining fast." Oil looks good for Q4. Thx Ruxandra Jordache #OOTT*." There is a huge question mark on where near term (next 3 to 9 months) increased global oil supply will come to meet still recovering oil demand and the December kick in of EU sanctions on Russian oil. Later in the memo, we noted RBC Helima Croft's comments on these EU sanctions. Yes, US oil supply continues to modestly increase, but Aramco CEO Nasser reminds of our big concern – there isn't much global spare oil capacity. And Nasser says that is less than 2 mmb/d and is declining fast. No surprise, earlier this morning, Saudi Aramco reported blow out Q2 results. Aramco holds its analyst call tomorrow, but held a media call this morning. There is no replay of the media call. But we reviewed as many reports of CEO Nasser's comments. Argus Media was the only one we saw that highlighted Nasser's comments on global spare capacity. Argus reported "*But he flagged supply-side constraints."Ongoing investment in our industry is essential — both to help ensure markets remain well supplied and to facilitate an orderly energy transition," he said, describing "strained" global spare capacity of less than 2mn b/d and "declining fast."* (iii) Nasser reiterated this concern on the Q2 call on Monday morning. We tweeted [LINK] "*#SaudiAramco Q2 call still on. CEO Nasser just reiterated his comments yesterday "today you have less than 2 million barrels a day of spare capacity", not enough for any increase in #Oil demand. Nasser also reminded there are always disruptions to supply. #OOTT*." The full Nasser quote was "*Today you have less than 2 million barrels a day of spare capacity." If demand picks up, you will have no spare capacity and you cannot go thru any disruptions."*

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Oil – Aramco CEO reminds on the reality check of the Energy Transition

We thought Saudi Aramco CEO Nasser made some excellent reality check comments on the energy transition that also point to why oil and natural gas should be stronger for longer. (i) Note that we made transcripts of his key comments. If you go to the Bloomberg transcripts, there are many typos in Nasser's key comments. (ii) We tweeted [LINK] "*Must read! #Aramco CEO Nasser "rest of world will not transition at the same speed as developed world. this is where most of humanity lives". ie. 6.8b of 7.8b world! It's why #EnergyTransition "ambition is years ahead of reality". #Oil #NatGas look good for 2020s. #OOTT.*" And [LINK] "*Also "some fear that anyone who continues to produce oil will be on the wrong side of history. to them i say we believe we are on the right side of reality". Great closing comments by @aramco CEO Nasser on the inconvenient truth on #EnergyTransition. #OOTT.*" Nasser said "At 7:34am MT, Nasser "*our focus remains on providing the reliable, sustainable and affordable energy the world needs. Some might ask why we are so deeply committed to growth and reliability when others are calling for reduced investment in oil and gas. Some fear that anyone who continues to produce oil will be on the wrong side of history. To them, I say that we believe we are on the right side of reality. Just look at the challenges the energy markets have faced in recent months. If alternative energy sources could have shouldered the burden, they would have. But ambition is still years ahead of reality. Longer term, we know the rest of the world will not transition at the same speed as the developed world. This is where most of humanity lives. Most of the roughly 2 billion new energy consumers on the planet by 2050 will be living there too. In short, we know the world is going to need energy from hydrocarbons for many decades to come. That is why we will never back down from our responsibility to the billions of people around the world who depend on us. Or t our commitment to an orderly and sustainable energy transition*."

Aramco reminds of the reality of energy transition

Oil – JCPOA, US says deal is now closer than it was two weeks ago

Our news cut off is 7am MT so we are signing off ahead of the Sunday morning news shows. (i) The White House and US State Dept do not hold Friday press briefings. (ii) But the Biden Administration clearly wanted a message out there on Friday afternoon on the JCPOA, otherwise they wouldn't have had a Senior Administration Official talk to CNN on Friday afternoon. Don't forget that governments often release info on Friday afternoons if they think the info won't go over well. On Friday, we tweeted [LINK] "*#JCPOA. #Oil market should keep pricing in likelihood of a deal as long as signs of progress. Senior Biden adminstration offical tells CNN "while a deal is now "closer than it was two weeks ago, the outcome remains uncertain as some gaps remain." #OOTT.* CNN wrote [LINK] "*Iran has officially dropped a key "red line" demand that had been a major sticking point in efforts to revive the Iran nuclear deal, a senior administration official told CNN. In its Monday response to a draft nuclear deal agreement proposed by the European Union -- which the EU has described as a "final" draft -- Iran did not demand that the Iranian Revolutionary Guard Corps be removed from the State Department's list of Foreign Terrorist Organizations, the official said. "The current version of the text, and what they are demanding, drops it," the official said, noting that the US had repeatedly and consistently rejected the demand. "So if we are closer to a deal, that's why." The Iranians also dropped demands related to delisting several companies tied to the IRGC, the official said. The official added that "the President has been firm and consistent that he will not lift the terrorism designation of Iran's Revolutionary Guards Corps." But the official*

US says JCPOA deal is closer

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said that while a deal is now "closer than it was two weeks ago, the outcome remains uncertain as some gaps remain. President Biden will only approve a deal that meets our national security interests." Our Supplemental Documents package includes the CNN report.

Oil – US says JCPOA big issues are settled, how can the US now walk away?

US says JCPOA big issues are largely settled

We thought US State Dept spokesperson Ned Price's comments at his Tues press briefing seemed to point to more momentum for a return to the JCPOA. (i) Big issues have been largely settled. We tweeted [LINK] "*Hmmm! is this #Biden messaging for return to #JCPOA? Big issues are fine, other items are details? @StateDeptSpox just now "the big issues have been discussed. they have been tabled. We believe they have been largely settled." Seems consistent with 👇Feb 1 tweet. #OOTT*"." We thought it was significant that Price highlighted the big issues have been largely settled. On a massive deal and one of this priority for Biden, we have trouble believing Biden would walk away if the big issues have been resolved. (ii) No greater challenge to US national security. We also tweeted [LINK] "*Hmm! 3 separate @StateDeptSpox comments point to US return to #JCPOA. no greater challenge to US national security than Iran w/ nuke, deal will be dead if no longer in national security interest to pursue, big issues have been largely settled. See 👇 SAF Group transcript. #OOTT."* There were separate comments at the Tues press conference that would seem to point to why it looks hard (nearly impossible?) for the US to walk away now. Price also said there is no greater challenge to US national security than Iran with a nuclear weapon and the JCPOA deal will be dead as soon as it is no longer in our national interest to pursue. If he says the big issues are largely resolved, how can Biden walk away? Our Supplemental Documents package includes excerpts from the Price Tuesday press briefing.

Is this just a ruse to get oil prices/gasoline prices lower for the midterms?
There seems to be a growing view that the US has no intention of getting the JCPOA back in place and that this may be a ruse to get oil prices/US gasoline prices lower for the midterm elections. Perhaps that is so and Biden has been playing chess to others playing checkers for the past 15 months. No question Biden wants/needs lower gasoline prices. But our questioning this thesis is that re-entering the JCPOA was a stated Biden priority long before gasoline prices were a problem. Plus there would also be a huge hit to his Europe relations if they found out that they, along with Iran, were played by Biden especially because Europe has been pressing for the JCPOA return. But you never know, maybe Biden has been playing Iran and Europe and has no interest in a return to the JCPOA.

US previously said would make last minute give on details to get JCPOA done
Our Tuesday tweet attached our Feb 1 tweet, which is the key reason why we thought it was significant to see Price's comments that the big JCPOA issues have largely been settled is because of something they six months ago. And it's why we think it is tough (nearly impossible?) for Biden to walk away if the big issues have been settled. Our Feb 6, 2022 Energy Tidbits memo was titled "*Biden's Team Messages Prepared to Give on "Details" to Get JCPOA Done.*" Here is what we wrote in our Feb 6 memo. **"***JCPOA, US prepared to make last minute concessions to get a deal done. No question it was a week of indicators pointing to a JCPOA deal coming very soon. On Tuesday morning, we tweeted [LINK] "Sounds like #Biden prepared to make last minute concessions to get #JCPOA. "We are prepared to go*

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back into the deal. It doesn't mean that every detail of the negotiation has been resolved from our side, but we are prepared to make those tough choices" US State Dept. #OOTT." Yesterday, we retweeted [LINK] the Tuesday tweet with the message "#JCPOA. #Biden had this briefing on Tues for a reason - he is prepared to give on something to get JCPOA done. Reality is that any give will be messaged as a "detail". #OOTT ." There was a US State Department background briefing on Monday afternoon (not Tues as in my tweet) on JCPOA and it seemed like there must be a reason. Last week's (Jan 30, 2022) Energy Tidbits noted the US official comment that they were "in the ballpark" for a JCPOA deal. At the Monday briefing, the Stated Dept official was specifically asked about the "in the ballpark" comment. The official didn't shoot down or confirm the question of the other US official saying they were in the ballpark for a deal. Rather he talked about making progress but still more work to be done. But then we saw what looked to be the one big opening given by the US as to why there will be a deal. At the start, he stuck to the line that its really up to Iran and that the US will remove sanctions that are inconsistent with the JCPOA. But then there is this exchange that he admits they will have to make some concessions but these are just details. The US State Dept transcript [LINK] has the official saying "Again, your question is kind of a different way to ask the prior question about what we think, where we are in the negotiations, which I don't want to – I'm not going to address outside of the negotiating room. I'd say the decisions that need to be made by the U.S. in order to come back to the deal have been made. We are prepared to go back into the deal. It doesn't mean that every detail of the negotiation has been resolved from our side, but we are prepared to make those tough choices."

Oil – Iran's oil would be a good crude quality replacement for Urals crude to Europe

Iran oil similar to Russia Urals

Here is what we first wrote on this in our March 13, 2022 Energy Tidbits. "*On Wednesday, we tweeted [LINK] on a good reminder from the Gulf Intelligence daily Podcast [LINK] that Iran's crude oil quality would be a good replacement for Russian Urals crude oil to Europe. We tweeted "#JCPOA. Good reminder from @gulf_intel podcast. Matt Stanley @starfuels reminds Iran light matches API and H2S very well and is a good substitute RUS Urals. See below @SPGlobalPlatts crude specs map. #OOTT". Our tweet included the below Platts map that noted crude qualities for Russia were Urals (Primorsk) 31.5 API 1.44% H2S, Urals (Ust Luga) 31.5 API 1.44% H2S, and Urals Gdansk 31.5 API 1.44% H2S, which compares to Iranian Light 33.4 API 1.36% H2S.*"

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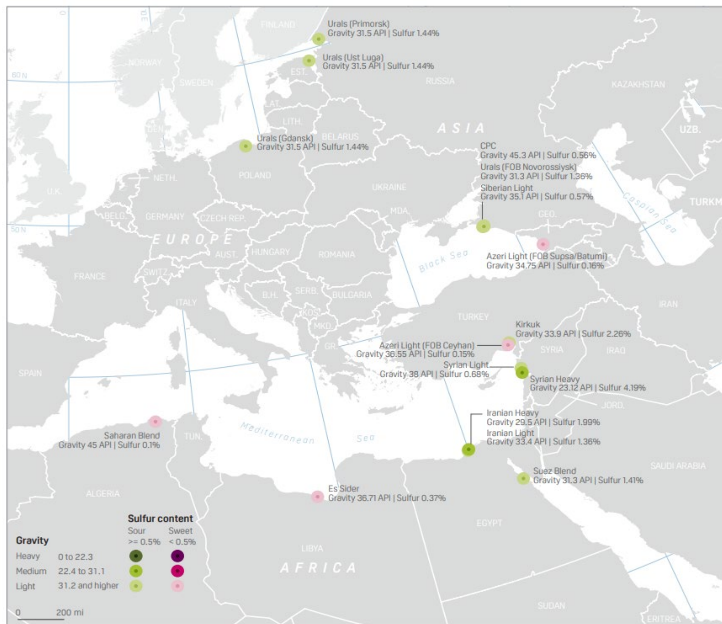
Figure 39: Platts Specifications Guide Europe and Africa Crude Oil



Source: Platts

Oil – Libya oil production was >1.2 mmb/d on Wednesday

Libya oil production continues to be solid post the recent change in the Libya National Oil Corporation management. On Wednesday, the Libya Observer reported [LINK] "*Libya's production of crude oil hit one million and 211 thousand barrels per day on Tuesday, the National Oil Corporation confirms. Earlier, the NOC Chairman Farhat bin Qadara attended a meeting to follow up on the implementation of the extraordinary budget of the state-run company, in the presence of Prime Minister Abdul Hamid Dbeibah. The PM revealed during the meeting a medium-term action plan extending from three to five years, in which all companies present their projects aimed at increasing production rates to two million barrels per day*."

Libya >1.2 mmb/d

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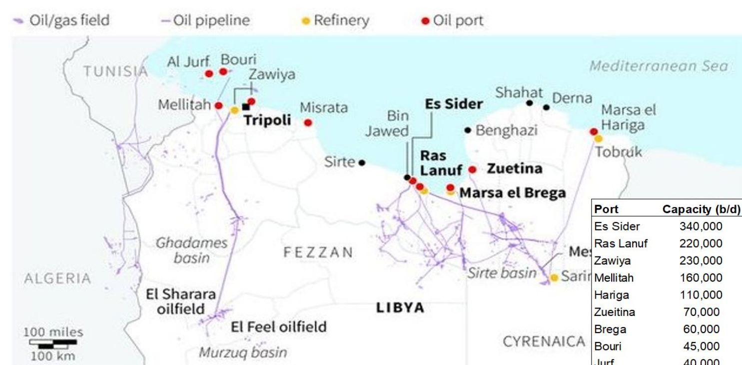
Figure 40: Libya Ports, Major oilfields and Terminals map

SAF Group Compiled Libya Ports & Terminals Status



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

Source: Bloomberg, HFI Research, SAF

Source: SAF Group

Oil – China apparent oil consumption currently down ~1.6 mmb/d YoY

China oil demand -1.6 mmb/d YoY

There is no question that China's zero Covid policy continues to have a significant impact on its oil consumption that Kpler sees is down ~1.6 mmb/d YoY. We were reminded of this by Bloomberg's Tuesday report "*Oil Consumption in China Is Under Threat in Risk to Prices, Oil demand in China, the largest importer, is under threat as the government presses on with strict anti-virus curbs and growth slows. Among warning signs, total oil-product demand may average about 14.1 million barrels a day this quarter, below the average of 15.7 million a day in the same period last year, according to data and analytics firm Kpler. Separately, official figures show apparent crude consumption sank almost 10% in July as refineries handled the least oil on a daily basis that month since March 2020."* When we saw the Bloomberg report, we thought $90 oil is probably higher than most would have expected with China down 1.6 mmb/d/. We tweeted [LINK] "*China apparent #Oil demand -1.6 mmb/d YoY. Combine that with RUS oil not down as much as expected, SPR releases & JCPOA chatter, oil ~$90 is higher than most expect. Thx @sarahchen @business John Liu. #OOTT."* Our Supplemental Documents package includes the Bloomberg report.

Oil – BNEF: global oil and product stocks deficit narrowed

BNEF's global oil inventories

For those with a Bloomberg terminal we recommend flipping thru BloombergNEF's "Oil Price Indicators" weekly that comes out on Mondays as it provides good charts depicting near-term global oil demand and supply indicators. The global oil and products stockpile deficit narrowed for crude and products from 68.2 mmb to 57.1 mmb. The stockpile deficit against the five-year average (2015-19) narrowed from 53.9 mmb to 49.6 mmb. Total crude inventories increased by 0.8% to 640.0 mmb, including global floating inventories. Product stocks were up 0.5% WoW with the stockpile deficit against the 3-year average widening from 57.3 to 57.8 mmb. Gas oil and middle distillate stocks have narrowed against their three-year average deficit (2017-2019) from 39.6 mmb to 38.7 mmb. Jet fuel consumption by international departures decreased by 6,600 b/d WoW while consumption by domestic passenger departures increased by 8,200 b/d. The global mobility index decreased over the past week, down 0.5% in the week to Aug 11. Below is a snapshot of aggregate global stockpiles. Our Supplemental Documents package includes excerpts from the BloombergNEF report.

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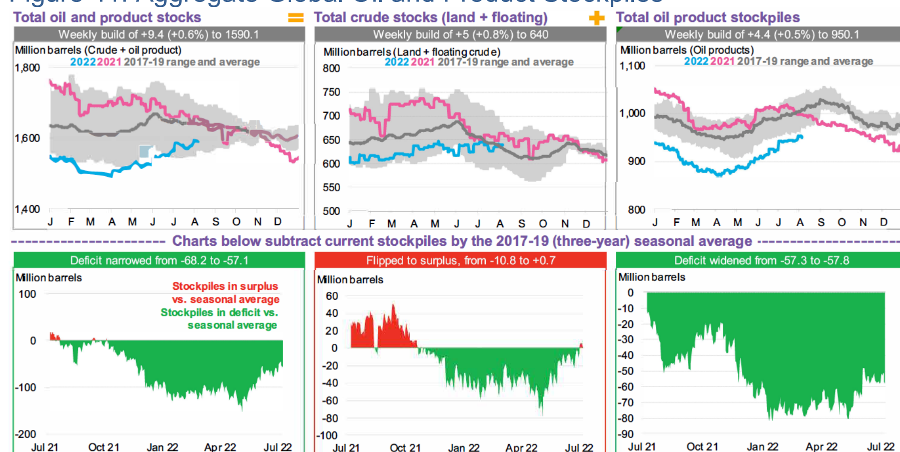
Figure 41: Aggregate Global Oil and Product Stockpiles



Source: Bloomberg

Oil – Vortexa crude oil floating storage 104.63 mmb as of Aug 19, -6.94 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 Noon 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 Aug 13 at noon MT. (i) As of Noon MT yesterday, Bloomberg posted Vortexa crude oil floating storage estimate for Aug 19 was 104.63 mmb, which is -6.94 mmb WoW vs revised up Aug 12 of 111.57 mmb. Note Aug 12 of 111.57 mmb was revised +4.66 mmb vs the 106.91 mmb posted on Bloomberg as of noon MT on Aug 13. (ii) Note that other than the revisions to Aug 12 noted above, the revisions for the prior several weeks were generally +/- 1 mmb. (iii) Prior to the last two weeks estimates, crude oil floating storage was generally back to more like +/- 90 mmb. However the last two weeks are more like +/- 110 mmb. (iv) Also remember Vortexa revises these weekly storage estimates on a regular basis and we do not track the revisions through the week. (v) Aug 19 estimate of 104.63 mm is -118,13 mmb vs June 26, 2020 peak of 222.76 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 late March/ thru late June 2020 as Covid started to have a huge impact. Aug 19 estimate of 104.63 mmb is +57.24 mmb vs pre-Covid on Aug 19, 2019 of 47.39 mmb. Aug 19 estimate of 104.63 mmb is +1.54 mmb YoY vs 103.09 mmb on Aug 20, 2021. (vii) Below are the last several weeks of estimates made as of yesterday at noon MT, Aug 13 at noon MT, and Aug 6 at noon MT.

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Figure 42: Vortexa Floating Storage as of Aug 12 posted on Bloomberg Noon MT yesterday

Source: Bloomberg, Vortexa

Figure 43: Vortexa Estimates Posted Aug 13 noon MT, Aug 6 noon MT, July 30 noon MT

Posted Aug 13, noon MT

FZWWFST VTXA Index 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

Aug 6, noon MT

FZWWFST VTXA Index 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

July 30, noon MT

FZWWFST VTXA Index 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: China outlook drops as US fills up on gasoline

Bloomberg's Oil Demand Monitor

We recommend reading the Bloomberg terminal Oil Demand Monitor for a good recap of key oil demand indicators around the world. The headline this week was that further improvement in gasoline use put US total oil demand firmly back above the five-year average, while China's economy and oil consumption are not growing as rapidly as expected. US oil products and gasoline supplied rose in the week ended Aug 12. Regular gasoline slid below $4/gallon after peaking above $5 in June. Demand in China has been rocky in recent months, coupled with an uncertain trajectory for economic growth as some cities continue to endure coronavirus lockdowns. Covid cases jumped to a three-month high on Wednesday, driven by an outbreak in Hainan province. On one hand, oil demand in China is up 5.5% from the same month of 2019, which is moderately bullish for demand, considering that many other countries haven't reached pre-Covid levels yet. But on the other hand, it's down almost 10% YoY, which is a worrying sign. The worldwide number of commercial flights hasn't changed much over the past four weeks, averaging about 108,000 a day. The seven-day average for Aug 16 was 13% lower than the same period of 2019. Globally, seat capacity is

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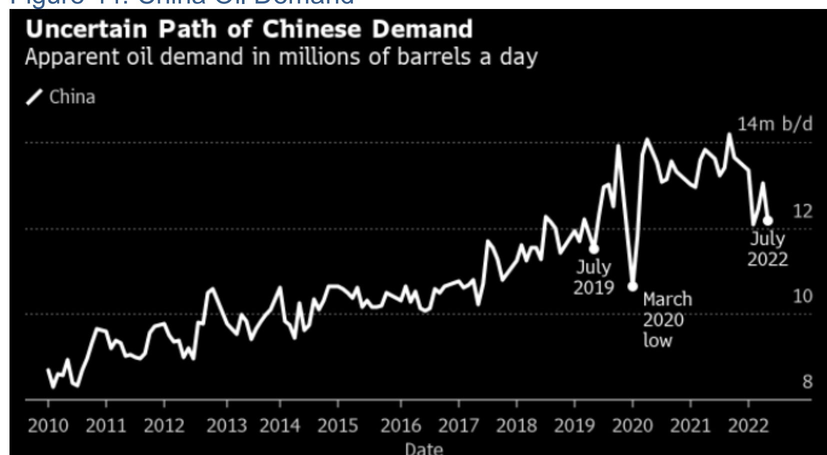
also 13% down from 2019 levels, while about one-third bigger than it was this time a year ago. North East Asia (which includes China) is down most significantly, lagging by 18%. A lack of Asian visitors is holding back passenger numbers at London Heathrow airport, while travel connections to other regions have recovered more fully. Our Supplemental Documents package includes the Bloomberg Oil Demand Monitor.

Figure 44: China Oil Demand



Source: Bloomberg

Oil – Bloomberg: US and Europe weekly jet fuel demand declines

BNEF Aviation Indicators weekly

On Monday, BloombergNEF released their "Aviation Indicators Weekly" report which showed both the US and Europe hitting an inflection point this week. Global passenger jet fuel demand rose by just 0.03% WoW, with the highest increase recorded in Asia Pacific (0.7%). In Europe, departures in the Eurocontrol area were down by 0.4% WoW amid the operational chaos that hit both airports and airlines. US passenger numbers dropped by 1.1 % WoW as the summer travel months peak. Cancellations since the previous week have removed on average 7,957 b/d of jet fuel demand over the next four weeks. The cancellations and delays in Europe and America are driven by staff shortages and operational issues at airports coinciding with the summer boost in flight schedules. In China, the number of scheduled domestic flights is set to increase by 15.2% over the next four weeks. However, this growth may not materialize, as China has routinely cut several thousands of scheduled flights a week or so before the intended departure date. Covid numbers are also rapidly increasing, triggering lockdowns in regions such as the Hainan province. Our Supplemental Documents package includes excerpt from the BloombergNEF report.

Oil – BNEF, North American congestion climbed while China levels slipped

Mobility up in Europe, down in China

Last Thursday, BloomergNEF posted its Global Road Traffic Indicators which highlighted that Europe mobility stopped its plunge as China levels fell on rising Covid numbers. TomTom congestion index showed Europe up 3.0%, Asia Pacific down 6.5% and North America up 8.7% from last week. Europe remains bearish despite the slight increase, subject to drivers responding to very high gasoline prices as North America recovers. China data fluctuates

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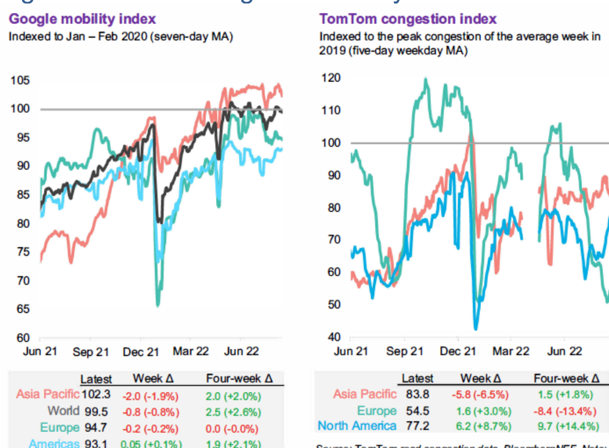
depending on covid restrictions, which tightened recently. Our Supplemental Documents package includes excerpts from the BNEF Global Road Traffic Indicators report.

Figure 45: BloombergNEF Mobility Indicators



Source: BloombergNEF

Oil – It took $5 gasoline to finally have a lower YoY US vehicle miles travelled

US vehicle miles travel in June

When US gasoline prices started to go above $4, our Energy Tidbits memos noted our view that, to the most part, US gasoline consumption is relatively inelastic in the short term. We really weren't expecting any big impact with $4 gas as most driving is essential to lives. It's not like food where people can replace one type of protein with a cheaper protein. Cars run on gasoline. It looks like there wasn't any significant response to US gasoline over $4, but we finally saw support for $5 gasoline did impact driving. And this was before the peak summer driving month, July. On Thursday, we tweeted [LINK] *"#Oil demand response. YoY % increase/decrease in @USDOTFHWA vehicles miles traveled vs @EIAgov US #Gasoline prices. Feb +10.7% v $3.61, Mar +2.9% v $4.32, Apr +1.6% v $4.21, May +1.4% v $4.55, June -1.7% v $5.03. Suggests July should be ~flat YoY with $4.67 gasoline price. #OOTT."* We noted the just issued Dept of Transportation estimated vehicle miles travelled int the US in June and compared to gasoline prices. June 2022 vehicle miles travelled were -1.7% YoY when US gasoline prices averaged $5.03. June 2022 was the first YoY decline since Feb 2021. Below are the DOT monthly vehicle miles of travel data and the EIA US gasoline prices.

Figure 46: 2021 Individual Monthly Vehicle-Miles of Travel in Billions

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2021	231.0	213.0	269.4	259.2	284.3	286.9	296.5	287.4	278.0	285.8	267.7	268.4
2022	240.5	235.8	277.3	263.2	288.2	282.1						
% Change	4.1%	10.7%	2.9%	1.6%	1.4%	-1.7%						

Source: US Department of Transportation

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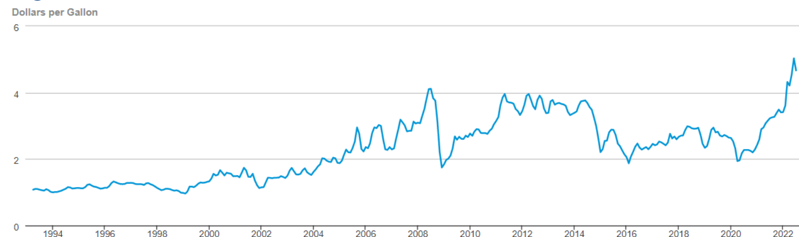
Figure 47: US Retail Gasoline Prices



Source: EIA

Oil – Rhine River water levels doubled this week, another double by Tues

Rhine River water levels up

It may have been too late for Switzerland having to access more of its fuel oil reserves (see below item), but the Rhine River water levels double this week and are set to double again in the next couple days. On Thursday, we tweeted [LINK] "*Should be back to shipping #JetFuel #Diesel #HeatingOil south on #RhineRiver with rising water levels. Looks like Mon/Tues was lowest level at 31 cm (12.2 inch), forecast to rise to double that by Sun. #OOTT*." Our tweet attached Germany's The Federal Waterways and Shipping Administration waters levels [LINK] that morning. We checked again this morning, and the forecast is for another doubling of the Rhine River water levels to increase from 62 cm (24.4 inches) as of 6am this morning to 140 cm (55.1 inches) on Tuesday morning.

Figure 48: Rhine River noting Kaub

Source: EIA

Oil – Swiss to release more fuel oil due to the low Rhine River water levels

Swiss to release more fuel oil

On Friday, Bloomberg reported [LINK] the Swiss government is releasing more fuel than expected before the end of September because of the low Rhine River water levels stopping barging of petroleum products. This should be it with the Rhine River water levels moving

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back up. This week, Bloomberg reported that Switzerland will release another 3 mmb of fuel oil from its strategic reserves. This is on top of the previously announced 1.5 mmb fuel oil release (see our July 24, 2022 Energy Tidbits). This additional 3 mmb draw will take inventories to almost a fifth below mandated levels, following a previous release in July. Our Supplemental Documents package includes the Bloomberg report.

Oil & Natural Gas – BHP CEO reminds Russia impacts oil, LNG but not copper

BHP CEO interview

There was an interesting Bloomberg interview with BHP CEO Mike Henry on Tuesday that we saw as a reminder how Russia impacts resource markets where it is a large exporter (oil, natural gas and LNG) vs markets that Russia isn't really an exports (ie. copper). We tweeted [LINK] "*RUS impact on #Oil/#NatGas vs #Copper. Slowing global economy, but RUS is huge in former so supply shortage. RUS is nothing in latter so @bhp CEO Henry "over the short to medium term, we expect there's going to be a bit of oversupply in copper". @DavidInglesTV. #OOTT.*" This was the thought that came to mind as we heard Henry talk about oversupply in copper since Russia really doesn't export copper. Whereas Russia has caused a panic for supply in oil, natural gas and LNG. We created a transcript of Henry's key comments [LINK]. Bloomberg's David Ingles asks "… *your outlook then on the copper market, do you think we will need more of this stuff these next 12 months or do we have to start paring back our expectations because of the growth outlook*?" Henry "*so, long term outlook for copper is really strong. Both for copper, nickel and, of course, potash. And that's off the back of these unstoppable global trends of decarbonization, electrification, population growth, increasing standards of living. All three of those commodities play to those fanatics. Now what happens over the next 12 months really does depend on that global growth outlook that we were speaking about earlier. We believe China is going to provide a bit of a growth tailwind, but we do expect we will see slowing global growth elsewhere. Over the short to medium term, we expect there's going to be a bit of oversupply in copper, but then towards the tail end of the decade, we expect the markets to move back into balance. the world needs more copper projects and that to be supportive of pricing*".

Oil & Natural Gas – Puerto Rico tends to be a good marker for GoM hurricane risk

Hurricane risk GOM vs Atlantic

It was another week of no hurricane activity in the Gulf of Mexico or for the Atlantic overall. And with the lack of hurricane activity, it seems like every potential disturbance off the west coast of Africa gets a lot of attention. As of our 7am MT news cut off, NOAA is showing one of these disturbances that has a 20% chance of cyclone formation (ie. potential tropical depression, storm, hurricane). But it is more than a week away from reaching the Caribbean assuming it doesn't turn north into the Atlantic. When we see these very very early indications, we remind of a good marker for potential storms to come into the Gulf of Mexico – Puerto Rico. On August 7, we tweeted [LINK] "*Forecasting Atlantic hurricane paths is impossible even for experts. But hurricane risk to GoM #Oil #NatGas #LNG #Refinery tends to increase if hurricanes are south of Puerto Rico. See 👇 excerpt SAF Group Dec 5, 2021 Energy Tidbits [LINK]* #OOTT". 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*."

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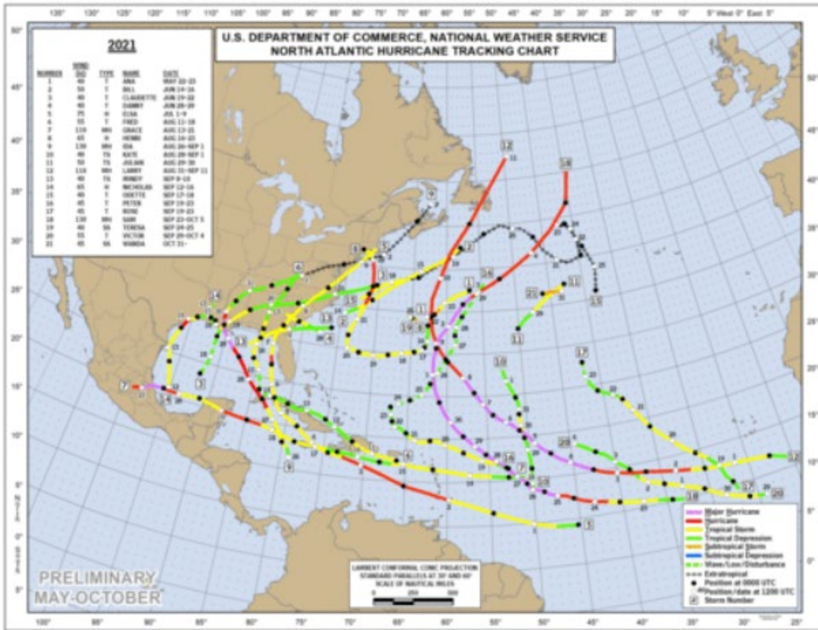
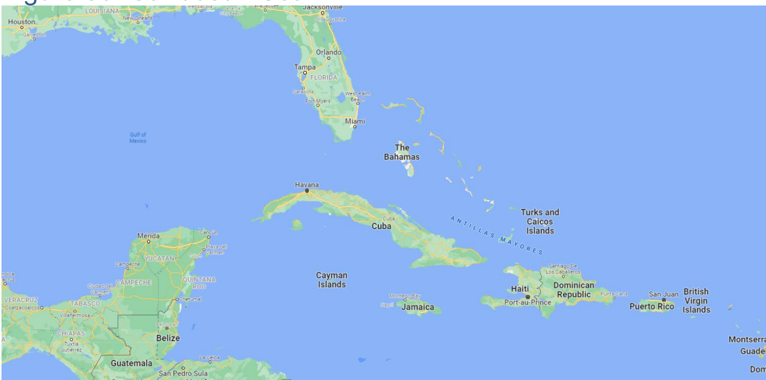
Figure 49: North Atlantic Storm Tracking Map in 2021



Source: National Hurricane Center

Figure 50: Caribbean Sea



Source: Google Maps

Energy Transition – Will Dems Net Zero push be helped by Liz Cheney's loss

Will Liz Cheney help Dems?

sThere was no surprise when Republican lost her primary to be the Republican candidate for the House in the Nov mid-term elections. She was wiped out with only 29% of the vote vs 66% for the winner, Harriet Hageman with 66%. After her loss, Cheney made it clear she wasn't going to fade away into the background. Rather she said ""*Now the real work begins*." As to what that work is, we tweeted [LINK] ""*I will do whatever it takes to ensure Donald Trump is never again anywhere near the Oval Office, and I mean it" says @Liz_Cheney. Have to believe she can, If she impacts Senate/House races, could see continued #NetZero*

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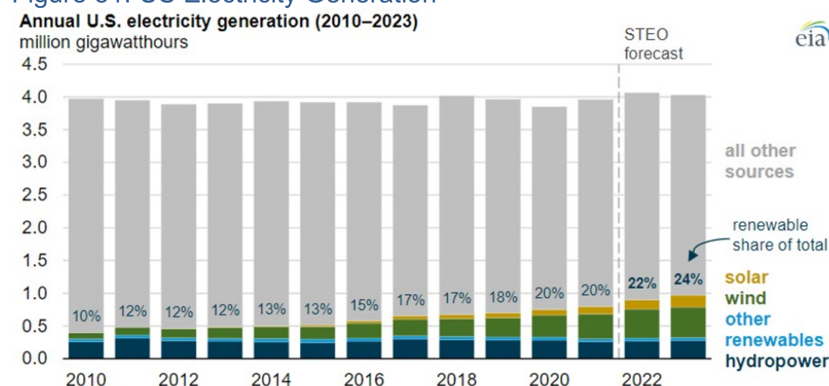
push no matter the energy security/cost risk. #OOTT." The next Presidential election isn't until Nov 2024, but, our tweet included the 1992 race when Clinton won the presidency and only got 43.0% of the vote. But this was the last Presidential election with an independent candidate, Ross Perot, who split the Republican vote getting 18.9% and that meant George Bush only got 37.5% and didn't win re-election as President. If Trump decides to run, we have to believe Cheney would take some Republican votes away and leave the door open for another Democrat to win with a percentage much like Clinton did at 43.0%. We wouldn't expect her to do much in the mid-terms in November against the Republican ticket, but we have to wonder what happens in 2024 in the Senate and House races if she runs as an independent. If she can influence the Senate and House races, it could be a big plus for the Democrats and lead to a continued push on Net Zero even as we are seeing increasing risks to energy security and costs.

Energy Transition – Slow increase of renewables for electricity in US

Slow ramp up in renewables

No one can deny that the Biden administration is trying to drive a huge acceleration in adding new renewable power. But there is also the reality that it is a slow rate of increase. On Tuesday, the EIA posted its blog "EIA expects renewables to account for 225 of U.S. electricity generation in 2022". [LINK] The EIA wrote "*U.S. electricity generation from renewable sources, such as hydropower, wind, and solar, accounted for 20% of electricity generation both in 2020 and in 2021. We expect that share to increase to 22% in 2022 and to 24% in 2023 as more generating capacity from wind and solar come online and other generation sources, such as coal and nuclear, are retired."* It is important to note that the renewable percentage increase is helped by coal retirements. That's a long way away from Biden's goal to have 100% carbon-free electricity by 2035. Our Supplemental Documents package includes the EIA blog.

Figure 51: US Electricity Generation



Source: EIA

Energy Transition – US utility-scale solar projects normally come on later than planned

Solar project delays

There was a good reminder this week that solar power generation additions normally start up later than planned/announced. Last Thursday, the EIA reported [LINK] that 4.2 GW of utility-scale solar photovoltaic (PV) generating capacity came online in the first 6 months of 2022. This is less than half of what the industry had planned to install in those months. From January through June 2022, about 20% of planned solar photovoltaic capacity was delayed

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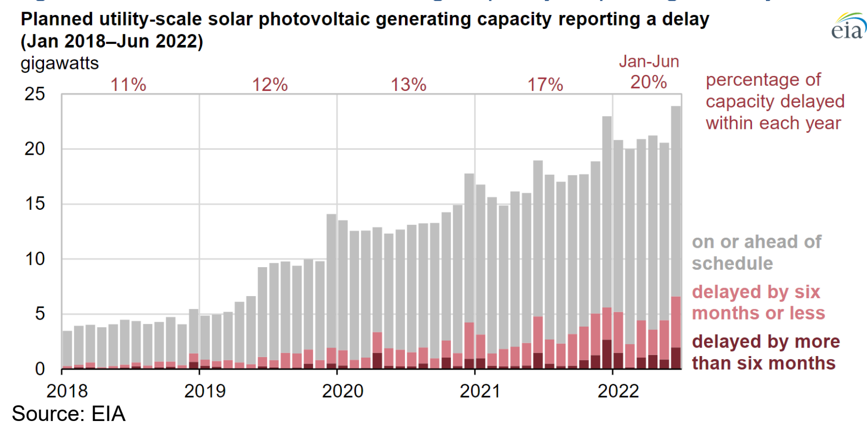
for an average of 4.4 GW each month. The EIA said "*Various factors could cause delays, including broad economic factors, such as supply chain constraints, labor shortages, and high prices of components, and factors specific to electric generator projects, such as obtaining permits or testing equipment*". The US solar market has encountered tariff challenges. In February, the United States extended tariffs on imported crystalline silicon solar products from China. Furthermore, In April, the U.S. Department of Commerce announced an anti-dumping circumvention investigation of solar cells and modules imported from countries that allegedly use parts made in China that otherwise would be subject to tariffs. To advance the deployment of solar, In June, Biden authorized the easing of import duties for a 24-month period for solar cells and modules imported from the countries under investigation and invoked the Defense Production Act to expand domestic production of solar modules. Our Supplemental Documents package includes excerpts from the EIA report.

Figure 52: Planned Solar Generating Capacity Reporting a Delay



Source: EIA

Energy Transition – No surprise, Germany to keep nukes running

Germany keeps nukes running

It won't surprise anyone because the chatter for the past few weeks has been that Germany would be force to postpone the closure of its three nuclear plants if it wants to have a chance at avoiding electricity shortages. We haven't seen any official confirmation, but, on Tuesday, the WSJ reported [LINK] Germany plans to postpone the closure of the country's last three nuclear power plants as it scrambles to replace Russian natural gas. While a formal decision has not yet been made, the government believes two key conditions allowing a temporary extension of the life of the plants have been met: Germany is facing a likely shortage of gas and letting the reactors operate longer poses no safety concern. By allowing the plants, which together account for around 6% of the country's electricity production, to stay online, Berlin would remove the need to replace them with gas- or coal-powered plants. While this is will not save Germany from a natural gas shortage, it will allow gas to be used in areas where it can't be replaced by other fuels. In our Aug 7, 2022 Energy Tidbits memo, we highlighted that German coal plants have already been brought back online to prevent energy blackouts. It is estimated that gas consumption will need to be cut by 20% if Germany is to avoid a gas shortfall this winter and next. There are many technical, political and legal hurdles that must be overcome to keep the plants running, and laws may need to be amended to make it happen. Our Supplemental Documents package includes the WSJ report.

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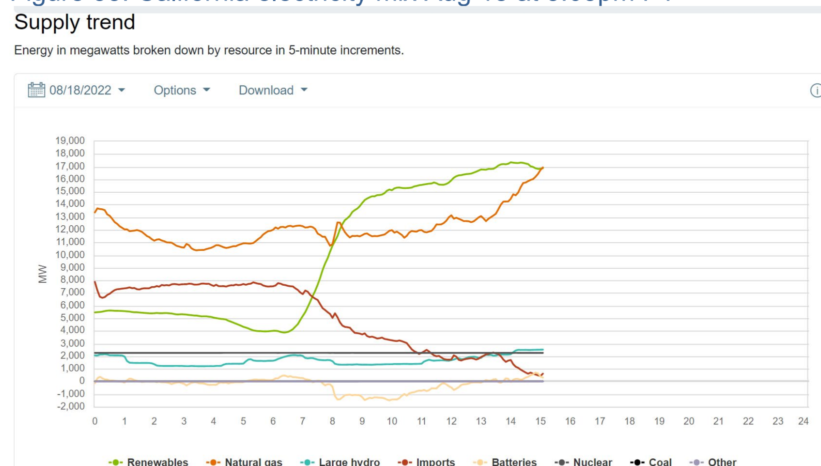
Energy Transition – Natural gas fills the gap for intermittent renewables in California

Natural gas fills the renewable gap

There is no question that California is the most advanced and most ambitious state on its plan to move to Net Zero as fast as possible. But there is also no question that the intermittent nature of renewable energy means it can't provide the reliable, available electricity needed for California. And no change from the past, natural gas steps in to fill the gap. On Thursday, we tweeted [LINK] "*for those who want to follow live @California_ISO #Electricity supply, here is the link. #RenewableEnergy peaked at 2:20pm PT. #NatGas increasing to fill the gap as daily power moves to peak over the next few hours. #OOTT [LINK].*" Our tweet included CAISO's supply mix at Thurs 3:05pm PT. The primary purpose of the tweet was to provide the link because it is expected to continue to be hot in California. Renewables on Thursday 3:05pm had begun its normal daily decline and were ~17,000 megawatts and natural gas was increasing and also ~17,000 megawatts. Below is the CAISO Thursday 3:05pm supply mix.

Figure 53: California electricity mix Aug 18 at 3:05pm PT



Source: CAISO

Capital Markets – Norway fund manager warns of several years of difficult markets

Norway warns on markets

We recognize that there may not be precision in the words in an interview vs what might be said in a scripted company results or outlook, but we wanted to highlight what looks to be a very different view of capital markets. We don't recall seeing other investment managers warn that it could be difficult markets for several years. Again we worry about the precision of the words. But still, it is food for thought as its always good to be challenged in thought from a non-consensus view. On Wed, the FT [LINK] posted a brief report on its interview with Norges Bank Investment Management CEO Nicolai Tangen, who are the manager for Norway's wealth fund. The interview was on the day of the release of the H1/22 performance noted in the following item and was titled "*Norway's oil fund chief warns of tough times ahead for investors*." We tweeted [LINK] "*"i'm worried that we can have tough times for an extended period""i'm more in the several years [of difficult markets] cap. i don't think this is done overnight". Food for thought, hope @NorgesBank CEO Tangen is wrong. Thx @AdrienneKlasa @RobinWigg. #OOTT* ." Tangen warned about difficult markets ahead for

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several years. The FT wrote "*The head of the world's largest sovereign has warned investors against complacency and said they face difficult years ahead, as Norway's oil fund swung to its biggest ever dollar loss in the first half of 2022. "Markets don't go down in a straight line, and I'm worried that we can have tough times for an extended period," Nicolai Tangen, the fund's chief executive, said in an interview with the Financial Times. "There is a risk that we haven't seen the worst yet." The effects of reversing monetary stimulus and low interest rates from the 2008 financial crisis through to the pandemic are so huge that "I'm more in the several years [of difficult markets] camp. I don't think this is done overnight," he added. July's market rally has encouraged some investors, but is likely to be a false dawn, he said. "The market has got one function, and that is trying to steal your money every day. The best way the market could steal your money in July was to rally, so that's what it did," Tangen said."* Our Supplemental Documents package includes the FT report.

Capital Markets – Even oil & gas couldn't save Norway wealth fund's H1 performance

Norway wealth fund's H1 performance

On Wednesday, Norway's wealth fund posted its H1/22 performance. We tweeted [LINK] "*Worst Norway wealth fund performance since 2008 crash. See 👇 12/21/21 thread & SAF Group 12/26/21 Energy Tidbits memo, fortunately they bucked the wave & decided to stay in #Oil #NatGas stocks that, even with Q3 weakness, are only positive performing equity sector. #OOTT*." Norway had a brutal H1/22 to say the least, but it could have been worse. H1/22 performance was -14%, which is the worst since -23% in the global economic crash years 2008. A lot of Norway's poor performance will be seen in other big funds but it will be worse for those funds that got out of fossil fuels as many did in 2021. Norway made a specific decision in Dec to stay in oil and gas, when most big pensions, endowments, etc. last year were getting out of fossil fuels due to ESG. Our Dec 26, 2021 Energy Tidbits memo was titled "*Norway's Wealth Fund is Another Major Investor, Like CPPIB, to Keep Investing in Oil & Gas Stocks*" on this move to stay in oil and gas. For H1/22, Norway's performance was hammered in all areas including equities that were down 17.1% that included all sectors being down in H1/22 other than Energy that was +13.2% in H1/22. Norway also provided the below graph that includes equities up until August 16 that includes the weaker oil stocks over the past month. Even still, Energy is the only up sector. We didn't do a full analysis of all the energy stocks but they clearly have a lot more than oil and gas stocks as three of their energy holdings were up big in H1/22 and, post the recent weakness, are still up strong YTD (to Aug 16) with Chevron +31% YTD, Exxon +44% YTD, Shell +27% YTD. Our Supplemental Documents package includes excerpts from the Norway wealth fund presentation.

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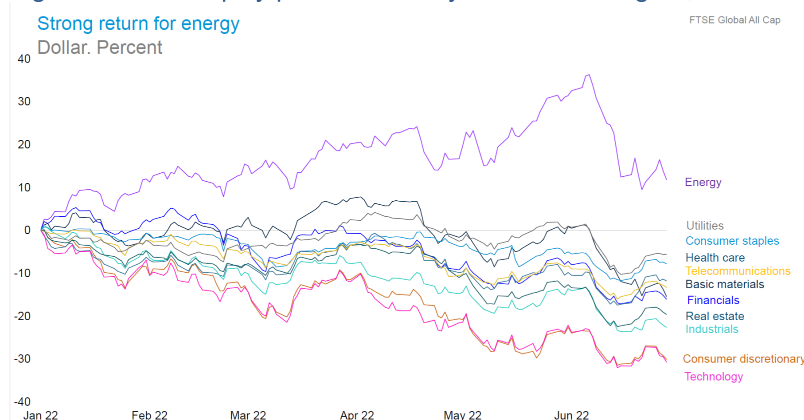
Figure 54: YTD equity performance by sector thru Aug 16, 2022



Source: Norway's wealth fund

Norway's wealth fund Dec 2021 decision to stay in oil and gas

Our tweet included the cover page from 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*". Here is what we wrote in that 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*

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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.

Norway followed CPPIB’s Dec 2021 calling oil & gas a strategic sector
Here is what we wrote in our Dec 19, 2021 Energy Tidbits memo on CPPIB’s Dec 15 “new” investment approach. “*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.*

Capital Markets – US “college endowments post biggest losses since financial crisis”

US endowment funds returns

There was no surprise by the Bloomberg report last week “*College Endowments Post Biggest Losses Since Financial Crisis*”, which to be fair, is not different than what we noted above

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with Norway's wealth fund – the worst performance since the 2008 financial crisis. (i) Our July 24, 2022 Energy Tidbits noted our July 19 tweet [LINK] ""*Ivy League Endowments Brace for Losses With PE Values Tumbling" reports @JanetLorin. The other challenge for these big college endowment funds as hey try to recover form these losses is that most can't/don't invest in #Oil #NatGas for #ESG reasons. Thx @JanetLorin. #OOTT.* Bloomberg highlighted the % of endowment in private equity was Notre Dame 46%, Michigan 42%, Princeton 42%, Penn 36%, Northwestern 36% and Harvard 34%. Our tweet noted that one of the reasons for the weak performance is that most of these endowments don't/can't invest in oil and gas, which has been the best performing sector. Bloomberg wrote "*Princeton, Harvard and Yale generated robust returns for their endowments in recent years, fueled in part by billions of dollars of investments in private equity and venture capital. That golden era appears to be over, at least for now. College endowments across the US are likely to report losses for the fiscal year ended June 30 as valuations for startups and other closely held companies deflate, following a sharp decline in public markets and the end of cheap leverage."* (ii) On Aug 9, Bloomberg reported "*Investments in US college endowments declined the most since the global financial crisis, owing in part to double-digit losses in US equity markets. Endowments lost a median 10.2% before fees for the 12 months through June, according to data to be published Tuesday by Wilshire Trust Universe Comparison Service."* Other than alternatives, most of the other key areas were down. And alternatives was more a product for the large endowment funds and not the smaller endowment funds. Whereas equities, private equity and debt were all down. There wasn't any commentary on the allocation to oil and gas, but, as noted in July 24, 2022 Energy Tidbits, many of the top endowments funds will not invest in fossil fuels. And, as noted in the Norway wealth fund, energy was the only positive equity sector in 2022 for the Norway portfolio. Our Supplemental Documents package includes the Bloomberg Aug 9 report and the Wilshire press release.

Capital Markets – Largest decline in US labor productivity since 1948

US labor productivity

We generally don't include a lot of general economic data points because they generally get a lot of business news discussion. But there was one US economic data point that had to catch everyone's attention when you hear it's the worse since 1948. It was the US labor productivity data. On Aug 8, the U.S. Bureau of Labor Statistics [LINK] reported "*From the same quarter a year ago, nonfarm business sector labor productivity decreased 2.5 percent, reflecting a 1.5-percent increase in output and a 4.1-percent increase in hours worked. The 2.5-percent decline in labor productivity from the same quarter a year ago is the largest decline in this series, which begins in the first quarter of 1948."*

Capital Markets – Higher income shoppers drove the Walmart Q2 results

>$100,000 income going to Walmart

Walmart reported Q2 results and highlighted how higher income shoppers, more than $100,000 household income, drove the strong Q2 results. The other factor is the rise food and other costs hit fast and hard and that drove different spending patterns for all income levels. Walmart benefited by having more higher income shop at Walmart. One other thing is clear from the Walmart comments on their Q2 is that your data is shared. Walmart's comments about different income bracket shopping shows they know a lot about their shoppers even if they aren't members. We reviewed the Q2 call transcript but we saw better insight from the Walmart CEO Dough McMillon CNBC interview on Aug 16. [LINK] We created a transcript of McMillon's key comments. McMillon ".. *It's a conflicting period in terms of the data. If you look at what's happening across categories and across income levels,*

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inflation is having an impact. Particularly for those who don't have as much money. So, we see them behaving in different ways. But we're also attracting a lot of new customers to come to our stores, to our app, to our website. Higher income families are shopping at Walmart because they are so price sensitive right now. We shared earlier this morning that families making more than $100,000 in household income have driven a lot of our growth during this later quarter." CNBC's Courtney Reagan "… *if higher income families are shopping at Walmart too, does that mean the consumer is weak?* McMillion *"I think people are really price focused right now, regardless of income level. And the longer this lasts, the more that's going to be the case. Right around the middle of the first quarter [not clear if he is talking Walmart first quarter Feb-Apr, or calendar quarter Jan-Mar] is when we saw food inflation reach a level where behaviour starting to change. Food inflation in the US started ticking up the fourth quarter of last years. And we thought it would come up a bit more gradually and take more time. But it went up fairly quickly and it went up more than what we expected it to go up. And kind of the middle of March, it got to a level where people making less than $50,000 household income started behaving differently. And then to the $75,000 level and then to the $100,000 level. So food inflation being mid double digits is a challenge. People got to pay for back to school. And everybody wanted to take, a lot of people wanted to take a vacation. So they're prioritizing their spending. And at the bottom of the list starting at the end of the first quarter was the apparel category because they were spending money on other things. That wasn't a total surprise, but the speed with which all this happened, was faster than we expected"*.

Demographics – Now costs $300,000 to raise a child in US

$300,000 to raise a child in US

We suspect parents may not know bother calculating how much it will cost to raise their children because they don't really look at their kids as cost centers. But parents are feeling the impact of high inflation on the cost to raise their children. On Friday, the WSJ posted its report "*It Now Costs $300,000 to Raise a Child A middle-income family might spend more than $18,000 a year on average, as inflation hits food, housing, haircuts and sports, Brookings analysis finds."* [LINK].. No surprise, WSJ wrote "*The multiyear total is up $26,011, or more than 9%, from a calculation based on the inflation rate two years ago, before rapid price increases hit the economy, the Brookings Institution said."* Our Supplemental Documents package includes the WSJ report.

Demographics – Increasing use of cash in UK as way to budget for rising costs

UK using more cash

It was a bit of the back to the future feeling in seeing the UK report of the increasing use of cash as a way to budget in a world or rising costs. The Guardian wrote "*In July, more than £800m in banknotes was withdrawn from Post Office counters, a 20% rise from the same month the year before. Martin Kearsley, banking director at the Post Office, told the BBC: "We're seeing more and more people increasingly reliant on cash as the tried-and-tested way to manage a budget." Since records began five years ago, Post Office withdrawals have exceeded £800m only once before – and that was last Christmas, a time when a lot of cash is tucked into cards. Shortly after UK wages fell at their fastest rate in 20 years, Kearsley said it was clear that Britain is "anything but a cashless society"*. The Guardian also wrote "*In 2020, researchers from Warwick business school analysed more than 300m transactions from 260,000 consumers and found that people with contactless cards spent "significantly more" than those without. Contactless spenders were also more likely to be charged overdraft fees and made more purchases overall. The researchers concluded that*

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contactless: "promotes increased spending and can promote decreased cash usage and increased use of debt." The back to the future feeling came from The Guardian talking about people using the envelope system to put cash into certain envelopes designated for certain items. This was the system that moms used in the 50s and 60s. Of course, that was also before credit cards for most people. The point is that true is that forking over cash gives better appreciation of how much you spending, especially when you can see your cash pile is down. Our Supplemental Documents package includes The Guardian report [LINK].

Capital Markets – Average monthly payment on US car loan is $702 and going higher

American's average car loans

One of the many areas being hit by rising interest rates is car loans and, with interest rates going higher, record monthly payments on car loans will be going up again when the Fed raises rates in September. We haven't followed the US data, but we expect the record monthly payments are leading to increasing car loan defaults. And there were some good do you know data points about US auto loans in CNBC's Monday report [LINK] "*Drivers are paying an average $702 monthly for new cars: Here's why that record high was 'inevitable,' says analyst*." The $702 monthly payment caught our attention as did some of the other data points. CNBC wrote "*Consumers looking to buy a new car may need to clear more room in their budgets for it. For new vehicles, the average auto loan is for 70.4 months (less than two months shy of six years) and monthly payments have climbed past $700 for the first time ever, according to new data from Edmunds. It echoes similar findings included in a joint forecast from J.D. Power and LMC Automotive released in late July."* And "*Higher interest rates for auto loans: The average is about 5.5%, up from 4.5% a year ago, Edmunds data shows. That rate could tick higher, given that the Federal Reserve is expected next month to again raise a key interest rate that many consumer loans derive from."* The debate is not whether the Fed raises rates in September, but will it be a 50 or 75 bps increase. One other data point that we got from Statista [LINK] is that the % of new car purchases in the US that had financing had fallen from its peak of 87.9% Q4/19 to 81.24% in Q1/21. Still, that's 4 out of every 5 new cars has financing. Our Supplemental Documents package includes the CNBC report.

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

@Energy_Tidbits on Twitter

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

LinkedIn – Look for quick energy items from me on LinkedIn

Look for energy items on LinkedIn

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

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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.

Big day for Cdn golfers to get into FedEx Top 30 for $18mm winners purse

It will be another big golf watching day today for Canadian golf supporters with the final round of the BMW Champship, where the top 30 in FedEx points get a chance to play next weekend for the $18 million winner's purse. The field is 70 and gets cut to 30. Going into the final round, Corey Connors is 28th after missing a short putt on 18, Taylor Pendrith is 51st after starting the day 67th, Mackenzie Hughes is 58th after starting the day 52nd, and Adam Hadwin is 60th after starting the day 59th. The annoying thing for Canadian golf fans is how little coverage they give to the Cdn pros. There has to be some reason why NBC Sports consistently does this.

53% of US homes have bacon on hand at all times

Yesterday, August 20, was National Bacon Day and Foodimentary posted a number of bacon facts. One that jumped was that "*More than half of all homes (53%) keep bacon on hand at all times*." That's pretty amazing to see more than half of homes have bacon on hand at all times. A couple other bacon tidbits that may surprise. Foodimentary also wrote "*Pregnant women should eat bacon. Choline, which is found in bacon, helps fetal brain development"* and "b*acon is said to cure hangovers."* Lastly, in terms of volume of bacon consumed, Foodimentary wrote "*each year in the US more than 1.7 billion lbs. of bacon are consumed*", which is approx. 5 lbs of bacon per American. It may be an oldie, but one of the classic bacon comedy routines is from Jim Gaffigan at [LINK].

Canadian National Exhibition, The "Ex" in Toronto reopens post Covid

The summer of re-opening post Covid continued this week with the opening of the Canadian National Exhibition in Toronto. The Ex as it is known in Toronto is the first since Covid and is also what signals the end of the summer as its last day is Labor Day. We are not sure how popular it is now for kids, but it was the event of the summer for most kids in the Toronto region. Everyone has their memories of going to the Ex, but two that have been long gone from the Ex that jump out are the Wild Mouse ride and the Shell Oil Tower. Both were introduced in 1955. The Wild Mouse would be a fairly tame ride by today's standards, but was considered a thriller in the 60s. Every kid know of the Shell Oil Tower at the east end of the Ex as it was always the place that you were told to go to if you got split up from your family or friends.

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Figure 55: CNE ride Wild Mouse and Shell Oil Tower in the 1960s

Source: Facebook, Elevator Scenes

Costco's adult version of Mr. Freeze freeze pops

Summer isn't over, so if you are looking for an adult frozen treat, one to consider is Costco's Kirkland Frozen Cocktails. These are the adult version of the classic Mr. Freeze freeze pops by having 8% alcohol content and, of course, modern flavors like Lime Drop, Strawberry Freeze and Watermelon Hibiscus. One of our neighbours brought a package. The 8% alcohol content compares to 5% for a Molson Canadian or >13% in a Tantalus (Okanagan) reisling.

Figure 56: Kirkland Frozen Cocktails, Mr. Freeze

Source: Costco, Mr. Freeze

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