Energy Tidbits

Aug 1, 2021

Produced by: Dan Tsubouchi

Israel PM: Iran "Carried Out" Drone Attack, "We Know How To Send a Message to Iran in Our Own Way"

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 and not just a specific company results. Our target is to write on 48 to 50 weekends per year and to post by noon mountain time on Sunday.

This week's memo highlights:

1. Will geopolitical risk start to impact oil price following clear warnings from Israel PM Bennett today, Iran carried out the drone attack on Mercer Street products tanker and says "we know how to send a message to Iran in our own way" (Click Here)

2. Curious how Saudi Arabia thwarted Houthis drone attack in southern Red Sea and what type of "commercial vessel" was the target (Click Here)

3. Equinor CEO attributes lowering returns on offshore wind to companies trying to catch up to get wind and having to bid aggressively for seabeds (Click Here)

4. Shell reiterated view that LNG demand to almost double to 2040 (Click Here)

5. A key reason why Cdn public E&P are moving more to take advantage of high oil and gas prices is their low base decline rates (Click Here)

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

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

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Natural Gas – Natural gas injection of 36 bcf, storage now -523 bcf YoY deficit

YoY storage at -523 bcf YoY deficit

The EIA reported a 36 bcf injection (vs 42 bcf injection expectations) for the July 23 week, which was above the 5-yr average injection of 28 bcf, and above last year's injection of 26 bcf. Storage is 2.714 tcf as of July 23, decreasing the YoY deficit to 523 bcf from 532 bcf last week and storage is 8 bcf above the 5 year average vs 13 bcf above last week. The significant YoY deficit along with the forecasted hot summer will help support natural gas prices during the injection season. 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 (07/23/20)		5-year average (2016-20)	
Region	07/23/21	07/16/21	net change	implied flow	Bcf	% change	Bcf	% change
East	583	562	21	21	704	-17.2	636	-8.3
Midwest	702	683	19	19	813	-13.7	715	-1.8
Mountain	184	183	1	1	195	-5.6	181	1.7
Pacific	246	247	-1	-1	313	-21.4	289	-14.9
South Central	999	1,002	-3	-3	1,212	-17.6	1,060	-5.8
Salt	269	279	-10	-10	340	-20.9	283	-4.9
Nonsalt	729	723	6	6	872	-16.4	776	-6.1
Total	2,714	2,678	36	36	3,237	-16.2	2,882	-5.8

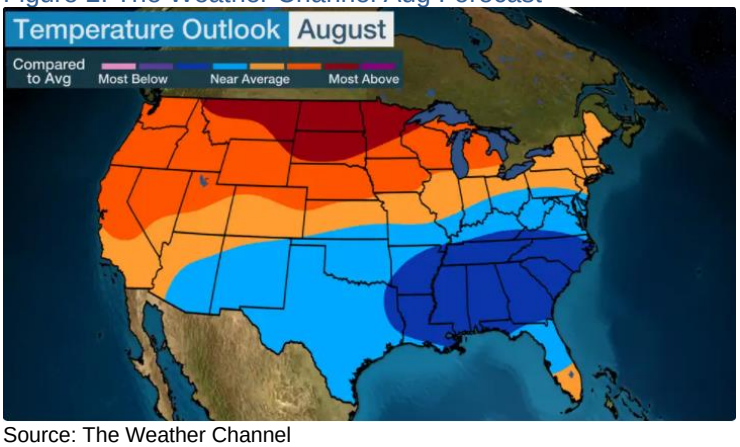
Source: EIA

Natural Gas – Aug temp outlook looking similar to July, warm but not as hot as 2020

Aug expected to be warmer than normal

We continue to see near term US weather forecasts that are supportive of the current very strong HH gas prices. On Friday, The Weather Channel posted an updated forecast for Aug temperatures [LINK]. They said that the Weather Channel espects August will follow along the same trend they have been seeing since summer began, ie. hot in Northern and Western US, and normal-cooler temperatures in the South. While Aug is expected to be warmer than normal, it likely will not be as hot as August 2020, which was the 3rd hottest in the last 126 years [LINK].

Figure 2: The Weather Channel Aug Forecast



Source: The Weather Channel

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The last 10 days of July were very hot in the south

We just thought we would should note that the Weather Channel forecast above said August would be more of the same with cool in the south. That was the same as their July forecast. We checked the AccuWeather daily temperatures vs normal for key cities in Texas, Louisiana, Mississippi, Alabama and Florida and no question the first 3 weeks of July were below normal temperatures in the south. But the last 10 days of July saw all with daily highs and daily lows well above normal. In fact, the Weather Channel's maps with daily highs above 90F supported this heat wave in the south in the last 10 days of July. The maps were much like the July 26 map below

Figure 3: Weather Channel July 26 Heat Map for July 27

Source: Weather Channel

Natural Gas – US May gas production up 4.59 bcf/d YoY, basically flat MoM

US May gas production up 4.59 bcf/d YoY

EIA released its Natural Gas Monthly on Friday [LINK], which includes its estimates for "actuals" for May gas production. US gas production in May was 92.4 bcf/d, up 0.054 bcf/ MoM from Apr of 92.3 bcf/d. The big YoY declines had been falling pre-Feb (ie. Jan was down 2.6 bcf/d YoY vs Oct being down 6.4 bcf/d YoY) but Feb saw a YoY decline of -8.8 bcf/d with the extreme weather. March's YoY decline of 2.5 bcf/d restarted the declining trend in the deficit, and April continued with only a -0.4 bcf/d deficit. As expected, the YoY declines were gone this month, and we saw a YoY increase of 4.59 bcf/d. We expect the YoY increases to continue through the summer. While the price support from YoY declines in production is being eroded, some level of support thru injection season remains with lower YoY stocks. May production is down 4.04 bcf/d since the Nov/19 peak of 96.4 bcf/d and still 2.2 bcf/d below March 2020 of 94.6 bcf. Below is our running table of US dry natural gas production. Our Supplemental Documents package include excerpts from the EIA Natural Gas Monthly.

Figure 4: US Dry Natural Gas Production

bcf/d	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Jan	56.0	60.0	65.9	65.3	67.8	72.6	73.8	71.0	77.9	88.6	95.1	92.5
Feb	57.3	58.8	65.2	65.9	67.5	73.7	74.7	71.6	79.4	89.4	94.7	86.0
March	57.3	61.5	65.1	65.4	68.2	74.1	74.0	73.3	80.2	89.9	94.6	92.0
Apr	57.6	62.3	65.4	66.0	68.6	75.0	73.8	73.4	80.4	90.4	92.9	92.3
May	58.0	62.4	65.6	66.3	69.5	74.2	73.5	73.3	81.3	89.9	87.8	92.4
June	57.2	62.1	65.4	66.3	69.8	74.3	72.5	73.8	81.8	91.2	88.4	
July	58.3	62.5	65.8	67.0	70.6	74.3	73.1	74.7	83.4	91.3	89.8	
Aug	58.9	63.2	65.4	67.0	71.6	74.3	72.3	74.7	85.2	93.3	90.2	
Sept	59.1	63.1	66.2	67.2	71.7	75.0	71.9	75.8	86.4	94.2	89.5	
Oct	60.1	65.1	66.5	67.6	72.2	74.1	71.4	76.9	87.2	95.4	88.9	
Nov	60.1	65.9	66.6	68.6	73.1	74.1	72.1	79.0	88.6	96.4	92.0	
Dec	61.0	65.6	65.8	66.6	74.7	74.0	71.2	79.5	88.9	95.6	92.5	
Average	58.4	62.7	65.7	66.7	70.4	74.1	72.8	74.8	83.4	92.2	91.4	

Source: EIA

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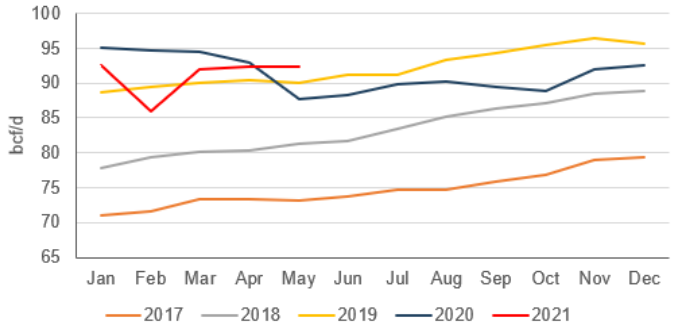
Figure 5: US Dry Natural Gas Production



Source: EIA

Natural Gas – US LNG exports flat MoM at 10.2 bcf/d in May

US May LNG exports +4.3 bcf/d YoY

The other big support for US gas prices, other than the Feb freeze, has been stronger YoY US LNG exports. The EIA Natural Gas Monthly also reported "actuals" for US LNG exports, which were 10.2 bcf/d in May, which is +4.3 bcf/d YoY and was basically flat from April of 10.2 bcf/d. There was still some maintenance impact on May. Note our table rounds to one decimal and the actual is 10.159 bcf/d for May. Below is our table of EIA's monthly LNG exports.

Figure 6: US LNG Exports (bcf/d)

(bcf/d)	2016	2017	2018	2019	2020	2021
Jan	0.0	1.7	2.3	4.1	8.1	9.8
Feb	0.1	1.9	2.6	3.7	7.8	7.6
March	0.3	1.4	3.0	4.2	7.9	10.2
Apr	0.3	1.7	2.9	4.2	7.0	10.2
May	0.3	2.0	3.1	4.7	5.9	10.2
June	0.5	1.7	2.5	4.7	3.6	
July	0.5	1.7	3.2	5.1	2.7	
Aug	0.9	1.5	3.0	4.5	3.6	
Sept	0.6	1.8	2.7	5.4	5.0	
Oct	0.1	2.6	2.9	5.7	7.2	
Nov	1.1	2.7	3.6	6.3	9.4	
Dec	1.3	2.7	4.0	7.1	9.8	
Full Year	0.5	1.9	3.0	5.0	6.5	
Full Year bcf	186	708	1,084	1,817	2,390	

Source: EIA

Natural Gas – US May LNG exports top destinations favoured Asia

May export volumes reach record of 10.2 bcf/d

The US Dept of Energy also posts a DOE LNG Monthly report [LINK] that has more details on LNG exports by cargo. Increasing US LNG exports has been a significant driver of HH strength in 2021 with exports reaching record highs. LNG exports reached 10.2 bcf/d in May, +72.8% over 5.9 bcf/d in May 2020. LNG exports to Asia dominated the top 5 with South Korea receiving the most at 1.5 bcf/d, China the second most at 1.22 bcf/d, India the third most at 0.91 bcf/d and Japan the fifth most at 0.81 bcf. Within the top 5 was also the Netherlands at 0.86 bcf/d. These top 5 export countries represented 51.0% of total US LNG exports in May. Our Supplemental Documents package includes excerpts from the DOE LNG Monthly.

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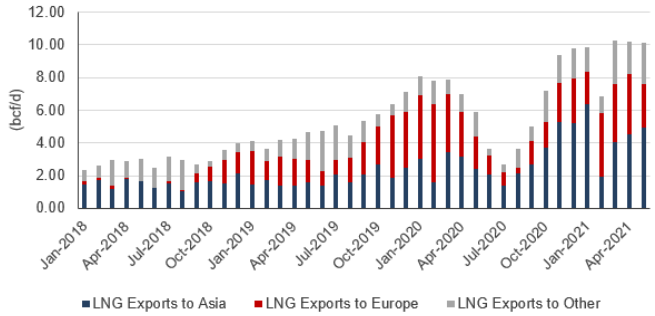
Figure 7: US LNG Exports by Destination



Source: EIA

Natural Gas – US pipeline exports to Mexico +0.1 bcf/d MoM to record 6.1 bcf/d in May

US May pipeline exports to Mexico +0.1 bcf/d MoM

The EIA Natural Gas Monthly also provides its "actuals" for gas pipeline exports to Mexico, which were 6.1 bcf/d in May, which is a new record and was +1.4 bcf/d YoY and up 0.1 bcf/d MoM from 6.0 bcf/d in May. Mexico natural gas production remains stuck below 5 bcf/d and the completion of new pipeline infrastructure such as the Wahalajara system [LINK] increases US penetration further into Mexico. Below is our table of the EIA's monthly gas exports to Mexico.

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

bcf/d	2014	2015	2016	2017	2018	2019	2020	2021
Jan	1.7	2.2	3.2	3.9	4.4	4.9	5.2	5.6
Feb	1.8	2.3	3.4	4.1	4.5	4.8	5.2	4.4
March	1.9	2.4	3.3	4.2	4.3	4.8	5.4	5.9
Apr	1.9	2.6	3.5	3.9	4.4	4.7	4.6	6.0
May	2.0	2.8	3.7	4.2	4.4	5.0	4.7	6.1
June	2.2	3.0	3.9	4.5	4.6	5.2	5.4	
July	2.2	3.3	4.0	4.4	4.9	5.4	5.8	
Aug	2.1	3.3	4.3	4.4	5.0	5.4	6.0	
Sept	2.2	3.3	4.1	4.2	5.0	5.4	6.0	
Oct	1.9	3.2	4.2	4.3	4.9	5.5	6.0	
Nov	1.9	3.0	4.0	4.5	4.7	5.3	5.5	
Dec	2.1	3.2	3.7	4.4	4.5	4.9	5.3	
Full Year	2.0	2.9	3.8	4.2	4.6	5.1	5.4	

Source: EIA

Natural Gas – Reminder added processing costs for Permian associated natural gas

Sweetening sour associated gas from the Permian

It's a good thing that the Permian is well located close to export markets either to Mexico via pipeline or to the Gulf Coast for LNG exports because there are added processing costs for the associated natural gas. We are big fans of RBN Energy as they provide good drill down detail on oil and natural gas issues. There was another good RBN Energy blog on Wednesday "*'Sweetening' Sour Natural Gas And Sequestering CO2 In The Permian*" [LINK]. It detailed a new project, Dark Horse, by Pinon Midstream which has been under construction for the past few months is set to start operating in early August. The central aspect of the project is the Dark Horse Treatment Facility, a large, centralized amine treatment and carbon capture facility, which will provide producers in the Delaware and Central basins of the Permian with i) a centralized gas-sweetening service ii) an ability to capture and sequester the H_2S and CO_2 that gets removed from the associated gas from those wells. The associated gas from these basins in the Permian has high levels of hydrogen sulfide and carbon dioxide, which has to removed – "sweetening" gas – before it can be piped to gas processing plants. One of the common practices is to inject a "scavenger", or speciality chemical, into the gas stream, which converts the H_2S into a to a harmless product. While this practice has low up-front capital costs, the scavenger chemical is very expensive and large volumes are often needed, so this can become cost-prohibitive; it can as much as $2 of

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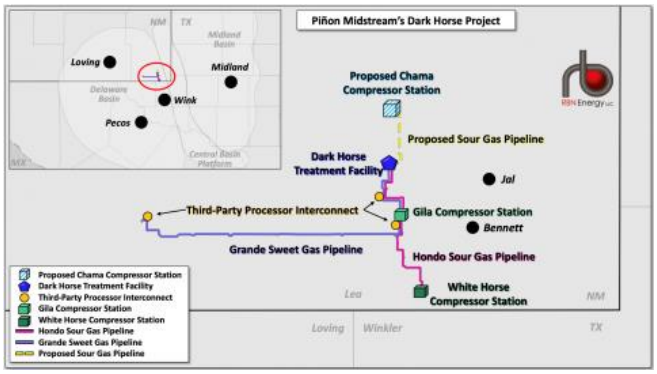
$3/Mcf. As a result, producers tend to just avoid areas where gas is very sour. Dark Horse will use a different method to sweeten the gas: running the gas stream through an amine solution, which strips out the H_2S and CO_2. Typically, in amine treatment facilities the waste H_2S and CO_2 is flared off into the atmosphere or injected deep into the earth, but Dark Horse plans to handle it differently. At Dark Horse, the waste products will be compressed and injected in the a sequestration well that has the capacity to store up to 175,000 tons of each substance. The pipelines of the project were designed to be able to handle the most acidic gas so it can also handle more sour gas than the average on-site facility can. Our Supplemental Documents package includes the RBN blog.

Figure 9: Map of Dark Horse's Facility



Source: RBN

Natural Gas – Mexico's natural gas production still stuck below 5 bcf/d, -0.6% YoY

Mexico natural gas stuck below 5 bcf/d

Pemex reported its June oil and gas data on Wednesday. One of the key Mexican energy themes for the past 3 years has been that Mexico has been unable to grow domestic natural gas production, which means the continued opportunity for increase exports of US natural gas to Mexico. US pipeline exports to Mexico have increased ~2 bcf/d since Jan 1, 2018. Mexico natural gas production has been stuck at or below 5.0 bcf/d since Aug 2017. We believe Pemex is still in the "natural gas production is stuck below 5 bcf/d" phase as it has since Sept 2017. Pemex reported June natural gas production of 4.727 bcf/d, which was down 0.6% YoY and down 0.1% MoM, so basically flat from May. Pemex does not provide any commentary along with its production data. Below is our ongoing table of Pemex reported monthly natural gas production.

Figure 10: Mexico Natural Gas Production (bcf/d)

Natural Gas Production bcf/d	2015	2016	2017	2018	2019	19/18	2020	20/19	2021	21/20
Jan	6.584	6.162	5.326	4.910	4.648	-5.3%	5.005	7.7%	4.848	-3.1%
Feb	6.676	6.122	5.299	4.853	4.869	0.3%	4.942	1.5%	4.854	-1.8%
Mar	6.558	6.030	5.383	4.646	4.857	4.5%	4.946	1.8%	4.839	-2.2%
Apr	6.257	5.921	5.334	4.869	4.816	-1.1%	4.827	0.2%	4.671	-3.2%
May	6.202	5.841	5.299	4.827	4.841	0.3%	4.460	-7.9%	4.730	6.1%
June	6.390	5.881	5.253	4.840	4.843	0.1%	4.754	-1.8%	4.727	-0.6%
July	6.374	5.785	5.216	4.856	4.892	0.7%	4.902	0.2%		
Aug	6.366	5.686	5.035	4.898	4.939	0.8%	4.920	-0.4%		
Sept	6.477	5.619	4.302	4.913	5.017	2.1%	4.926	-1.8%		
Oct	6.397	5.583	4.759	4.895	4.971	1.6%	4.928	-0.9%		
Nov	6.316	5.515	4.803	4.776	5.015	5.0%	4.769	-4.9%		
Dec	6.236	5.380	4.811	4.881	5.024	2.9%	4.846	-3.5%		

Source: Pemex

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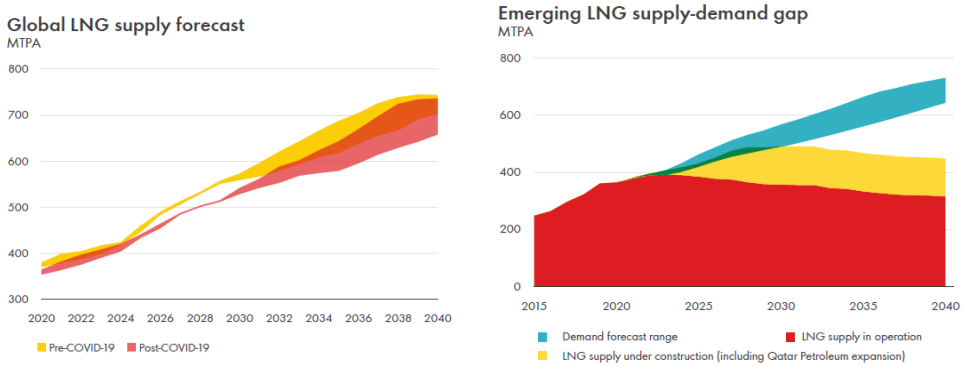
Natural Gas – Shell sees LNG demand to ~double by 2040, LNG supply gap mid 2020s

Shell: LNG demand to ~double to 2040

Maybe Shell doesn't want to be criticized by the Net Zero proponents for being too bullish on long term oil, natural gas and LNG markets or else we don't know why they didn't say their views on LNG markets in their Q2 call early Thursday morning. Its why we tweeted [LINK] *"1/3. #LNGSupplyGap. Great #Shell reminder of bullish #LNG outlook in 2020s. Wasn't in today's Q2 results/call, but in #Tellurian #DriftwoodLNG release Shell signed 10-yr LNG purchase deal for 0.4 bcf/d."* and [LINK] *"2/3. #Shell says #LNG demand to nearly double by 2040, secures volumes for portfolios by the mid-2020s. same view as per Shell LNG outlook Feb 25/21 to nearly double (+340 mtpa or +45 bcf/d) by 2040 & #LNGSupplyGap in mid 2020s."* Shell did not mention its new LNG purchase deal with Tellurian that came out in a Tellurian press release [LINK] issued after the Shell Q2 call on Thursday. Shell signed a sale and purchase agreement to buy LNG from the Tellurian Driftwood LNG project for 0.4 bcf/d for 10 years. The Tellurian release included a quote from Shell management "*Steve Hill, EVP Shell Energy stated, "LNG demand is expected to nearly double by 2040. This deal secures additional competitive volumes for our portfolio by the mid-2020s, enabling us to continue providing diverse and flexible LNG supply to our customers. We look forward to working with Tellurian."* Shell's statement on LNG demand to nearly double by 2040 is exactly what they said in their LNG Outlook 2021 on Feb 25, 2021. This represents an increase of 45 bcf/d to 2020. The LNG Outlook 2021 also included Shell's forecast for an emerging LNG supply gap in the mid 2020s. Below are the Shell LNG forecast slides from the Feb 25, 2021 LNG Outlook 2021. Our Supplemental Documents package includes the Tellurian release.

Figure 11: Global LNG supply forecast & Emerging LNG supply-demand gap



Source: Shell LNG Outlook 2021 on Feb 25, 2021

Shell's LNG forecast was 2 mths before Total's Mozambique force majeure

On Thursday, we also tweeted [LINK] "*3/3. Don't forget #Shell Feb 25 #LNGSupplyGap outlook was 1 mth pre #TotalEnergies force majeure on Mozambique #LNG Phase 1 of 1.7 bcf/d in 2024 & delays in #Exxon Mozambique Rozuma 2.0 bcf/d originally in 2025. See SAF Group Apr 28 & July 14 LNG blogs."* We meant to say 2 months before and not 1 month before, but the point we wanted to remind is that Shel's Feb 25 LNG global supply forecast was 2 months before Total declared force majeure on its Mozambique Phase 1 LNG of 1.7 bcf/d. We have been consistent that the Total force majeure of Phase 1 actually means a delay of 5 bcf/d and not just the Phase 1 of 1.7 bcf/d. Its why, on April 28, 2021, we posted our 7-pg blog "*Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?*" [LINK] The more people expect to see a LNG supply gap around 2025, the more the focus will be on brownfield LNG that could go FID ie. the quickest possible new LNG supply. We

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thought, and still think, there has been a major change to the outlook for LNG supply in the 2020s and one that is still being overlooked – there is a big new LNG supply gap starting around 2025 that is hitting faster and bigger than anyone expects. We saw Total's April 27, 2021 announcement of force majeure at its Mozambique Phase 1 LNG of 1.7 bcf/d was much more significant that viewed. We just didn't see market focused on the fact that this situation backs up an additional 3.3 bcf/d of LNG supply that is also being counted on in all LNG supply forecasts. Total's Phase 2 of 1.3 bcf/d was to follow, and Exxon's Rozuma Phase 1 of 2.0 bcf/d was originally expected to go FID in 2019 but is now not expected to have a FID decision until 2022. Mozambique is considered a premium LNG supply region for Asia and is in LNG supply forecasts. Total's original in service for Phase 1 is 2024. We had been warning that Mozambique has a major LNG market impact and its why we posted the April 28 blog. Our blog reminds that even if Total makes a restart development decision in 12 months, it will take months just to get back to where they left off including rehiring services so any return to where they were in the construction process is at least more likely 18 months at a minimum. This is going to create a bigger and sooner LNG supply gap and the reality is that the only projects that can step up in any reasonable time frame will be brownfield LNG projects. Its why we also said what about LNG Canada Phase 2. There is much more in the 7-pg blog. Our Supplemental Documents package includes our blog.

Natural Gas – PGNiG adds more 20-yr deals to buy LNG

PGNiG buys more 20 yr LNG

We are seeing more signs of LNG buyers wanting to tie up long term LNG supply. This week, it was Polish Oil and Gas Co. (PGNiG) with two transactions. (i) Sempra deal. PGNiG did two transactions with Sempra that should out to no net change. It cancelled it terminated its sale and purchase agreement to buy 2 mtpa (0.26 bcf/d) for 20 years from Sempra's Port Arthur LNG facility due to delays in startup at Port Arthur, but will agreed to a MOU to replace the 2 mtpa for 20 years from other Sempra LNG facilities. (ii) Venture Global Plaquemines and Venture Global Calcasieu Pass. PGNiG concluced agreements to purchase an additional 2 mtpa (0.26 bcf/d) for 20 years to bring its commitment to 5.5 mtpa (0.72 bcf/d) from the two LNG terminals – Calcasieu Pass and Plaquemines on the Gulf of Mexico. Our Supplemental Documents package includes the PGNiG and Sempra releases.

Follows Asian LNG buyers abruptly pivoting and locking in long term LNG

We shouldn't be surprised to see European buyers moving to lock in long term LNG supply given we have seen Asian LNG buyer recently shift to do the same. On July 14, 2021, we posted our 8-pg blog "*Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs*" [LINK]. The reason why we write longer blogs is that we try to provide the thesis and backup so readers don't have to do dig up the back up or sign up to get the backup. We believe it is significant that Asian LNG buyers have changed their LNG contracting strategy post the Total Mozambique LNG force majeure and are now moving to lock in long term supply. We believe this is the best validation of the LNG supply gap and also a big plus for LNG supply FIDs. Here is the summary of the blog "*The last 7 days has shown there is a sea change as Asian LNG buyers have made an abrupt change in their LNG contracting and are moving to lock in long term LNG supply. This is the complete opposite of what they were doing pre-Covid when they were trying to renegotiate Qatar LNG long term deals lower and moving away from long term deals to spot/short term sales. Why? We think they did the same math we did in our April 28 blog "Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?"*

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and saw a much bigger and sooner LNG supply gap driven by the delay of 5 bcf/d of Mozambique LNG that was built into most, if not all LNG supply forecasts. Asian LNG buyers are committing real dollars to long term LNG deals, which we believe is the best validation for the LNG supply gap. Another validation, Shell, Total and others are aggressively competing to invest long term capital to partner in Qatar Petroleum's massive 4.3 bcf/d LNG expansion despite plans to reduce fossil fuels production in the 2020s. And even more importantly to LNG suppliers, the return to long term LNG contracts provides the financing capacity to commit to brownfield LNG FIDs. The abrupt change by Asian LNG buyers to long term contracts is a game changer for LNG markets and sets the stage for brownfield LNG FIDs likely as soon as before year end 2021. It has to be brownfield LNG FIDs if the gap is coming bigger and sooner. And we return to our April 28 blog point, if brownfield LNG is needed, what about Shell looking at 1.8 bcf/d brownfield LNG Canada Phase 2? LNG Canada Phase 1 at 1.8 bcf/d capacity is already a material positive for Cdn natural gas producers. A FID on LNG Canada Phase 2 would be huge, meaning 3.6 bcf/d of Cdn natural gas will be tied to Asian LNG markets and not competing in the US against Henry Hub. And with a much shorter distance to Asian LNG markets. This is why we focus on global LNG markets for our views on the future value of Canadian natural gas". Below are the headers to each of the sections in the blog. Our Supplemental Documents package includes the July 14 blog.

Natural Gas – Chevron's LNG growth is focused on incrementally creeping capacity

Chevron's LNG focus

Chevron held its Q2 call on Friday. One of the LNG points was that all Gorgon LNG trains are online, mgmt said "*Repairs to the Gorgon propane heat exchangers are complete and we now have all five operated LNG trains online in Australia".* There were no questions or comments on any potential corrosion issues at Wheatstone. There was some interesting insight into Chevron's mid to long term strategy on LNG in the Q&A. The takeaway is that Chevron is not looking for any significant LNG growth or for any new LNG projects, rather it is focused on incrementally creeping capacity from its existing LNG projects. Mgmt was asked "*I'm pretty sure it would be below your target on a per unit basis, but look the gas prices are very high globally, LNG prices are very high, there are some opportunities out there in LNG and I'm just wondering on sort of Chevron's official position on how that marries with your broader emissions' targets?"* Mgmt replied "*Well, this is certainly a part of, when we look at our portfolio, we consider the LNG assets and production to be part of the upstream, so that's in all of the numbers that we've given you. And we continue to look for opportunities to make those operations more efficient and lower our carbon intensity. We think natural gas is an important fuel. It's an important transition fuel. It's going to play a critical role as the world continues to lower its overall carbon footprint. And so we're going to stay focused on incrementally creeping capacity of our existing facilities. We'll look at the opportunities to use existing knowledge or upcoming knowledge in other facilities to increase our production through those facilities. But most importantly, we want to leverage the investments that we've already made to continue to focus on higher returns as we go forward. So it's a part of the portfolio, but doesn't occupy any particular premium or special place".*

Natural Gas – TotalEnergies, no change to expectation for force majeure at least 1 year

No change to TOT force majeure views

TotalEnergies held its Q2 call on Wednesday. In the Q&A, mgmt was asked for its current thoughts on Mozambique and any further thoughts on timelines. Mgmt gave a fairly lengthy reply that basically says they don't see a variety of the timeline from what they publicly said that it woud take at least one year ie. no change to their views. It was interesting to hear mgmt describe this area around their LNG project saying "*Mozambique. You know the situation. You can read the newspaper like me, we have been quite clear. There is a war in*

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Mozambique. It's a severe war in this area in the north of Mozambique." It was also interesting to see TotaEnergies make sure everyone knows they aren't involved in any military actions. Its not clear to us exactly what mgmt meant by its comment on Rwanda saying "*It's the Cabo Delgado as a whole because with insurgence everywhere I would say, you've seen that we have taken decision at the AC/DC level to the government – Mozambique government has asked AC/DC to mobilize some air military out, we have seen our of, you're right. Probably as well but Rwanda is involved now. But frankly, to be clear, Total Energy is not involved at al in this military actions."* Our Supplemental Documents package includes the mgmt comments on Mozambique.

Mozambique says Rwandan troops "slaughtered" terrorists

We have to wonder what TotalEnergies meant by its "*probably as well but Rwanta is involved now*" because the one thing that jumps out with Mozambique having the Rwandan troops is that it seems like either a change in tactics or strategy to one to go and try to wipe out the insurgents. Last week's (July 25, 2021) Energy Tidbits noted the KT Press (Rwanda news) reported [LINK] the just arrived Rwandan trips killed, or slaughtered in the words of Mozambique defence minister, a number of insurgents. On Friday, Club of Mozambique news reported [LINK] on comments from Mozambique defence minister. They wrote "*Mozambique's defence minister said on Friday that terrorists are being slaughtered and are in a "very dramatic situation" as a result of "intense operations" taking place in Cabo Delgado, supported by Rwandan forces. "What we must assure the Mozambican people is that the terrorists are currently in a very dramatic situation because the operations are intense, and they are being beaten," Jaime Neto said on the sidelines of the accreditation ceremony for new military attachés in Maputo. The defence minister said it was difficult to count the number of insurgents killed in operations in a reaction to an announcement made by the Rwandan authorities in Kigali about killing 14 terrorists in Cabo Delgado in operations carried out by that country's contingent in northern Mozambique. "It was not only this number [of terrorists] that was slaughtered. We are talking about what was counted on the Rwandan side, but our air and ground operations have been doing a great job," Neto said."*

Natural Gas – Japan LNG Imports in June 9.13 bcf/d, +8.5% YoY

Japan June LNG imports +8.5% YoY

Japan Ministry of Finance released its June LNG import data on Thursday [LINK]. Japan's June LNG imports were 9.13 bcf/d, up +8.5% YoY and up +19.1% MoM from 7.67 bcf/d in May. LNG imports outperformed big vs thermal coal (-8.4% YoY). Despite the high price of LNG, restocking LNG inventories was key for Japan, preparing for a hot July with a low electricity reserve, coupled with hosting the Olympics. Below is a temperature map of June and our table that tracks Japan LNG import data.

Figure 12: Japan Monthly LNG Imports

bcf/d	2015	2016	2017	2018	2019	19/18	2020	20/19	2021	21/20
Jan	13.06	11.22	12.85	12.79	11.69	-8.7%	11.63	-0.5%	12.48	7.3%
Feb	13.26	12.30	13.36	14.23	12.61	-11.4%	10.99	-12.8%	13.84	25.9%
Mar	12.60	12.62	12.61	12.28	11.30	-8.1%	11.16	-1.2%	11.04	-1.1%
Apr	10.56	10.21	10.52	8.97	9.00	0.3%	8.31	-7.7%	7.96	-4.3%
May	8.91	8.55	9.66	9.92	8.62	-13.1%	7.09	-17.7%	7.67	8.1%
June	10.61	10.02	9.90	8.88	8.32	-6.3%	8.42	1.2%	9.13	8.5%
July	10.77	10.19	10.19	10.55	10.56	0.1%	9.35	-11.5%		
Aug	10.93	11.96	11.24	11.73	9.45	-19.5%	9.04	-4.3%		
Sept	11.06	10.67	9.31	10.04	10.30	2.6%	10.41	1.0%		
Oct	9.38	9.73	9.50	10.12	9.75	-3.6%	9.20	-5.7%		
Nov	10.71	12.07	10.26	10.15	10.03	-1.2%	9.63	-4.0%		
Dec	12.51	11.69	12.31	11.23	10.54	-6.2%	11.96	13.4%		

Source: Japan Ministry of Finance

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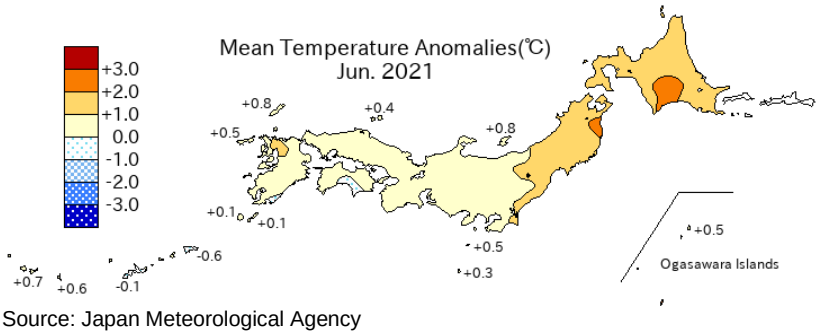
Figure 13: JMA June 2021 Temperature Recap



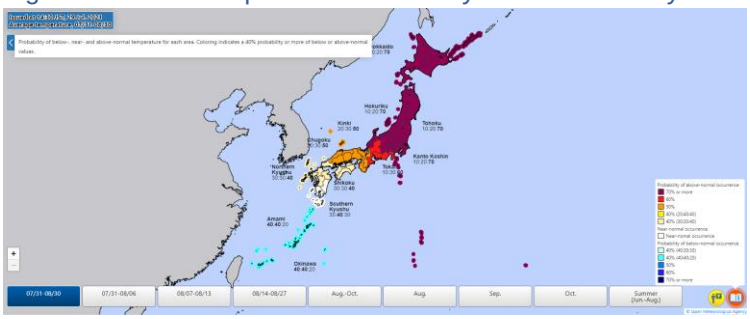
Source: Japan Meteorological Agency

Natural Gas – Expectation for continued hot weather in Japan in Aug

JMA forecasting a very hot August

Anyone following the Tokyo Olympics knows it has been hot and humid in Japan in July. And it looks like the hot humid temperatures will continue into August and the weather in Japan will continue to be very supportive of the strong summer LNG prices. Weather always changes and there is no certainty of that the forecasts will be accurate. However, the last week saw a much warmer outlook for Japan for the next 30 days, and this week's updated look-ahead further supports those expectations. August temperatures are forecasted to be very hot throughout the country, especially in the North, although the forecast for the South has cooled slightly since last week. The Japan Meteorological Agency issued its updated month ahead weather forecast for July 31 – Aug 30 on Thursday [LINK] Below is the current JMA forecast for the the month of Aug.

Figure 14: JMA Temperature Probability Forecast for July 30 – August 30



Source: Japan Meteorological Agency

Natural Gas – Europe storage 56.09% full vs 5 year average of 72.33%

Europe gas storage 56.09% full

As noted above, high Asian spot LNG prices are attracting LNG cargoes away from Europe. And even though Europe storage started off well behind 2020 levels, it is unable to catch up due to the Asian LNG prices. Plus it has been hot in Europe so natural gas consumption has stepped up to fill the void from solar/wind. The continued significant YoY deficit in Europe gas storage sets up a push for Europe LNG imports this fall. It still looks strong for US LNG exports this summer/fall. Europe gas storage started the winter (Nov 1) at basically full levels at 94.66% and had dropped by 65.77% to be 28.89% at Apr 1. This 65.77% decline since Nov 1 compares to the 5 yr average that would be down 53.99% in the same period or to last winter that was only down 43.29% in the same period. We are now seeing storage starting to build, but the storage build is slow for the above reasons, with storage as of June 3 being up 9.64% since April 19, which looks to be the bottom. Storage as of July 29 is 56.09%, 29.10% less than last year of 85.19% and 16.24% below the 5 yr average of 72.33%. Europe storage

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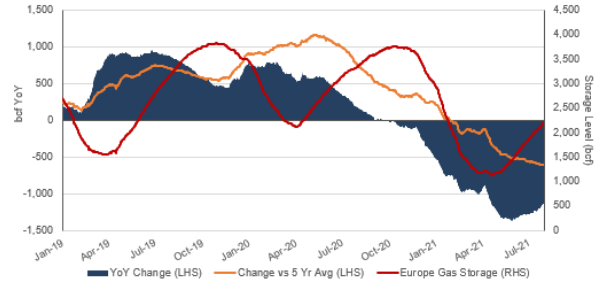
levels this summer will be the key item to watch for indications on LNG markets going into the winter. Below is our graph of YoY change in net LNG flows to NW Europe.

Figure 15: Europe Gas Storage Level



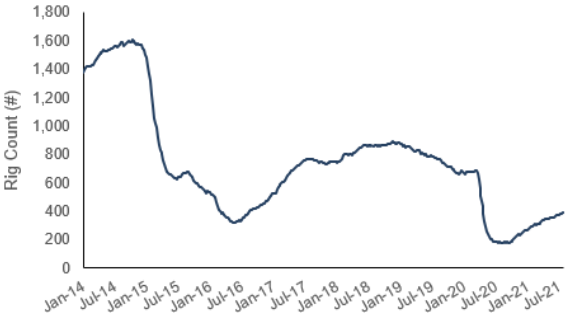
Source: Bloomberg

Oil – US oil -2 WoW at 385 oil rigs

US oil rigs -2 WoW

Baker Hughes reported its weekly rig data on Friday. This week US oil rigs were down 2 rigs WoW at 385 rigs. Permian was up 1 at 243 rigs. Increases came from Granite Wash (+1), Permian (+1), and Bakken (+1). Decreases came from Others (-5). It's probably not surprising that Others was down -5 oil rigs and -2 gas rigs. Others tends to be driven by small operators and privates and they were early to move on increasing rigs when oil and gas prices went up, so a pull back isn't surprising. Oil rigs have been on a strong recovery path and are +213 off the bottom of 172 in the Aug 14/2020 week. US oil rigs hit their 2020 peak at 683 on March 13 and have since fallen by 298 to 385 oil rigs (-43.36%). Below is our graph of Baker Hughes US oil rigs.

Figure 16: Baker Hughes Total US Oil Rigs



Source: Baker Hughes

Oil – Frac spreads -4 to 239 as of July 30

Frac spreads -4 to 239

Every week, Mark Rossano (C6 Capital Holdings) posts a YouTube recap of frac spreads for the week on the Primary Vision Network. [LINK] Note that it was another week where he didn't provide what used to be his normal graphs. US frac spreads as of July 30 were down 4 to 239. He says not unexpected as July often sees a move period. The declines were in the smaller basins, but that is a timing delay, someone will drop a program here or there. Texas remains firm and there were some increases in the Appalachia. He still expect a step up in frac spreads as we get into August.

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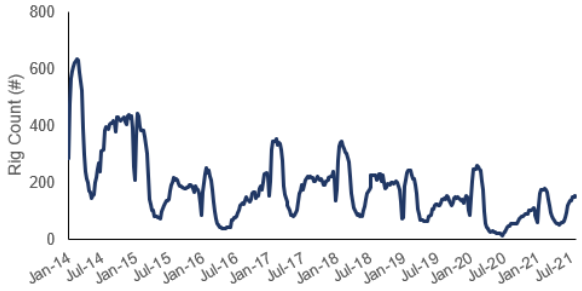
Oil – Total Cdn rigs +4 to 153 total rigs and up 108 YoY

Cdn rigs +4 this week

Total Cdn rigs were up 4 this week to 153 total rigs. Cdn oil rigs were flat at 93 rigs. Cdn gas rigs were +4 to 59 gas rigs. Total rigs are now +140 since the June 26, 2020 all-time low. We have been seeing Cdn rigs continue to ramp up out of the Spring Breakup, but this week we have to wonder if oil rigs being flat is wildfire related as it is certainly not due to oil and gas prices. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 11 and Cdn gas rigs were 33 and Misc. was 1 for a total Cdn rigs of 45, meaning total Cdn rigs are +108 YoY and total rigs are up +26 vs 2019. Below is our graph of Baker Hughes Cd oil rigs.

Figure 17: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production -0.2 mmb/d to 11.2 mmb/d

US oil production -0.2 mmb/d WoW

US oil production was down 0.2 mmb/d to 11.2 mmb/d for the July 21st week. Lower 48 was down 0.1 mmb/d to 10.9 mmb/d. The overall decrease in production was due to planned maintenance at two offshore Gulf of Mexico platforms and a small decrease in Alaska. This puts US oil production up 0.1 mmb/d YoY and is down 1.9 mmb/d since the 2020 peak of 13.1 mmb/d on March 13. The July STEO forecast slightly raised its US crude expectations thru 2021, however it is still not returning anywhere near the Q4/19 peak of 12.78 mmb/d, with Q4/21 US crude of 11.34 mmb/d (down 1.40 mmb/d from peak). In the US oil production commentary, the EIA wrote *"Higher oil price levels realized in 2021 drive increases in U.S. tight oil production in 2022. In addition, we expect more barrels from OPEC+ members to reach the market. We expect U.S. crude oil production to increase by 0.8 million b/d in 2022 and OPEC crude oil production to increase by 1.8 million b/d in 2022."* Additionally, on US rig counts, the EIA wrote *"The recent pace of rig deployment indicates that operators are adding rigs more slowly than during past periods when prices reached similar levels. If operators take a more cautious approach to rig deployment than we are expecting, crude oil production could be lower than in our forecast".* The EIA DPR has the expectation of slight MoM increases in July/August. The EIA Form 914 April actuals were 219,000 mb/d above the weekly estimates average of 10.950 mmb/d for Apr, following a similar trend from March's +213,000 mmb/d underestimate.

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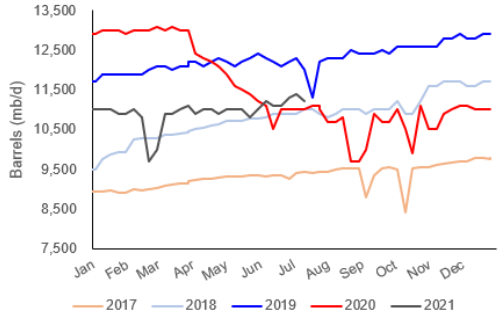
Figure 18: EIA's Estimated Weekly US Oil Production

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-Month	End Date	Value	End Date	Value	End Date	Value	End Date	Value	End Date	Value
2019-Jan	01/04	11,700	01/11	11,900	01/18	11,900	01/25	11,900		
2019-Feb	02/01	11,900	02/08	11,900	02/15	12,000	02/22	12,100		
2019-Mar	03/01	12,100	03/08	12,000	03/15	12,100	03/22	12,100	03/29	12,200
2019-Apr	04/05	12,200	04/12	12,100	04/19	12,200	04/26	12,300		
2019-May	05/03	12,200	05/10	12,100	05/17	12,200	05/24	12,300	05/31	12,400
2019-Jun	06/07	12,300	06/14	12,200	06/21	12,100	06/28	12,200		
2019-Jul	07/05	12,300	07/12	12,000	07/19	11,300	07/26	12,200		
2019-Aug	08/02	12,300	08/09	12,300	08/16	12,300	08/23	12,500	08/30	12,400
2019-Sep	09/06	12,400	09/13	12,400	09/20	12,500	09/27	12,400		
2019-Oct	10/04	12,600	10/11	12,600	10/18	12,600	10/25	12,600		
2019-Nov	11/01	12,600	11/08	12,800	11/15	12,800	11/22	12,900	11/29	12,900
2019-Dec	12/06	12,800	12/13	12,800	12/20	12,900	12/27	12,900		
2020-Jan	01/03	12,900	01/10	13,000	01/17	13,000	01/24	13,000	01/31	12,900
2020-Feb	02/07	13,000	02/14	13,000	02/21	13,000	02/28	13,100		
2020-Mar	03/06	13,000	03/13	13,100	03/20	13,000	03/27	13,000		
2020-Apr	04/03	12,400	04/10	12,300	04/17	12,200	04/24	12,100		
2020-May	05/01	11,900	05/08	11,600	05/15	11,500	05/22	11,400	05/29	11,200
2020-Jun	06/05	11,100	06/12	10,500	06/19	11,000	06/26	11,000		
2020-Jul	07/03	11,000	07/10	11,000	07/17	11,100	07/24	11,100	07/31	11,000
2020-Aug	08/07	10,700	08/14	10,700	08/21	10,800	08/28	9,700		
2020-Sep	09/04	10,000	09/11	10,900	09/18	10,700	09/25	10,700		
2020-Oct	10/02	11,000	10/09	10,500	10/16	9,900	10/23	11,100	10/30	10,500
2020-Nov	11/06	10,500	11/13	10,900	11/20	11,000	11/27	11,100		
2020-Dec	12/04	11,100	12/11	11,000	12/18	11,000	12/25	11,000		
2021-Jan	01/01	11,000	01/08	11,000	01/15	11,000	01/22	10,900	01/29	10,900
2021-Feb	02/05	11,000	02/12	10,800	02/19	9,700	02/26	10,000		
2021-Mar	03/05	10,900	03/12	10,900	03/19	11,000	03/26	11,100		
2021-Apr	04/02	10,900	04/09	11,000	04/16	11,000	04/23	10,900	04/30	10,900
2021-May	05/07	11,000	05/14	11,000	05/21	11,000	05/28	10,800		
2021-Jun	06/04	11,000	06/11	11,200	06/18	11,100	06/25	11,100		
2021-Jul	07/02	11,300	07/09	11,400	07/16	11,400	07/23	11,200		

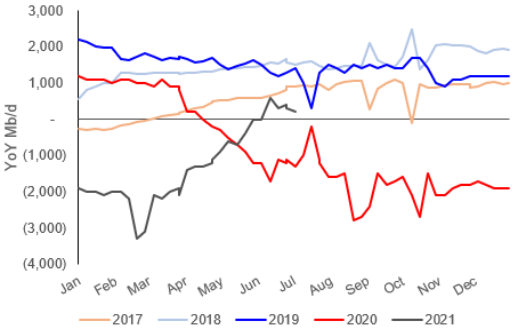
Source: EIA

Figure 19: US Weekly Oil Production



Source: EIA, SAF

Figure 20: YoY Change in US Weekly Oil Production



Source: EIA, SAF

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Oil – EIA Form 914 May actuals 281,000 b/d higher than weekly production estimates

EIA Form 914 May

The EIA released its Form 914 data [LINK] on Friday, which is the EIA's "actuals" for May US oil and natural gas production. Form 914 shows total US May oil production of 11.231 mmb/d, up MoM by 0.080 mmb/d from Apr of 11.151, and up 80,000 b/d YoY from May 2020 of 9.711 mmb/d. Three key items to highlight. (i)The actuals for May have come in 281,000 b/d higher than the weekly estimates that are noted in our Energy Tidbits memos. The actuals are also 0.149 mmb/d higher than the EIA STEO June had for May. This means they will be increasing their forecast, at least for the near term. (ii) This month has flipped over to YoY increases, and we expect to see this continue through the summer. (iii) May was also starting to show the impact of the strengthening oil prices. Not necessarily from new drilling, although drilling has been increasing because it takes time to translate increasing rigs into actual oil production. We think one of the reasons for the higher numbers are the actuals are showing the impact of bringing back shut in oil wells with higher oil prices. We have noted this return of shut in in the North Dakota # of producing wells data. Other specific state info is: (i) New Mexico had the largest MoM increase and was +49,000, and its production has been growing steadily for the past 3 months. It has eclipsed North Dakota's production actuals for the past 3 months running, making it the new #2 producer. (ii) Texas was up -22,000 to 4.763 mmb/d, but is still well above its levels post the Feb freeze-out. (iv) North Dakota was up MoM, +26,000 b/d to 1.061, but its Apr production numbers were revised downwards from 1.172. ND is still 33,000 b/d below Jan levels, meaning it has still not fully recovered from the February freeze-out. The form 914 actuals were slightly lower than the North Dakota Industrial Commission having North Dakota at 1.128 mmb/d in May. Note completions were only 41 in May, below the ~48 completions needed to keep ND production flat at ~1 mmb/d meaning North Dakota oil production should continue to slightly decline. Note, we believe a large portion of the MoM increase in ND had come from returning shut-in wells due to the higher oil prices, so if this trend continues we may continue to see small upticks in production despite the low level of completions. The May actuals were 281,000 mb/d above the weekly estimates average of 10.950 mmb/d for May, following a similar trend from April's +201,000 mmb/d underestimate. Below is the EIA Form 914 data for oil, and our graph of EIA actuals oil production data vs the weekly estimates.

Figure 21: EIA Form 914 US Oil Production

thousand barrels per day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021	11,056	9,773	11,160	11,151	11,231							
2020	12,785	12,826	12,816	11,911	9,711	10,420	10,956	10,558	10,868	10,413	11,121	11,084
2019	11,848	11,653	11,899	12,125	12,141	12,179	11,896	12,475	12,572	12,771	12,966	12,910
2018	9,998	10,261	10,489	10,496	10,457	10,605	10,903	11,384	11,463	11,554	11,907	12,004
2017	8,874	9,108	9,192	9,115	9,208	9,134	9,266	9,264	9,534	9,668	10,088	9,993
2016	9,203	9,065	9,089	8,871	8,834	8,671	8,664	8,686	8,544	8,841	8,906	8,846
2015	9,388	9,510	9,585	9,661	9,481	9,362	9,447	9,416	9,491	9,406	9,337	9,281

Source: EIA

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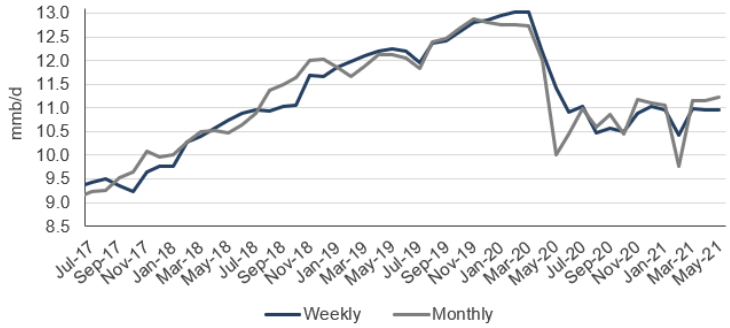
Figure 22: EIA Form 914 US Oil Production vs Weekly Estimates



Source: EIA

Oil – US says no formal bilateral Canada discussions on Line 5

No US/CAN discussions on Enbridge Line 5

We are now 10 days from the Enbridge/Michigan mediator meeting on Aug 11. Our July 10 tweet [LINK] was "*#Line5. #Enbridge/Michigan mediator meeting Aug 11 as work to complete mediation by Aug 31. nothing is impossible but, unless someone gives in, how do you find a common ground on a no pipeline vs pipeline? #OOTT*". We have trouble seeing how the Enbridge/Michigan Line 5 mediation process will result in any agreement, but who knows. It was interesting to see the US State Dept July 23 release [LINK] on Secretary of State Blinken's call with Michigan Gov Whitmer that said "*Secretary Blinken and Governor Whitmer also discussed Enbridge Energy's Line 5, which crosses the U.S. border with Canada in Michigan and is the subject of litigation between the State of Michigan and Enbridge in U.S. domestic courts. Secretary Blinken noted that there is no formal bilateral process between the federal governments of the United States and Canada concerning Line 5."* We have to believe that, at least for now, absent a miracle deal, the next steps are more likely

Could you imagine what Merkel would be doing if she was Canada PM?

Merkel was just in the US meeting with Biden and, no surprise, the US and Germany reached an agreement for the US to support Merkel and Germany on Nord Stream 2. So when we saw the Blinken comments on no bilateral discussions with Canada on Line 5, we couldn't help think that Merkel would be beating Biden's door down if she was Canada PM? We really believe a key part for Merkel's success is that she was persistent. We have just seen how Merkel didn't give up on a pipeline that was a big win for the hated Russians. Yet, she never gave up and got it done. Whereas Trudeau's position on dealing with Biden on energy issues that they don't agree on was also made clear by him – he isn't going to waste his time on items that Biden doesn't like. Our March 14, 2021 noted Trudeau's comments on NBC Meet the Press on Feb 28 on Keystone XL. The NBC transcript was "*TODD: Does this mean you're done asking for -- are you going to stop advocating for it here? Do you feel as if the Keystone pipeline is now dead? TRUDEAU: I think it's fairly clear that the U.S. administration has made its decision on that, and we're much more interested in ensuring that we're moving forward in ways that are good for both of our countries. I think there's so much we can do together that I don't spend too much time worrying about the tension points. It'll always come up in our relationship, but we'll work through them, particularly given the alignment on so many things that we're able to bring with this new administration."*

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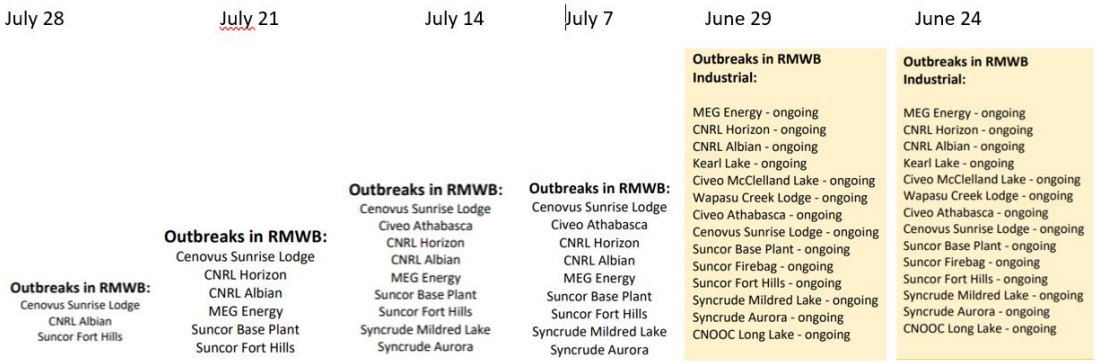
Oil – Another big reduction in this week in oil sands facilities on Covid outbreaks list

Big drop in oil sands covid outbreaks

There was a another big reduction this week in oil sands facilities considered Covid outbreak areas and clearly getting to zero should happen soon. Wood Buffalo is now down to one Covid update per week with the latest being as of July 28 [LINK]. This week, there were three oil sands facilities removed from the outbreak list – CNRL Horizon, MEG Energy and Suncor Base Plant. This brings the total down to three oil sands facilities still on the Covid outbreak list. Below, we pasted the oil sands facilities listed in June 21, 24, 29 and July 7, 14 and 21 updates.

Figure 23: Oil Sands Facilities With Covid Outbreaks at June 24, 29, and July 7, 14, 21 & 28



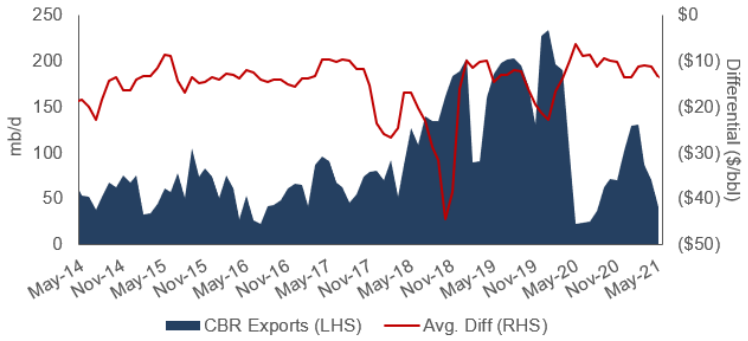
Source: Wood Buffalo

Oil – Cdn crude by rail imports to Gulf Coast down 150,000 b/d YoY in May to 40,000 b/d

Cdn crude by rail imports to Gulf Coast

The EIA posted its monthly "U.S. Movements of Crude Oil by Rail" [LINK] on Friday, which also had good insights on Cdn crude by rail. Canadian CBR volumes to PADD 3 (Gulf Coast) were 40,000 b/d in May, which is down 30,000 b/d MoM from May, and is down big YoY being -150,000 b/d vs May 2020. Apr volumes were revised downward by 2,000 b/d from 70,000 b/d reported last month. Tighter YoY WCS to WTI differentials were the key factor in the low crude by rail volumes since December, however it came as a surprise to us that with widening differentials in May vs 2020 the CBR exports were so low. We have to think, rail transport must have been prohibitively expensive in May. Note that we expect to see crude by rail to the US increase in Q3 given the comments from Cenovus on their Q2 call this week. Below is our graph of Cdn CBR exports to the Gulf Coast.

Figure 24: Canada CBR Exports to US Gulf Coast vs WCS Differential



Source: EIA

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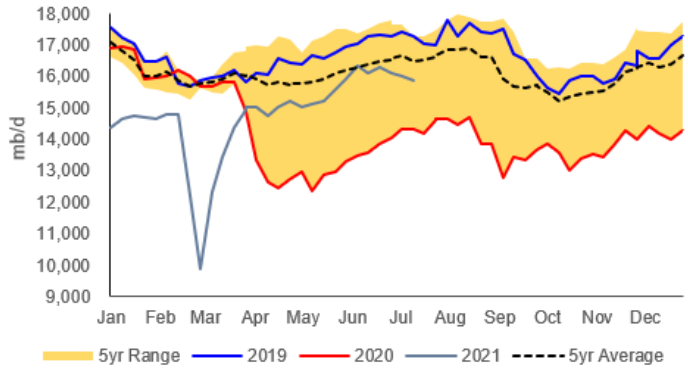
Oil – Refinery inputs +1.280 mmb/d YoY to 15.875 mmb/d, down 1.116 mmb/d vs 2019

Gasoline demand levelling off at ~9.3 mmb/d

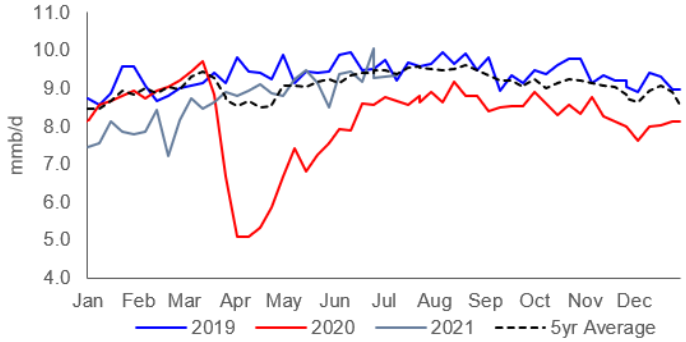
Crude inputs to refineries were down this week and were -0.132 mmb/d to 15.875 mmb/d, and are +1.280 mmb/d YoY, and are -1.116 mmb/d vs 2019. Refinery utilization was down 0.3% this week at 91.1%, which is +11.6% YoY. The decline in refinery runs was due to an outage at the BP Whiting refinery. Total products supplied (ie. demand) increased this week, with a +0.542 mmb/d increase to 21.123 mmb/d, and this week motor gasoline was up slightly but basically flat, being +29,000 b/d to 9.325 mmb/d. For motor gasoline, the market has entered a period where demand starts to fall ahead of fall, so demand levelling off the past few weeks at 9.3 mmb/d is in line with seasonal trends. Gasoline consumption in the US is expected to rise, with the EIA writing in their 2021 Summer Fuels Outlook [LINK] *"We forecast that gasoline consumption in 2021 will peak in August at 9.1 million b/d, which is up from 8.5 million b/d in August 2020 but down from the 9.8 million b/d in August 2019. We forecast that 2021 summertime gasoline consumption will average almost 8.8 million b/d, a 1.0 million b/d (13%) increase from 2020 but a 0.7 million b/d (7%) decrease from summer 2019"*. Below is our graph of crude inputs to US refineries and our graph of US motor gasoline supplied.

Figure 25: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA, SAF

Figure 26: US Motor Gasoline Supplied (mmb/d)



Source: EIA, SAF

Oil – US renewable diesel capacity increasing thru but a fraction of diesel production

US renewable diesel capacity

The EIA posted a great blog on Friday [LINK] detailing the upcoming capacity increases in renewable diesel through 2024 due to announced and developing projects. The EIA is projecting that if all planned/developing projects come online as intended, US renewable diesel production will total 0.333 mmb/d by end of 2024. Granted, this is a massive increase

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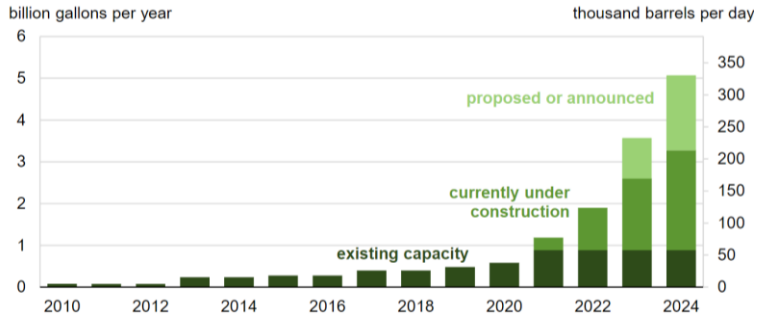
percentage (+875% over 4 years), however it comes from a very small base so this would mean renewable diesel would make up just 5% of total US diesel production capacity in 2024. In fact, as of the end of 2020, US renewable diesel production capacity was only 38,000 b/d. Some of the major projects contributing to the bump in capacity come from converting petroleum refineries. For example, Marathon Petroleum's refinery in Martinez, CA is expected to start production renewable diesel in 2022, with plans to reach its full capacity of 48,000 b/d (already exceeding total country capacity in 2020) by 2023. Below is a chart detailing the growth in US renewable diesel capacity projected to 2024. Our Supplemental Documents package includes the EIA blog.

Figure 27: US renewable diesel capacity (2010-2024E)



Source: EIA

Oil – US "net" oil imports down 0.616 mmb/d to 4.018 mmb/d

US "net" oil imports -0.616 mmb/d WoW

US "NET" imports were up down -0.616 mmb/d to 4.018 mmb/d for the July 23 week. US imports were down by -0.590 mmb/d to 6.507 mmb/d. Due to the market being in backwardation, there's no incentive to hoard oil. US exports were up slightly, being +26,000 b/d to 2.489 mmb/d. The WoW decrease in US oil imports was driven by decreases in Canada, Mexico. Iraq and Nigeria. Some items to note on the by country data. (i) Canada was down this week, and was -0.135 mmb/d to 3.476 mmb/d for the July 23 week, which is now ~0.2 mmb/d below the average levels in Jan/Feb of 2020. This is likely due to the outage at the BP Whiting refinery. (ii) Saudi Arabia was basically flat but up slightly by 4,000 b/d to 0.363 mmb/d this week. (iii) Colombia was flat again this week at 0.144 mmb/d. (iv) Ecuador was basically flat but down by 3,000 b/d at 168,000 b/d. (v) Iraq was down big, retracing its big gains from last week, -335,000 b/d to 145,000 b/d. (v) Venezuela remained at 0 due to US sanctions. (vi) Mexico was up by 176,000 b/d to 0.621 mmb/d.

Figure 28: US Weekly Preliminary Oil Imports By Major Countries

	May 14/21	May 21/21	May 28/21	June 04/21	June 11/21	June 18/21	June 25/21	July 02/21	July 09/21	July 16/21	July 23/21	WoW
Canada	3,806	3,549	3,147	3,971	3,644	3,435	3,282	3,744	3,480	3,611	3,476	-135
Saudi Arabia	424	277	188	144	381	555	565	316	347	359	363	4
Venezuela	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	692	661	702	423	764	878	747	408	648	797	621	-176
Colombia	325	71	185	137	143	340	139	154	140	144	144	0
Iraq	199	184	163	173	305	151	142	229	182	480	145	-335
Ecuador	80	229	226	122	96	29	260	0	95	171	168	-3
Nigeria	73	29	169	264	169	183	33	142	187	195	55	-140
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	5,599	5,000	4,780	5,234	5,502	5,571	5,168	4,993	5,079	5,757	4,972	-785
Others	812	1,273	851	1,404	1,244	1,372	1,238	882	1,142	1,340	1,535	195
Total US	6,411	6,273	5,631	6,638	6,746	6,943	6,406	5,875	6,221	7,097	6,507	-590

Source: EIA, SAF

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Oil – Mexico June production of 1.698 mmb/d, up 5.8% YoY, nowhere near forecast

Pemex June production up 5.8% YoY

Mexico's oil production continues to look to have no chance of reaching their 2021 forecast, but it looks to be stable, just not growing. On Wednesday, Pemex reported its crude oil production for June was 1.698 mmb/d, up slightly MoM from 1.688 mmb/d in May. The actuals to the end of June are nowhere near high enough to meet Pemex's unchanged 2021 production forecast to average 1.944 mmb/d of crude oil and condensate, which would be approx. 1.9 mmb/d of crude oil. Although Pemex's production has flipped to YoY increases this month as expected, it is just due to covid induced production declines, not actual growth.

Figure 29: Pemex Mexico Oil Production

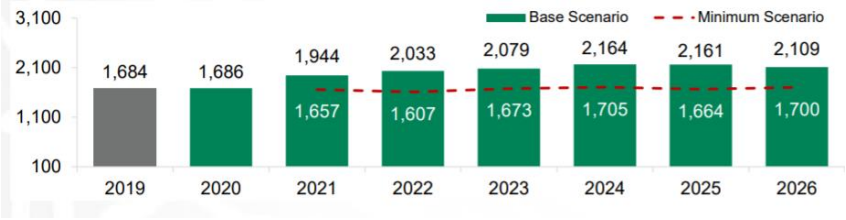
Oil Production (thousand b/c	2015	2016	2017	2018	18/17	2019	19/18	2020	20/19	YTD 2020	2021	21/20
Jan	2,251	2,259	2,020	1,909	-5.5%	1,623	-15.0%	1,724	6.2%	1,724	1,651	-4.2%
Feb	2,332	2,214	2,016	1,876	-6.9%	1,701	-9.3%	1,729	1.6%	1,726	1,669	-3.5%
Mar	2,319	2,217	2,018	1,846	-8.5%	1,691	-8.4%	1,745	3.2%	1,714	1,697	-2.8%
Apr	2,201	2,177	2,012	1,868	-7.2%	1,675	-10.3%	1,703	1.7%	1,711	1,693	-0.6%
May	2,227	2,174	2,020	1,850	-8.4%	1,663	-10.1%	1,633	-1.8%	1,695	1,688	3.4%
June	2,247	2,178	2,008	1,828	-9.0%	1,671	-8.6%	1,605	-3.9%	1,680	1,698	5.8%
July	2,272	2,157	1,986	1,823	-8.2%	1,671	-8.3%	1,595	-4.5%	1,668		
Aug	2,255	2,144	1,930	1,798	-6.8%	1,683	-6.4%	1,632	-3.0%	1,663		
Sept	2,271	2,113	1,730	1,808	4.5%	1,705	-5.7%	1,643	-3.6%	1,667		
Oct	2,279	2,103	1,902	1,747	-8.1%	1,655	-5.3%	1,627	-1.7%	1,663		
Nov	2,277	2,072	1,867	1,697	-9.1%	1,696	-0.1%	1,633	-3.7%	1,660		
Dec	2,275	2,035	1,873	1,710	-8.7%	1,706	-0.2%	1,650	-3.3%	1,659		

Source: Pemex

Pemex 2021 oil production forecast of 1.944 mmb/d looks ridiculously high

Pemex posted a investor presentation [LINK] on June 23, which includes its unchanged 2021 forecast for "Total Crude Oil Production" to average 1.944 mmb/d in 2021. The fine print says it includes condensate, which typically runs about <50,000 b/d. If we back out the condensate and use 1.90 mmb/d, it means crude oil production would have to average ~2.05 mmb/d for the last 7 months of 2021. Below is the production forecast from the Pemex June 23 investor presentation.

Figure 30: Pemex total crude oil production forecast



Source: Pemex June 23, 2021 investor presentation

Oil – Mexico June oil exports -0.7% YoY to 1.106 mmb/d

Mexico oil exports -0.7% YoY in June

Pemex also reported its June crude oil exports on Wednesday. Mexico oil exports in June were 1.106 mmb/d, which is -0.7% YoY, and +7.3% from May of 1.031 mmb/d. Exports will be an important item to watch in 2021 given one of Pemex and AMLO's big pushes is for a rapid increase in domestic refining volumes, leading to a drop in exports. We noted in our Mar 7, 2021 Energy Tidbits that Pemex stated at CERAWeek that there was no need to reduce exports currently, but we have to wonder if that is because refinery inputs are vastly below targets. Pemex has not updated their refinery input forecasts since Oct 5 which was for 2020 of 681,000 b/d and 2021 of 1.114 mmb/d and 2020 was well below forecast at 591,000 b/d. Refinery inputs continue to be nowhere near the 2021 forecast. We had expected exports to be down to some extent MoM as 1 of 2 single buoy-moorings at the Dos Bocas terminal had been shut for repairs for 4 months, however they were in fact up slightly

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from April at 0.647. June was down slightly, likely reflecting the maintenance, at 0.669 mmb/d, which is +14.6% YoY. This is again nowhere near the 2021 forecast. Below is our table of the Pemex oil export data.

Figure 31: Pemex Mexico Oil Exports

Oil Exports (thousand b/d)	2015	2016	2017	2018	2019	19/18	2020	20/19	YTD 2020	2021	21/20
Jan	1,261	1,119	1,085	1,107	1,071	-3.3%	1,260	17.6%	1,260	979	-22.3%
Feb	1,305	1,241	1,217	1,451	1,475	1.7%	1,093	-25.9%	1,179	1,006	-8.0%
Mar	1,228	1,062	1,001	1,176	1,150	-2.2%	1,144	-0.5%	1,167	925	-19.1%
Apr	1,035	1,081	1,017	1,266	1,023	-19.2%	1,179	15.2%	1,180	923	-21.7%
May	1,114	1,204	958	1,222	1,205	-1.4%	1,062	-11.9%	1,156	1,031	-2.9%
June	1,047	1,098	1,157	1,110	995	-10.4%	1,114	12.0%	1,149	1,106	-0.7%
July	1,187	1,146	1,255	1,156	1,079	-6.7%	1,051	-2.6%	1,135		
Aug	1,261	1,261	1,114	1,181	1,082	-8.4%	1,190	10.0%	1,142		
Sept	1,169	1,425	1,159	1,206	995	-17.5%	1,023	2.8%	1,132		
Oct	1,280	1,312	1,342	1,027	963	-6.2%	908	-5.7%	1,110		
Nov	1,178	1,273	1,388	1,135	1,114	-1.9%	1,171	5.1%	1,115		
Dec	1,008	1,115	1,401	1,198	1,115	-6.9%	1,243	11.5%	1,126		

Source: Pemex

Oil – Argentina's Vaca Muerta oil field exceeds 150,000 b/d

Vaca Muerta hits record oil production

Last week's (July 25, 2021) Energy Tidbits memo highlighted the Halliburton Q2 call, where mgmt emphasized Argentina as a key growth area for their activity. Now this week on Monday [LINK], La Patilla, a Venezuelan news website, reported that shale fracking in Argentina's Vaca Muerta had reached a new production record of 150,000 b/d in June. The province of Neuquen, home to Vaca Muerta, saw tax revenue from oil and gas activity increase to $7bn in July, double January's revenue. Vaca Muerta is an unconventional oil field, so production has increased so much due to a record level of hydraulic fractures. Most of the production in from Vaca Muerta is going to stay within the country to serve domestic demand. Our Supplemental Documents includes the Google translated news report.

Oil – Israel warns will send a message to Iran on drone attack on products tanker

Israel to send message to Iran

Is it time to add some, even a little, geopolitical risk in oil prices? We have Israel clearly warning they plan to send some sort of message to Iran post the drone attack on the Mercer Street products tanker. There were two big udpates this morning on the Mercer Street products tanker attack on Friday. Note that we have a 7am MT news cut off for our memo. (i) Earlier this morning, we tweeted [LINK] "*Time to add some geopolitical risk to #Oil price. Israel PM @naftalibennett "I declare unequivocally: Iran is the one that carried out the attack on the ship" "We, in any case, have our own way to relay the message to Iran" #OOTT*". Reuters reported [LINK] on comments from Israel PM Naftali Bennett (it sounds strange not to say its Netanyahu) on the attack writing "*Speaking during a weekly meeting of his cabinet on Sunday, Bennett said: "I declare unequivocally: Iran is the one that carried out the attack on the ship," adding that intelligence supports his claim. "We, in any case, have our own way to relay the message to Iran," Bennett said. Israel's foreign minister said earlier the incident deserved a harsh response."* It looks like a clear warning Israel will be sending a message to Iran. (ii) Then ~6:20am MT, Bennett posted a tweet [LINK] with his warning to Iran. We tweeted [LINK] his closing comment "*Time to add geopolitical risk to #Oil price? #Bennett closes with "we expect the international community will make it clear to the Iranian regime that they have made a serious mistake. In any case, we know how to send a message to Iran in our own way" #OOTT".* This is a pretty clear warning, the question is what will they do? and then what will Iran do in a response. (iii) The increasing reason why we are concerned on what will happen is that Israel is also faced with Iran continuing to increase its nuclear capability. Some may believe that being closer to getting to being able to go nuclear will give more leverage to Iran on any negotiations. The other reality is that Israel has always vowed

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they would not let Iran get to that stage so the closer Iran gets, the higher the risk that a much more severe Israel action happens. (iv) Iran has said they weren't responsible for the attack. (v) Last night, we tweeted [LINK] "*US #AnthonyBlinken & Israel #YairLapid call, agree to work with UK, RO & other international partners to investigate the facts, provide support & "consider the appropriate next steps" regarding drone attack on #MercerStreet products tanker. #OOTT."* It was based on the short US State Dept statement last night at [LINK]. (vi) On Friday, US Central Command issued a release [LINK] on the attack on the Mercer Street, a petroleum products tanker, just off the coast of Oman in the Arabian Sea. The attack was reportedly in international waters. The Times of Israel reported [LINK] "*An oil tanker operated by an Israeli-owned company came under attack off the coast of Oman in the Arabian Sea, the British military said Friday, with the company later confirming the reports. The vessel is operated by Zodiac Maritime, a London-based company belonging to Israeli tycoon Eyal Ofer. The company said that while it operates the Liberia-flagged MERCER STREET tanker, the owner of the ship is Japanese."* CENTCOM wrote "*Initial indications clearly point to a UAV-style attack*." In our tweet [LINK] we noted what we think the key question will be "*Have to wonder what is coming in a counter punch from Israel?*" Our Supplemental Documents package includes the Reuters report and CENTCOM release.

Figure 32: Mercer Street location when attacked

Source: FleetMon.com

Curious drone attack in southern Red Sea

Oil – Saudi thwarted a drone attack on a commercial vessel in southern Red Sea

Are Houthis going to use drones in attacking Saudi ships/tankers in the Red Sea? It was likely because of the drone attack on the products tanker south of Oman but there was an overlooked story on a thwarted attack in the southern Red Sea. Yesterday, we tweeted [LINK] "*1/2. Saudi says thwarted armed drone attack on Saudi commercial vessel in southern #RedSea. Wonder how & what type of "commerical vessel". Are #Houthis moving from small boats w/ explosives & mines to drones? If so, elevates risks to #RedSea #BabElMandeb tankers? #OOTT."* This was after seeing the Saudi Arabia statement that they thwarted an armed drone attack on a commercial vessel in the southern Red Sea. It was interesting to see this referred to a "drone" attack and not a rocket attack (ie. from a RPG) or some other attach. It certainly made us wonder what was the type of commercial ship? How did they thwart a drone attack on this commercial ship? We wouldn't expect commercial ships to have any type of missile defense systems and we find it hard to believe they just happened to have jets in the area to show down the drone. Regardless, almost all of the Houthi attacks in the Red Sea have reportedly been by mines or small boats laden with explosives. If the Houthis are moving back to drone attacks, we believe this elevates the risk for tankers and ships in the southern Red Sea and Bab el-Mandeb. Our Supplemental Documents package includes Saudi Gazette and Saudi Press Agency reports.

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Saudi traffic in Red Sea for 8 days in 2018 after tankers attacked

The significance this week is that Saudi noted it was a drone attack that was thwarted. Over the past few years, the Houthi attacks on ships in the Red Sea have reportedly been carried out by mines or small boats laden with explosives. However, three years ago, we posted our SAF Group July 25, 2018 blog "*Major Global Oil Supply Chain Hit, Saudi Arabia Stops Oil Shipments Thru Red Sea Following Houthi Attack On A SuperTanker*" that said "*There is big news in oil markets tonight with Saudi Arabia announcing at 5:20pm EDT that it was temporarily halting all oil tanker shipments thru the Red Sea. This was in response to the Houthis attack on two Very Large Crude Carriers (VLCCs) that each has capacity of 2 million barrels of oil. Saudi Arabia said one of the ships sustained "minimal damage", but did not disclose the nature of the attack ie. mine, boat, missile, rocket or drone."* The Saudis never did disclose the attack method, however our July 29, 2018 Energy Tidbits noted "*The think tank Washington Institute said "The Arsan was struck at the stern above the waterline, with imagery analysis showing an impact hole two to three meters wide and minor scorching damage on the outer hull. The most likely cause was a large unguided rocket fired from a fast-attack craft following behind the tanker. Less likely, it could have been a sea-skimming antiship missile such as Yemen's C-801 or Iranian-origin C-802, or perhaps a large, explosive-laden aerial drone. The warhead may have detonated inside the vessel's large aft ballast tank, with some signs of smoke damage around a door on the deck above."* At that time, we also reported on the unconfirmed speculation that the Houthis may have hit a Saudi frigate and not a tanker, which s also why we wonder about what type of commercial vessel was attacked. Saudi resumed tanker traffic 8 days later.

Over 6 mmb/d of oil & products is tankered thru the Bab el-Mandeb

The Bab el-Mandeb is one of the world's most significant chokepoints for moving oil and petroleum products. The EIA Aug 27, 2019 brief "The Bab el-Mandeb Strait is a strategic route for oil and natural gas shipments" reminds "*The Bab el-Mandeb Strait is a sea route chokepoint between the Horn of Africa and the Middle East, connecting the Red Sea to the Gulf of Aden and Arabian Sea. Most exports of petroleum and natural gas from the Persian Gulf that transit the Suez Canal or the SUMED Pipeline pass through both the Bab el-Mandeb and the Strait of Hormuz."* And the EIA estimates "*In 2018, an estimated 6.2 million barrels per day (b/d) of crude oil, condensate, and refined petroleum products flowed through the Bab el-Mandeb Strait toward Europe, the United States, and Asia, an increase from 5.1 million b/d in 2014. Total petroleum flows through the Bab el-Mandeb Strait accounted for about 9% of total seaborne-traded petroleum (crude oil and refined petroleum products) in 2017. About 3.6 million b/d moved north toward Europe; another 2.6 million b/d flowed in the opposite direction mainly to Asian markets such as Singapore, China, and India".* Our Supplemental Documents package includes the EIA brief [LINK].

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Figure 33: Bab el-Mandeb Strait, a world oil chokepoint

Source: EIA

Oil – Increasingly difficult for Biden to accomplish a return to JCPOA

JCPOA is looking less likely in near term

We think the key question and biggest near term upside to oil is will the US start to aggressively clamp down on Iran barrels being snuck on the market if it looks like no near term potential to return to the JCPOA? Returning to the JCPOA has been one of Biden's moon shots for 2021. We have said that we thought Biden would be turning a blind eye to Iran sneaking out barrels because he was moving toward a JCPOA return. But if that looks less likely, will Biden clamp down? Iran's oil production has increased by almost 0.5 mmb/d since Biden's election. Even prior to the Mercer Street products tanker drone attack, there was a building expectation that Biden wouldn't be able to complete one of his moon shots for 2021 – a return to the JCPOA. But this increasing doubt has to be has to impact the JCPOA return potential, at least for the near term. Earlier this morning, we tweeted [LINK] *"#JCPOA. has to make increasingly difficult for #Biden to achieve his moon shot of return to JCPOA unless Iran gives in on missiles. Key question/upside to #Oil - will POTUS clamp down on Iran barrels being snuck into market? Iran up almost 0.5 mmb/d since Nov election. #OOTT."*

Oil – EIA updated country analysis brief on Iran

EIA's country brief on Iran

We continue to recommend adding the EIA's country analysis briefs to reference libraries as good quick references, in this case its new EIA country brief summary and also background reports on Iran. Most will only look at the summary, but one example of added color in the background is on Iran's all time peak oil production. The summary says "*Total oil production in Iran has declined since 2017, when output reached a high of 4.8 million b/d*." But the background report remind that *"Iran's oil production averaged more than 5.0 million b/d between 1972 and 1978, and production topped 6.0 million b/d in 1974. Since the 1979 revolution, however, a combination of war, limited investment, sanctions, and a high rate of natural decline in production at Iran's mature oil fields has prevented a return to those production levels."* There are few other items of note from the EIA's reports. While Iran holds some of the word's largest proved crude oil reserves and natural gas reserves, crude oil production has stagnated and declined due to sanctions targeting Iran's energy sector since the United States withdrew from the JCPOA in May 2018. As such, even though it is a member of OPEC, it is exempt from production cuts. All upstream and natural gas projects are government owned, as the nation's constitution prohibits private ownership of natural resources, but international oil companies can participate in E&P through Iran's petroleum contract. The IPC retains a 51% local content requirement. There were two signed foreign contracts, one Chinese and the other Russian, but both withdrew when sanctions were re-imposed. If JCPOA were to be reinstated and oil sanctions lifted, Iran's crude production

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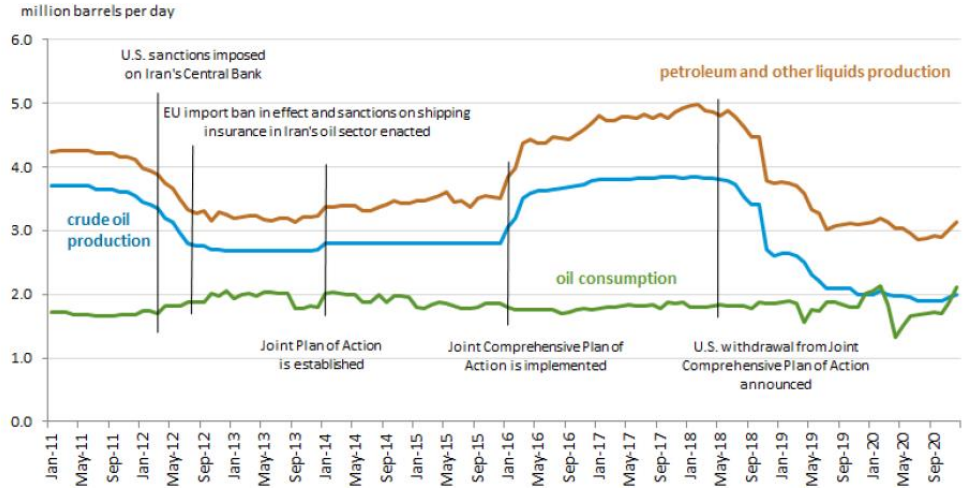
could increase its capacity to 3.8 mmb/d within ~18 mths. As for natural gas, Iran is one of the world's largest natural gas producers producing 8.4 Tcf in 2019. Most of the natural gas activities are focused on the South Pars field, which holds about 40% of Iran's natural gas reserves. Local companies are currently the main developers on the field. 97% of Iran's natural gas exports went to Iraq and Turkey. Iran has aspired to build a liquefaction facility ever since the 1970s, but there is still no infrastructure in the country to export or import LNG. A few pipelines have been proposed to aid natural gas exports, such as an Iran-Oman pipeline and an Iran-Pakistan pipeline, but both projects currently in limbo. We have included a chart from the EIA tracking Iranian production throughout sanctions. Our Supplemental Documents package includes the two EIA reports.

Figure 34: Iran's petroleum and other liquids production and consumption, 2011-2020



Source: EIA

India's strategic petroleum reserve

Oil – India planning to commercialize part of its 39 mmb strategic petroleum reserve

On Tuesday, we tweeted [LINK] on the Argus report [LINK] that "*India is planning to commercialise its strategic petroleum reserves (SPR) for the first time, including by generating revenue from leasing capacity and freeing up some of its stocks for trading. State-controlled Indian Strategic Petroleum Reserves (ISPRL), which manages the country's strategic stocks, will trade the equivalent of 20pc of the reserves' capacity to hedge against price inflation or to supply refiners that are in urgent need of crude, ISPRL's chief executive HPS Ahuja told Argus. Another 30pc will be leased to all third-party entities, Ahuja said. The commercialisation plans were approved by the cabinet."* Our tweet noted that this suggests India is not worried about risk for any major supply interruption as India's current strategic petroleum reserve capacity is only 39 million barrels or less than 10 days of demand. Our Supplemental Documents package includes the Argus report.

Vortexa floating storage

Oil – Vortexa floating storage -8.0% WoW to 81.15 mmb

Prior to today's memo, our weekly reporting on the Vortexa floating crude oil in storage data was always a week late because we would use Bloomberg's early Monday morning reporting on the Vortexa data as of the prior Friday. We didn't realize until last night that Bloomberg updated the Friday floating storage data sometime on Saturday. As a result, we can report the floating storage data as of the most recent Friday, in this case as of July 30. Last night, we tweeted [LINK] "*#Oil markets look to be absorbing increased #OPEC+ barrels since May1. Vortexa crude #Oil in floating storage as of 07/30 was 81.15 mmb, down vs 88.18*

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mmb as of 07/23. Down 135.72 mmb vs 06/26/20 peak of 216.42 mmb. Thx @Vortexa for data & @TheTerminal for posting today. #OOTT". There was a revision up in the July 23 data, which was originally estimated at 86.44 mmb. Below is a graph of the Vortexa Global Floating Storage Level over the past 5 years.

Figure 35: Vortexa Global Floating Storage Level (5 yr)

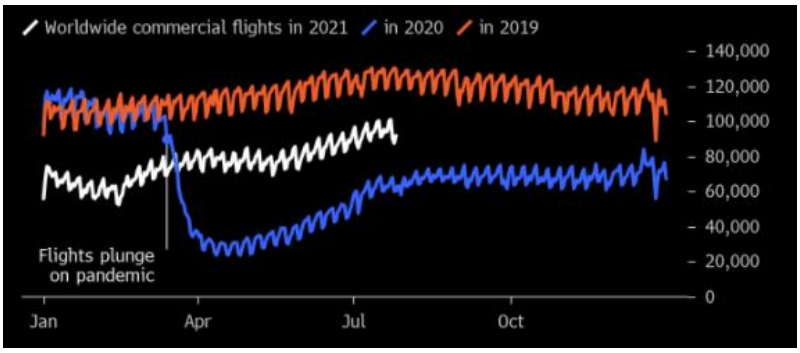
Source: Bloomberg, Vortexa

Bloomberg's Oil Demand Monitor

Oil – Bloomberg Oil Demand Monitor, Air traffic lagging 2019 by a quarter

We recommend reading the weekly Bloomberg terminal Oil Demand Monitor for a good recap of key oil demand indicators around the world. Their update provides more support that oil demand is moving into the demand surge period. Air travel had recently been the demand story, however, its recovery is hitting a few bumps with seat capacity plunging by about 23% in Australia and 11% in Japan, even though the latter is currently hosting the Olympic Games. China and the U.K. had small declines, but there were increases in the U.S., South Korea, Germany and South Africa. Seat capacity in the US has risen to 19.62mm per week, which is down 15% from its 2019 level. Across the whole world, seat capacity is down 31% vs 2019, while the number of commercial flights lags the 2019 level by 25%. On the other hand, roads are quite busy. Portugal's gasoline demand has reached a 9-month high, just 0.6% below 2019 levels and Italy's toll-road traffic is the closest to 2019 levels it has been this year at -2.4% vs 2019. In fact, Italy, Mexico and Brazil are all within 3% of 2019 levels. Below is a chart tracking commercial flights from 2019 until now. Our Supplemental Documents package includes the Bloomberg Oil Demand Monitor.

Figure 36: Worldwide commercial flights from 2019-2021



Source: Bloomberg, FligthRadar24

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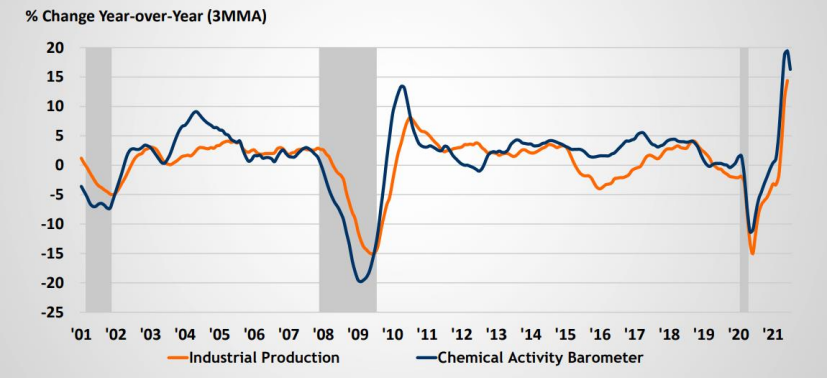
Oil – ACC Chemical Activity Barometer rose 16.3% YoY in July

ACC Chemical Activity Barometer

US manufacturing and industrial activity had recovered well and quickly and was one of the first positive indicators for the US economy in early/mid 2020. And it continues to remain positive. We always look at an excellent forward indicator on this from the monthly American Chemistry Council's April "Chemical Activity Barometer" (CAB) [LINK] for the indicators on industrial and manufacturing in the US. The CAB has had a pretty good track record as a leading indicator of a recession in the US economy with an average lead time of 8 months as a prior indicator, but lead time ranging from 2 to 14 months. The July reading continues to trend upwards, continuing upwards from May's rounding out of one year of consecutive increases. The July CAB *"rose 0.5% in July on a three-month moving average (3MMA) basis following a 0.8% gain in June. On a year-over-year (Y/Y) basis, the barometer rose 16.3% in July (3MMA). The unadjusted data show a 0.1% advance in July, a slowdown from a 0.3% rise in June and 1.0% gain in May. The diffusion index reached 88% in July. The diffusion index marks the number of positive contributors relative to the total number of indicators monitored. The CAB reading for June was revised upward by 0.14 points and the reading for May was revised downward by 0.34 points."* Note that Kevin Swift, chief economist at ACC said, *"The latest CAB reading is consistent with expansion of commerce, trade and industry, but growth has peaked."* This will be key data to watch going forward.

Figure 37: July Chemical Activity Barometer vs Industrial Production



Source: American Chemistry Council

Oil – US truck vehicle miles now 8% higher than 2019, total US

Trucking saw a better recovery than passenger travel

On Wednesday, we tweeted [LINK] "*US vehicles miles traveled for week ended July 25: Total VMT est 17.15 b vehicle miles, +1% vs same week 2019. Passenger VMT is -1% vs 2019. Truck VMT +8% vs 2019, no wonder there is truck driver shortage, better for #Oil demand for diesel guzzler trucks vs gasoline cars. #OOTT*." The US Department of Transportation released their weekly traffic volume report for the week of July 19-25 [LINK]. The overall US picture was +1% vs the same week in 2019, but it was driven by truck vehicle miles. The DOT reported truck vehicle miles travelled on all interstate highways for this week are 8% higher than the same week of 2019. The chart below tracks vehicle miles and their changes from the same week of 2019, and as you can see, truck vehicle miles have been above 2019 levels quite consistently since last summer, apart from a few dips. Conversely, passenger miles have been under 2019 levels since the pandemic began and are still -1% vs the equivalent 2019 week.

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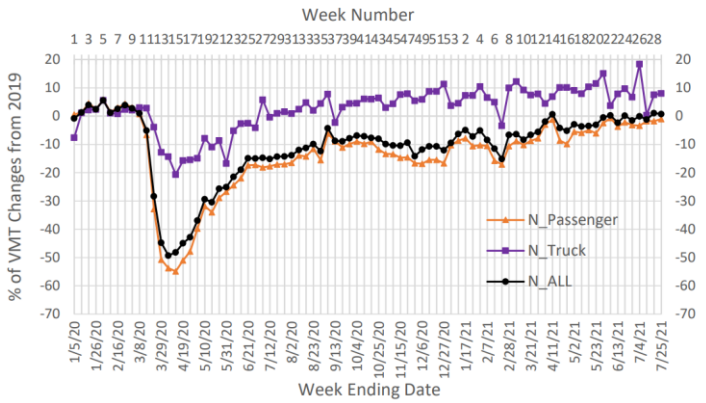
Figure 38: All vehicles, passenger vehicles and truck vehicle miles travelled vs 2019 levels



Source: US Department of Transportation

Oil & Natural Gas – Low decline rates giving Cdn public E&P a leg up

Cdn public E&P doing more with the O&G price increase

Last week's (July 25, 2021) Energy Tidbits highlighted the Precision Drilling's Q2 call, when they noted Canadian public E&P had bounced back much faster than US E&P, and that Canadian public were driving the rig increases, while south of the border it is more driven by privates. In their Q2 release, Precision wrote *"Looking closer at our Canadian customer mix, while private equity producers play an important role over 2/3 of the demand we see comes from publicly listed producers. This group has seen has experienced several years of operating within capital constrained in fiscally disciplined framework. They've been focused on debt reduction and return of capital to shareholders. Since the middle of the last decade and driven cost efficiencies through all aspects of their business models."* For the last several years, we have highlighted the key advantage of Cdn public producers vs their US peers – they have lower base decline rates. This wasn't a big deal when the US producers had basically unlimited equity/debt capital for growth. But it is a huge deal when capital dries up and oil and gas prices are weaker ie. in 2020. The Cdn producers are not fighting base production declines like the US peers. Its why they are able to expand when oil and gas prices jumped up in Q2. We reached out to Travis Wood (National Bank) for his decline rate data and, across the group of companies, the average decline rate was 28%. On Friday, we tweeted [LINK] "*Low decline rates are key reason why Cdn public E&P are able to take advantage of high #Oil #NatGas prices to increase shareholder distributions **and** drilling. Less capex was needed in 2020 to fight higher decline rates as in shale. Thx @nationalbank Travis Wood for data #OOTT pic.twitter.com/frGTfi3hwu*". Below is the National Bank data that we put ito chart form highlighting that most of the companies are coming in under 30% decline rates.

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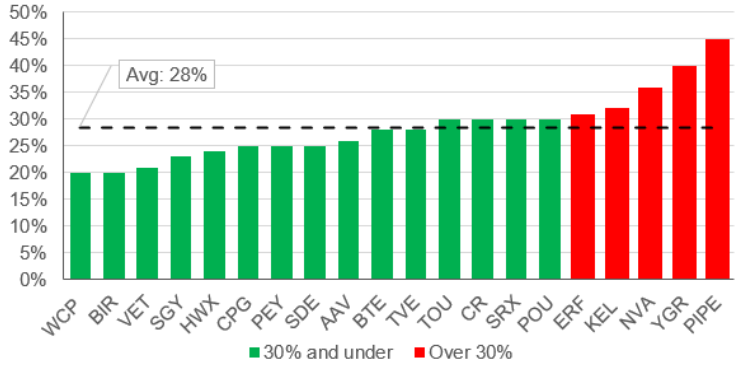
Figure 39: 2022E Production Decline Rate, Cdn Public E&Ps



Source: National Bank

Oil and Natural Gas – sector/play/market insights from Q2 calls

Sector insights from Q2 calls

This is our favorite time each time of each quarter as it is quarterly reporting and this is when we get the best insights into a range of oil and gas themes/trends, sectors and plays. The big service companies have finished Q2 reporting, the supermajors were this week as were many of the large US and Cdn producers. As a reminder, our Energy Tidbits memo does not get into the quarterly results, forecasts or valuation. Rather the purpose of highlighting a company is to note themes/trends and plays that will help shape a reader's investment thesis to the energy sector. In the conference calls, we also tend to find the best insights from the Q&A portion as opposed to the prepared remarks. Plus we tend to get the best E&P sector insights from services, pipelines, refineries and utilities and that was the case again this week.

Liberty Oilfield - Robust energy demand = early innings of a frac upcycle

Liberty Oilfield held its Q2 call on Wednesday. (i) Liberty believes we are in the early innings of a frac upcycle due to "the robust demand in global energy demand and supportive commodity price environments… increasing the demand for Frac services." As a result, the company plans to increase fracking and drilling in 2022. In the intro, Mgmt said *"This should support the continued to increase in demand for North American completion services. Expiration of production capital spending likely increases in 2022, as operators work towards attaining modest oil growth next year. They will need to address both the decline in the inventory of DUCs, and the impact of decline curves on their production base. A modest increase in US oil and gas production requires an increase in practice activity from today's levels, the combined impact of improve the MP economics with greater potential for free cash flow generation, increase completion service demand and tightness in next-generation practice equipment is expected to underpinned a more disciplined Frac market and continued modest rises and service prices."* (ii) Management placed a big emphasis on supply chain issues, not just labor trucking, raw materials etc. They noted challenges a few times. (iii) Pricing increases are happening, but gradually. In the Q&A, mgmt said *"So pricing is coming through not hugely in Q2, but we had pricing improvements in Q2 will have more in Q3 and more beyond that in Q4 and probably means the more next year. So it's a continual gradual process…But in the shape of this downturn the downing pricing was abrupt and the rebound is slow and gradual"*. Note it's this pricing increase that will allow for a gradual fleet reactivation. (iv) They

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are seeing increased customer demand for Electric/Gas dual frac units for frac units for environmental reasons, but even though gas powered is cheaper than diesel, they remind that overall it costs more for the frac Our Supplemental Documents package includes the Liberty Oil Field Q2 Call Transcript.

Shell – CEO/CFO written Q2 comments don't mention oil and gas prices

Shell reported Q2 and held its Q2 call on Thursday. As part of the Q2 results package, Shell released a 4-pg message from the CEO and CFO on the results. As the analysts noted on the results, there were very strong financial results driven by high oil and natural gas prices from the Upstream, which is why we tweeted [LINK] "*What's missing from #Shell CEO CFO 4-pg message on Q2 +38% to dividend, $2b share buybacks? Any credit that it was driven by strong #Oil #NatGas #LNG price or they expect continued strong #Oil #NatGas #LNG prices in for why have confidence in strength of cash generation. #OOTT*". We are sure that everyone knows it's the high current oil and gas prices driving the very strong returns, but they don't seem to want to acknowledge in their written disclosure that the outlook for oil and gas prices looks strong. CEO van Beurden wrote "*so, although volatility in commodity prices and demand recovery might still continue for some time, we are confident in the strength of our cash generation potential"*. We recognize that Shell's focus is on the long ter and it being one of the leading supermajors for the energy transition, but we thought they could have been clearer in their written disclosure on the outlook for oil and gas prices. Our Supplemental Documents package includes the CEO/CFO comments.

Teck Resources – Seeing "signs of cost inflation" across the business

Teck Resources held its Q2 call on Tuesday. (i) Fort Hills delays. It was interesting to see Teck disclose a day before Suncor on the need for more overburden stripping. Mgmt said "*There has been a slower than planned ramp-up of contract overburden stripping, as well as challenges around managing groundwater inflow from deep subsurface aquifers. And subsequent to the end of the quarter in July, we encountered additional challenges that will require mining shallower mines open plan resulting in lost or and the need for additional overburden stripping. The ramp-up to two train operation has therefore been delayed until 2022. As a result of the operational issues and the mining challenges, we have lowered our 2021 production guidance range by 2 to 4 million barrels to 6.8 to 8.1 billion barrels for the year".* (ii) Teck highlighted higher costs being a factor across the business. Mgmt said "…*like others in the industry, we are seeing signs of cost inflation across the business more generally. We have noted increases in the cost of certain key supplies, including mining equipment, fuel tires and explosives. Driven largely, by price increases for underlying commodities such as steel, crude oil and natural gas, for our operations our largest impact is on our fuel costs".* Mgmt also reminded that higher natural gas prices is also a factor on mining operations. The reference was to mining but it also applies to any oil sands/bitumen project. (iii) Teck is bullish on the medium term outlook for met coal pricing. In the Q&A, mgmt highlighted that the Liberals recently rejected an Alberta met coal project, *"it's pretty clear that there are constraints on investment in new supply, and not just capital providers willingness to provide capital, but also permitting issues. And we've seen it right here in Canada, where recently a project proposal to, even though they done all the hard work for six years until, but it was turned down and we've seen the same in Australia as well. So, I have a view that there'll be less supply, but roughly the same demand."* The went on to say that the demand outlook for met coal has changed but supply is far less due to events such as that, and therefore Teck is bullish on met coal prices. Mgmt highlighted *"our*

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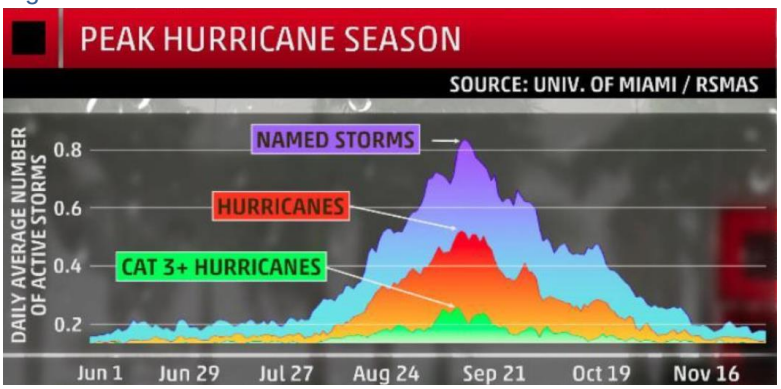
core customers in Japan and Korea and China and India are seeing strong demand. Indian steel industry of course is planned by the government to basically triple in the next 10 years. So we think that the outlook from a price point of view is actually quite a strong." (iv) Teck noted that rail logistics issues had been caused by the wildfires, which lead to lower guidance. Our Supplemental Documents package includes the Teck Resources Q2 Call Transcript.

Oil & Natural Gas – Peak Atlantic hurricane season is Aug 20 thru Oct 10

Peak Atlantic hurricane season still to come

Its been quiet in the past few weeks for any significant tropical storm/hurricane activity in the Atlantic overall and moreso for the Gulf of Mexico. But we remind that its still a few weeks away from the normal peak of Atlantic hurricane season. Our prior Energy Tidbits have noted before how peak Atlantic hurricane season is in the Aug/Sept/Oct. Below is graphic we first last summer on a Aug 28, 2018 Weather Channel report that had a good graphic (see below) and wrote [LINK] "*Historically speaking, September has recorded the most Atlantic hurricane formations since 1851 with 404. That's an average of two or three forming in the month every year, according to NOAA. August ranks second with 245 hurricanes, and October ranks third with 205. The period between Aug. 20 and Oct. 10 accounts for 60 percent of all Atlantic Basin hurricanes and 75 percent of all major hurricanes (Category 3 or stronger) in that basin, according to Dr. Phil Klotzbach, a tropical scientist at Colorado State University*." We double checked the Weather Channel link this weekend and it still works.

Figure 40: Atlantic Peak Hurricane Season



Source: Weather Channel

Electricity – Renewables #2 US electricity source at 21% of supply

Renewables made up 21% of US electricity

No one can deny that wind and solar growth has been very strong and is expected to be very strong for the coming years as the US moves to accelerate its fight against emissions. For the first time in history, renewables have surpassed both coal and nuclear in the share of electricity generation in the United States. The EIA reported on Wednesday [LINK] that the in 2020, renewables became the second-most prevalent US electricity source, at 21% of the total generation in the year. Last year, renewables generated a record 834 billion kWh, with only natural gas surpassing it at 1,617 billion kWh. Over the year, electricity generation from coal declined 20% YoY, while renewable generation increased 9%. However, the EIA expects coalfired electricity generation to increase in the US over 2021 due to the high natural gas prices making coal competitively inexpensive. Our Supplemental Documents package includes the EIA brief.

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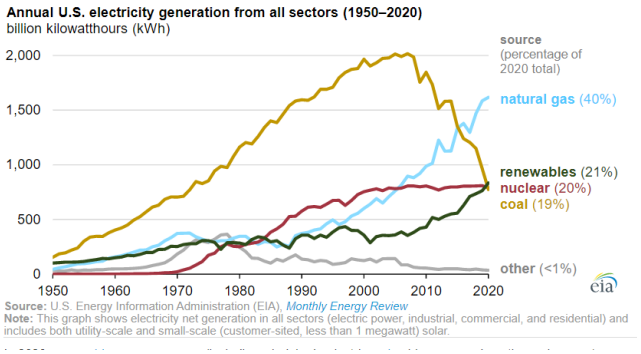
Figure 41: Annual US electricity generation from all sectors



Source: EIA

Energy Transition – "Energy Transition is not Ready for Prime Time" in the UK

Not Ready for Prime Time

We believe one of the growing Energy Transition themes for 2021 and 2022 will be more actions and warnings (probably gentle) from pro Net Zero leaders that the "Energy Transition is not Ready for Prime Time". This week, we saw a couple of couple of higher profile UK examples on this theme. Lets be clear, we have always, and continue to, believe that the Energy Transition is happening, but we have always said it will take longer, cost more and be a bumpy road. The pro Net Zero leaders have been key to building what looks to be an unstoppable momentum to accelerate the fight to reduce emissions. But, its like there are more of them trying to warn that it won't be smooth. Perhaps the highest profile was BlackRock CEO Larry Fink. Our June 6, 2021 Energy Tidbits noted his warning at a US sellside conference "*The last thing I just want to say and to link in ESG&E with the question on inflation, let's be clear. If we rush this and if our solution is entirely just to get a green world, we're going to have much higher inflation, because we do not have the technology to do all this yet to have it equivalent to the cheapness of hydrocarbons. And so that's going to be a big policy issue going forward too. Are we going to be willing to accept more inflation if the inflation is to accelerate our green footprint? And that's going to be a big policy question".* This week's two UK actions/warnings are below:

UK Boris Johnson pushes back ban on new gas boilers by 5 years

On Monday, the Daily Mail [LINK] (and similarly by other UK media) reported that *"Boris Johnson 'puts ban on new gas boilers back by five years to 2040' after backlash over soaring heating costs. Britons are set to be allowed up to five more years before a ban on sales of all new gas boilers comes into force. Prime Minister Boris Johnson is looking at delaying the ban by five years to 2040 over soaring 'net zero' cost. Move would give millions of households more time for new hydrogen boilers and heat-pumps to fall in price. It comes amid a mounting backlash over the spiralling cost of Mr Johnson's so-called green revolution."* We believe Johnson backing off any action to get to Net Zero in 2021 is significant because he has been one of the most ardent Net Zero global leaders given the UK is the host to COP-26 Glasgow in November. He is the one pushing other global leaders to accelerate their emissions reductions actions. So for him to back off in the lead up to COP-26 must be very hard to do. Our Supplemental Documents package includes the Daily Mail reporting.

UK transport committee warns the grid isn't ready for EV push

The UK press was also all over the Transport Committee's Wednesday report on the grid not being read for the EV push. The Committee's release gave a hint at some of

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their concerns "*Transport Committee: Charging an electric vehicle should be convenient, straightforward, and inexpensive; owners should not face a postcode lottery".* The Committee starts off "*Questions remain on whether the Government's current plans are enough to deliver the public charging infrastructure needed across all regions of the UK and whether it will benefit everyone, says the report. Accessible and reliable charging infrastructure must be available by 2030 but drivers who live in rural or remote areas or who don't have off-street parking risk being left behind. Unless charging habits change, or the National Grid is strengthened, concerns exist that the charging needs from millions of new electric vehicles will cause blackouts to parts of the country."* There are a number of recommendations from the Transport Committee, but one that caught our eye "*17. We welcome the Government's commitment to mandate that all new private charge points should be equipped with smart functionality and to introduce the relevant legislation later in 2021*." Its not just that EV drivers should avoid peak demand time for charging EVs, the push to "smart" charging. It reminds of the recent surprise by some Texas residents with smart electricity who woke up in the middle of the night surprised to find their house wasn't cranking out air conditioning. The smart EV charging will also give the UK electricity provider the ability to determine when EVs can be charged. And the Chair of the Transport Committee reminds that their concern on the grid is not the first, but hope it will be the last. The Chair wrote ""*Putting guarantees in place on infrastructure is crucial but one report after another flags concerns to Government about the provision of electric car charging infrastructure. Let ours be the last: it's time that ministers set out the route map to delivering a network of services for everyone across the UK*." Our Supplemental Documents package includes the Committee release and key recommendations. [LINK]

Energy Transition – UK suggests individual behavioral changes to get to Net Zero

Individual "micro-steps" to reduce emissions

It looks like many, at least in the UK, don't realized that all plans and forecasts for Net Zero involve individual behavioural changes as a key factor to reach lower emissions targets. And that these individual behavioural changes are much more than involved with transportation. The IEA's recent "*Net Zero by 2050: A Roadmap for the Global Energy Sector*" wrote "*Behavioural changes are important in reducing energy demand in transport, buildings and industry. If the changes in behaviour assumed in the NZE were not attainable, emissions would be around 2.6 Gt CO2 higher in 2050. Avoiding these emissions through the use of additional low-carbon electricity and hydrogen would cost an additional USD 4 trillion."* This will be a huge government messaging/information campaign for the foreseeable future. Its much more than turning setting your thermostat to cooler temperatures in the winter and your air conditioner to higher temperatures in the summer. There will be all these little tips on how to reduce an individual's energy footprint. And, as we saw in the UK this week, people got angered by as the UK drilled down and decided to note some of these "micro-steps" individuals should make to fight climate change. Its why we felt sorry for UK COP-26 spokeswoman, Allegra Stratton, being ridiculed for her article in The Daily Telegraph suggesting the British public can take "micro-steps" to help in the climate crisis. We couldn't access The Daily Telegraph but all the UK press jumped in on the Stratton article. The Independent wrote [LINK] "*So the headline suggestion from Boris Johnson's Cop26 spokesperson, Allegra Stratton, that the British public can help tackle the climate crisis through "micro-steps" such as not rinsing dishes before putting them in the dishwasher, or by putting bread in the freezer to help it last longer, has drawn a broad array of criticism. In an article in The Daily Telegraph, she also suggested that consumers might buy shower gel in bar form, packaged in cardboard, and could consider walking rather than driving to the shops*." We recognize that people got upset as the focus of her article was on individual

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micro-steps instead of focusing on big emitters. However, we remind that all plans/forecasts on how to get to Net Zero assume individuals make micro-steps to reduce their footprint.

IEA's Net Zero pathway includes back to 60's before clothes dryer

A good example of how these individual behavioral changes are worked into forecasts was in our May 30, 2021 Energy Tidbits, which included this item as one example of the behavioral change assumed in the IEA's Net Zero pathway. At that time, we wrote "*Wouldn't it be interesting if the IEA Net Zero pathway was adopted as a plan? There are many little tidbits in the pathway/plan that would catch people by surprise. Hopefully its never to Putin's extreme warning of sending people back to the caves if natural gas is gone. Rather for baby boomers in North America, it would be a back to the future of what it was like in the 60's to watch your mom do laundry. The IEA pathway/plan talks about needed behavioural changes "Behaviour changes are also important in the NZE, with a reduction of almost 250 Mt CO2 in 2030 reflecting changes in temperature settings for space heating or reducing excessive hot water temperatures. Additional behaviour changes such as greater use of cold temperature clothes washing and line drying, facilitate the decarbonisation of electricity supply." if this were to be the plan, then countries would ban the sale of clothes dryers much like they banned wood burning fireplaces. We didn't have a clothes dryer until the 70s and prior to that, my mom had the tub washing machine that had the hand ringer on the top to wring out the clothes so she could then go hang the clothes to dry on the clothes line in the back yard. The problem was during winter, when my dad would put up some makeshift clothes line anywhere he could find in our 900 sq ft post war house. Don't forget the 60's really pre-high rise apartment/condo living, it was move to suburbia. Clothes line drying is still common in most of the world outside developed western countries, but could you imagine seeing the typical family back to line drying in the backyard or from the apartment like in parts of Hong Kong?"*

Figure 42: Rigging a clothes line, Hong Kong clothes drying in highrise 2017

Source: Martha Stewart, A Day in the Kitchen

UK National Grid ESO winter outlook

Energy Transition – UK National Grid ESO's winter outlook didn't highlight wind risk

We clearly understand that the G7 countries are taking the leadership to try to get the world to Net Zero, but just believe the governments should be giving its people the costs to do so and if there are bumps in the road. Our concern is that governments and the bullish energy transition corporate leaders are greenwashing and choosing to ignore to even mention any potential issues that are already rising from the shift from fossil fuels to clean energy. But that is probably why they don't mention these items, there will be less questions on accelerating emissions reductions. A good example of why it will be tough to get govts and people concerned that there are going to be busts in the traditional reliable, affordable power model for the next number of years is because companies don't seem to want to criticize or highlight

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that renewables are not reliable or are why there are increasing power outage risks. In this case, it s the UK National Grid ESO, who posted their early outlook for winter margins in 2021/22. The "*Systems margins/Early view of winter 2021/22*" had its #1 point noted was "*1. De-rated margin. Our base case view of de-rated margin for winter 2021/22 is currently 4.3 GW or 7.3%. This is slightly lower than last year, but the associated loss of load expectation (LOLE) of around 0.1 hours/year is well within the Reliability Standard of 3 hours set by Government".* The summary page did not highlight any wind risk for winter 2020/21. Its why we tweeted [LINK] "*Hmmm! Why doesn't UK #NationalGridESO want to call out #Wind as key wildcard for reliable power? Fcast lower reserve for winter 21/22. "reflecting on last winter" say main issue #Coal #CCGT #NatGas plants. Yet common denominator for their 5 winter 20/21 bad power days is wind?"* We were referencing their June recap of winter 2020/21 that included five case study periods in the winter that had power risks and how the one common denominator of all five case studies was lower wind power generation. But somehow the common denominator for power risks last winter aren't specifically highlighted as the key risk to winter 2021/22 UK power generation reliability. Our Supplemental Documents package includes excerpts from the winter 2021/22 outlok and the recap of winter 2020/21.

Energy Transition – What will it cost to force long life fossil fuels to be junked?

Who pays for long life fossil fuel assets?

We believe there is a major overlooked item in the 2021 movement to accelerate the world's, or at least the G7's, emissions reductions targets by shifting away from Paris to Net Zero. And a key reason why energy is going to cost way more than expected. Most are overlooking that committing to Net Zero also means committing to setting hard near term targets (ie. 2025 and 2030) and staying on track to hit those near term emissions reductions targets. This is a massive shift from working to a 2050 target without these hard near term targets to hard 2025 or 2030 targets. Governments are assuming that they can effect a disruptive change to the world's energy system. Our concern is governments are greenwashing and choosing to ignore to even mention how much it will cost to force owners and users of long life fossil fuel assets to retire, junk or not use these assets. The entire energy supply chain is driven by long life assets and long life investments from supply to processing to transportation/shippng to conversion to electricity to having capacity to deliver 24/7 electricity to electricity transmission to local distribution. One way or another forcing these assets to be junked long before their useful life to hit new more aggressive 2025 or 2030 targets will add costs to the energy supply chain. Will there be government compensation, will asset owners just be forced to eat the costs, etc? The costs will be masked to some degree with announcements of governments supporting repurposing some assets. We understand the G7 is being put on the path to Net Zero, we just believe people deserve to know what it will cost instead of governments doing what they accuse companies of doing – greenwashing.

Will we see Europe Energy Charter Treaty type compensation in US/Can?

We have to believe that there will be lawsuits in the US and Canada if the implementation of the new US and Canada emissions reduction targets force companies to abandon long life fossil fuels assets like coal or natural gas power generation. Or if they are public companies, just junk the assets early and pass on the costs to their shareholders? Or will we see something in G7 countries like in Europe with its Energy Charter Treaty. One way or another the costs to abandon and junk long life fossil fuels assets will have to flow thru to the cost of providing energy. And we never see these costs being noted in the Net Zero plans. Maybe they are just buried and like silent nod or maybe its just denial, but there will be costs and its hard to see that these costs don't flow thru to the consumer. Our Feb 28, 2021 Energy Tidbits wrote "*One added cost that we hadn't been aware in Europe is the Energy Charter Treaty. Our excuse is that we never get to all the items we want*

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to every week so one of the older items that was in our unread pile was a Politico Feb 4 report "EU governments whipsawed by climate and coal lawsuits" [LINK]. Politico wrote "Fighting climate change could become a sued if you do, sued if you don't problem for governments. German utility RWE this week slapped the Dutch government with a €1.4 billion lawsuit over its plans to end coal power. But the coal phaseout itself was compelled by the Dutch Supreme Court, which found in 2019 that the government was failing in its duty to protect citizens from climate change and mandated that it speed up emissions cuts. It's the wicked problem facing EU members. They are under pressure from lawsuits holding them to climate pledges that require huge drops in fossil fuel use, but are all signed up to a 55-country investment protection deal called the Energy Charter Treaty (ECT). That treaty allows foreign investors in the energy sector to claim compensation for profits deemed unfairly lost due to government regulation. "It's not inconceivable that there will be more cases" from both fossil fuel and renewable energy investors, said Johannes Tropper, international law lecturer at the University of Vienna.". Basically, Netherlands can rule the coal plant be shut, but also needs to compensate RWE for doing so. And this means somewhere the costs will be passed thru for not just the replacement renewable power but also the costs to compensate for forcing the shutdown of the coal plant. Looks like paying double for electricity and an excellent example of why we say the Energy Transition will cost more than expected. Our Supplemental Documents package includes the Politico report."

Diesel engines have a long life

Energy Transition –Who will pay if Liberals force diesel truck engines to be junked

Getting rid of long life fossil fuels assets isn't just in providing power or shipping via pipelines or tanks at terminals or oil/products/LNG tankers, etc. Its also in fossil fuels assets like diesel engines used for heavy transportation. One of the interesting items to watch will be the challenge of how the Liberals force ICE cars and diesel trucks off the road before the end of their useful life? ICE passenger cars have a lot longer life then did in the 60s and 70s when it was common for owners to trade in very few years. But the reason we thought about this question was a Business in Vancouver report "*Efforts to decarbonize long-haul trucking face literal uphill battle*" [LINK] on an often overlooked challenge to get long haul trucking to go electric – they have a very long useful life. And these are the lifeblood of moving goods and and products so if diesel engines are forced off the road before their useful life, there will be a cost that has to flow thru to basically every food, consumer product, etc that people buy every day. BIV wrote "*Then there's the chicken-and-egg problem of fueling infrastructure – regardless of whether that fuel is electricity, hydrogen or biofuel – and the range anxiety that goes with it. But the biggest hurdle is fleet turnover, Earle says. A diesel engine for a Class 8 semi truck can last up to one million miles (1.6 million kilometres) for an average lifetime of 15 years. The average year for a heavy commercial truck in B.C. is 2008, Earle says, with a 3% turnover per year. Even if the technology, infrastructure and fuels were widely available today, which they're not, it would take 25 years to convert the entire fleet, Earle estimates. "That assumes you start turning it over today," he adds*." The obvious answer is increasing taxes on ICE vehicles in the future and how high it will need to go to force them off the road? Our Supplemental Documents package includes the BIV report.

Over 90% of all consumer products/foodstuffs are shipped by truck

The Canadian Trucking Alliance posts a range of facts and figures on the Freight Economy at [LINK], which include "*Trucking Economy: it is estimated that over 90% of all consumer products and foodstuffs are shipped by truck. Either solely or in part*." One of the US jet fuel themes is that there are jet fuel shortages in certain regions because of the shortage of tanker truck drivers to for the last mile delivery of jet fuel.

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The CTA notes this concept "*the North American just-in-time inventory system is built around the truck and is the mode of choice for reliable and efficient, time-sensitive service that manufacturers, retailers and shippers require".*

Energy Transition – Unofficial EV charging ranges UK test, none meet official ranges

Unofficial UK EV range test

This is not an official UK agency test, but we are seeing more tests of EVs ranges vs their official standard. The car industry is claiming that the latest official range tests (called WLTP) are completely reflective of driving in the real-world, and therefore can be relied upon when selecting an electric car. UK WhatCar was skeptical, so it set out to see whether those claims were true, testing all 6 of the fully-electric winners from their 2021 Electric Car Awards [LINK], and 4 wild cards. The results of the test were not promising [LINK] as none of the vehicles tested met their official range; all of the batteries died before their official range, and on average deviated from their posted range by 15%. Note the testing was conducted in near-ideal conditions for electric cars – a mild day with no rain and close to no wind. The results could have been even worse had it been a cold and/or rainy day. The vehicle with the worst performance was the MX-30. No surprise, as it has the smallest battery of the group, but its mileage was only 7% off from the official range. The Fiat had the second worst performance, and its tested range deviated the most from the posted range: by ~30%. The Porsche Taycan was the closest to its official range, only deviating by 3%, and was third best for range. The vehicle with the longest range was the Ford Mustang Mach-E, again battery size being a huge determinant. The Mach-E, however deviated by 20%. Below we have included the summary of WhatCar's Real-World Range Test results. Our Supplemental Documents package includes the Whatcar's report.

Figure 43: WhatCar's Real-World Range Test Results

Make and model	Wheel size	Usable battery size	Official (WLTP) range	TEST RANGE	Shortfall	Miles per kWh*
Ford Mustang Mach-E Extended Range RWD	18in	88.0	379	**302**	20.2%	3.4
Tesla Model 3 Long Range	19in	70.0	360	**284**	21.1%	4.1
Porsche Taycan 4S Performance Battery Plus	20in	83.7	290**	**281**	3.0%	3.4
Audi Q4 e-tron 40 S line	20in	77.0	308	**266**	13.6%	3.5
Kia e-Niro 64kWh 3	17in	64.0	282	**257**	8.5%	4.0
Volkswagen ID.3 58kWh Pro Performance Life	18in	58.0	264	**226**	14.2%	3.9
Renault Zoe R135 GT Line	16in	52.0	238	**208**	12.4%	4.0
Skoda Enyaq 60	20in	58.0	254**	**207**	18.3%	3.6
Fiat 500 42kWh Icon	17in	37.3	198**	**140**	29.2%	3.8
Mazda MX-30 SE-L Lux	18in	30.0	124	**115**	7.1%	3.8

*Based on usable battery size **With test car's non-standard wheels, which affect range

Source: WhatCar

Energy Transition – RBN: Cdn oil sands implementing carbon capture projects

CCS projects in Western Canada

RBN posted a good blog on Tuesday [LINK], detailing the two largest CCS projects announced to date in the Canadian oil and gas sector and in particular, the oil sands. RBN also presented some interesting statistics about the oil sands, which is certainly a sector that environmental activists have vilified. While Canada's carbon footprint has changed very little over the past 20 years, oil sands production has doubled. In fact, the oil sands are only 0.16% of the global total of emissions in 2019. Nonetheless, the industry is facing some lofty goals from the Liberal government for GHG reductions with a new goal of reducing GHG to

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~443 MMT, a level not seen since 1977. Consequently, there are some significant projects underway. The first comes from the 5 large oil sands companies (CNRL, Cenovus Energy, Imperial Oil, MEG Energy, and Suncor Energy) under the "Oil Sands Pathway to Net Zero". However, the project details are still vague and it is still waiting on government involvement to become feasible. The next major project is the Alberta Carbon Grid (ACG), which is a joint proposal from TC Energy and Pembina Pipeline. The ACG is setting out to be a CO_2 transportation and sequestration system capable of handling up to 20 MMT/yr and will use either un-utilized or underutilized segments of the two companies' pipeline network, plus some newbuild pipe for CO_2. TC and Pembina have stated that the price to use the system would be materially less than the current carbon price in Alberta, which would incentivize emmitters to use ACG. If the ACG were to be operational, its 20 MMT/yr would make up a little under 30% of the oil sands CO_2 emissions, and slightly more than 10% of the entire O&G section's 2019 emissions, which is no small feat. Our Supplemental Documents package includes the RBN blog.

Energy Transition – Shell's GoM Whale FID should provide $ for lower return wind

Oil & gas IRRs vs wind

Shell has been very clear with its shareholders on the critical role oil and gas production plays in its ability to anchor returns to shareholders and help fund the shift into renewables and new energies. Now, they also guide to reducing oil production over the 2020s. There was an excellent example this week on why Net Zero supporters should give Shell a break when they add what looks to be an excellent GoM Whale development. On Monday, we tweeted [LINK] "*>25% IRR, no wonder why #Shell FIDs Whale 100,000 boed GoM development. Apr 15/21, upstream IRRs "needed" to fund shareholder distributions & #EnergyTransition ie. compensate for hugely lower #Renewable IRRs. >25% IRR projects give Shell strong cash flow for plan execution. #OOTT".* In the press release announcing the Whale FID [LINK], Shell wrote "*With this development approach, Shell anticipates an internal rate of return estimated to be greater than 25%."* This isn't a >25% after applying leverage or farming down. Our Supplemental Documents package includes the Shell announcement.

Shell's Energy Transition Strategy outlined the above concepts

Our tweet also included an excerpt from our April 18, 2021 Energy Tidbits on Shell's then released Energy Transition Strategy [LINK] as it provides excellent insight on the energy transition challenge, opportunity and specific action areas. We may point out a few negatives, but this is an excellent report and kudos to Shell. We then wrote (i) "*Upstream funds the dividends and the energy transformation. This is not a surprise, rather a reminder that Upstream is crucial to both fund dividends and provide the capital to fund an energy transition. Shell doesn't say it specifically, but it is also a reminds of the relative cash flow generation of each sector and raises the challenge that Transition and Growth pillars have to get to much higher returns and cash flow generation if they are to fund dividends in the future. The dividends are funded from Upstream. Shell wrote "Our business has three pillars: Growth, Transition and Upstream. Within each pillar, we expect the underlying businesses to evolve and transform as demand for our products changes, driven through our sector-based businesses. Our Upstream pillar delivers the cash and returns needed to fund our shareholder distributions and the transformation of our company, and provides vital supplies of oil and natural gas which the world needs today. Our Transition pillar comprises Integrated Gas, and our Chemicals and Products business, and it makes the products needed to enable the energy transition. It produces sustainable cash flow and gives us the asset infrastructure to support our investments in our Growth business. Our Growth pillar includes our service stations, fuels for business customers, power, hydrogen, biofuels, charging for electric*

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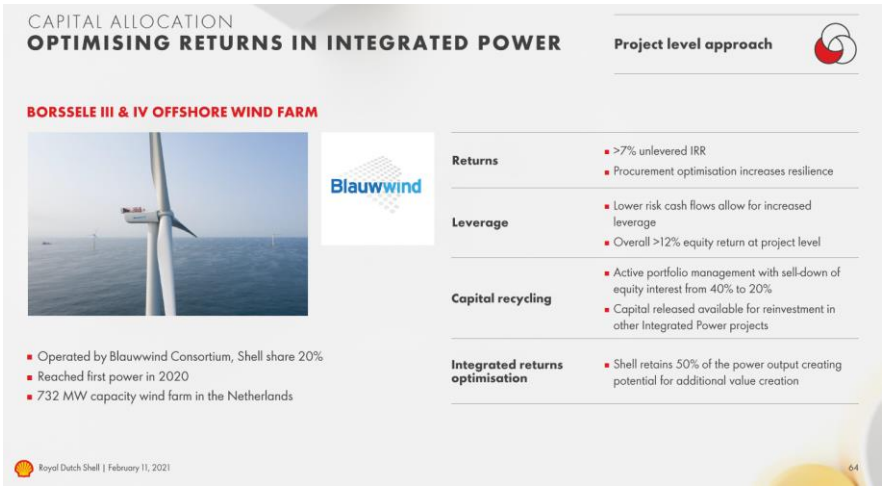
vehicles, nature-based solutions, and carbon capture and storage. It focuses on working with our customers to accelerate the transition to net zero and is the foundation for the future businesses in Shell." And (ii) *Reminds the way to get renewable returns up is to farm out and trading. There was another good reminder on how Shell get returns from renewable like offshore wind up to needed levels. Shell doesn't say it directly in its Energy Transition Strategy but clearly reinforces the key to renewable project returns is farming down interests, but marketing/trading output on behalf of the other project participants. In Offshore Wind, Shell wrote "Shell is part of the Blauwwind Consortium that was awarded the right to develop, construct and operate the Borssele III and IV wind farm off the Dutch coast. Shell entered with a 40% share in 2016 and Shell Energy Europe Limited secured a contract to sell 50% of the power produced. We sold half of our joint venture partnership in 2018 when we brought on board an additional partner. The wind farm is now fully operational and has a total installed capacity of 731.5 MW, equivalent to powering 825,000 Dutch households. We still sell 50% of the power produced." Shell starts with 40% interest, sells down to 20% interest, but retains the right to sell 50% of the output. The Blauwwind Consortium project is the same offshore wind project highlighted in Shell's Feb 11 Strategy day 2021. Shell outlined how it took a >7% unlevered IRR offshore wind project to get higher returns.*

Figure 44: How Shell Optimizes Returns from Offshore Wind



Source: Shell

Overpaying for offshore wind

Energy Transition – Equinor: companies are overpaying so low offshore wind IRRs

Another fit into our thesis that the "Energy Transition is Not Ready for Prime Time" is that there aren't the required returns from renewables, which means that higher costs will be passed thru the electricity supply chain ie. electricity will cost more under the Energy Transition. Once again, the best insights don't come from company releases, but from either Q&A or TV interviews. In this case it was Equinor CEO Anders Opedal interview on Bloomberg Daybreak Europe on Wednesday. By way of background to the Bloomberg interview, our June 20, 2021 Energy Tidbits wrote "*Equinor has been one of the early movers for the energy transition with early entry into offshore wind in size. Its that early entry that allows them to get significant uplift from expected base returns from renewable energy via farming down their interest and promoting others into a project. And of course, Equinor also has some high quality oil and gas in the North Sea ie. Johan Sverdrup. On Tuesday, we*

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tweeted [LINK] "Good thing #Equinor has #Oil #NatGas w/ ave payback time <2.5 yrs & >20% base IRRs as they lowered expected base returns (prior to farmdowns & project financing) from #Wind to 4-8% vs 6-10% in Dec. But didn't include average payback time for wind, Hmmm! #EnergyTransition #OOTT." This was the key new disclosure for Equinor's offshore wind projects. In its December 2020 Equinor Business Update presentation, Equinor reported that its expected base returns for renewable (basically offshore wind) were 6-10%, with is before any farmdowns or project financing. This week, its Capital Markets Day lowered the real base project returns to 4-8% before any farmdowns or project financing. Equinor is a reminder that the shift to renewables means lower returns. The Capital Markets Day also showed Equinor's much higher returns from oil and gas with >20% internal rate of return and an average payback time of <2.5 years." We created a transcript of Opedal's reply to the Bloomberg Manus Cranny question [LINK] where Opedal explained why the offshore wind returns are low. " *At 2:50 min mark. Cranny "you recently reduced your renewables returns, what are the biggest headwinds in renewables?" Opedal "… but we also see there is strong competition. We see that there is a companies that are very ambitious about their targets. But we still need more seabeds to actually execute on a project. At the moment there are higher ambitions than seabeds available. So but we think that, based on the ambitions we see from different countries, more seabeds will be available."* Basically, in company's race to go renewable, they are overpaying and therefore the low returns. Our Supplemental Documents package includes the transcript we made of the Equinor CEO quotes.

Equinor CEO says need govt help to make CCS economic

Another example that the "Energy Transition is Not Ready for Prime Time" comes from CCS and the fact that it needs government incentives to make it economic. And all that means is that higher costs get passed thru the energy supply chain. There was another reality check on the economics of key Energy Transition technologies from the Equinor CEO Opedal interview with Manus Cranny on Bloomberg Daybreak Europe on Wed – CCS needs govt support to make it economic. We created a transcript of his answer in this section. At 3:50 min mark on CCS. *Cranny "Anders on the hydrogen and carbon capture business, when will you return to profit?" Opedal "well, that's a little bit to early to say. Still we are now working on a lot of different options. Both in the UK, Norway, Germany and Holland. We are maturing those options. We need to see higher carbon price to make those projects profitable. It actually needs to be more expensive to pollute than actually capture and storage. The Northern Lights project is progressing well. This is the world's first project where we are actually picking up the CO2 from different places in Europe and bring it by vessel to the western coast of Norway and store it safely under the North Sea. We expect more years to see this type of projects can be profitable. At the moment we are dependent upon on support from governments".*

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.

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LinkedIn – Look for quick energy items from me on LinkedIn

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

Look for energy items on LinkedIn

Misc Facts and Figures.

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

Canada continues to add medals at Tokyo Olympics

As of our 7am MT news cut off, its now 10pm in Tokyo so Day 9 is now over for the day. Canada's medal count is now 3 Gold, 4 Silver and 7 Bronze to bring out total medal count to 14. One of the advantages/disadvantages of the Tokyo Olympics is the different time zones. Its good for working as the time zone differences mean that the live coverage is done early in the day. Although if there is a good live event like women's soccer on Thursday morning, it means that we aren't as productive early in the mornings before the market. One of the enjoyable items about Olympics is that we get a chance to root for Canadian athletes in a wide range of sports that we only see at Olympics times like Volleyball, track & field, gymnastics, and swimming. Canada continues to add medals at the Tokyo Olympics,

Figure 45: Canada's medal count at summer Olympics

Games	Athletes	Gold	Silver	Bronze	Total	Rank
1984 Los Angeles	407	10	18	16	44	6
2016 Rio de Janeiro	314	4	3	15	22	20
1996 Atlanta	303	3	11	8	22	21
2008 Beijing	332	3	9	8	20	20
1992 Barcelona	295	7	4	7	18	11
2012 London	281	2	5	11	18	27
1908 London	87	3	3	10	16	7
1928 Amersterdam	69	4	4	7	15	10
1932 Los Angeles	102	2	5	8	15	12
2000 Sydney	294	3	3	8	14	24
2020 Tokyo*	370	3	4	7	14	14

Source: Wikipedia, CBC

Cdn sprinter Andre De Grasse medals again, wins bronze in 100m sprint

Just before our 7am MT news cut off, the men's 100 m sprint final just ran and Canada's Andre De Grasse ran a personal best of 9.89 to win the bronze. We hae to wonder if he was distracted by the Nigerian sprinter pulling up lame beside him at the 50 m mark and ahead of De Grasse at the time. Regardless, De Grasse was last at 25 m and turned on the after burners to end up 3rd. The reason we wanted to mention De Grasse is his impressive record. He has now medaled every time he is in a final at the Olympics or World Championships, he is 8 for 8. That is an amazing sign of someone who always delivers under pressure.

How One Man Changed the High Jump Forever – Dick Fosbury

Watching the men's high jump at the Tokyo Olympics this morning, we couldn't help think about how Dick Fosbury (Gold medal at the Mexico City 1968 Olympics) changed high jumping when the world saw his Fosbury Flop when all the other high jumpers were doing the Straddle, which was mostly viewed as a variation of the Western Roll. Western Roll. Prior to that, it was the Scissors. A big factor helping the

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evolution of the high jump style were the landing pits. At the Tokyo 1964 Olympics, the men's high jump landing pip was still the old style about 6 inches of sand raked after jumper. Kind of like a built up golf sand trap. Then there was a short period of kind of like saw dust. And finally deep piles of foam chunks and then in the mid 60s, the big single piece of foam emerged to become the norm for the high jump and pole vault in time for the 1968 Olympics. Its hard to see how high jumpers would have wanted to do the Fosbury Flop into about 6 inches of sand. There is a good 4 min video "How One Man Changed the High Jump Forever | The Olympics on the Record" on Dick Fosbury at [LINK]. For today's high jump, thought Cdn high jumper Django Lovett might have snuck in for a medal, he looks so smooth to start but just couldn't get to his new personal best at 2.33m (his is 2.32m) but just fell a little short of the podium.

Figure 46: Dick Fosbury and Ed Carruthers at Mexico City 1968 Olympics

Source: How One Man Changed the High Jump Forever

One major food group that is going up in price for multi years - bacon

For bacon lovers, bacon is a major food group. And unfortunately, it is only going up in price for multiple years and bacon lovers can blame California. We often forget that California is ~12% of total US population. So it makes sense that California reportedly consumes ~15% of all pork produced in the US and its restaurants and groceries are estimated to use 255 million pounds of pork per months and its farms produce only 45 million pounds of port. Yesterday, AP reported [LINK] "*At the beginning of next year, California will begin enforcing an animal welfare proposition approved overwhelmingly by voters in 2018 that requires more space for breeding pigs, egg-laying chickens and veal calves. National veal and egg producers are optimistic they can meet the new standards, but only 4% of hog operations now comply with the new rules. Unless the courts intervene or the state temporarily allows non-compliant meat to be sold in the state, California will lose almost all of its pork supply, much of which comes from Iowa, and pork producers will face higher costs to regain a key market."* And if there are higher costs to pork producers, there are higher bacon prices for everyone. Our Supplemental Documents package includes the AP report.

Always think of Jim Gaffigan's class "BACON!" comedy routine

How could we mention bacon without reminding of the classic Jim Gaffigan 2011 reouting "BACON!". It's a 8:30 min routine on bacon and is found at [LINK]. Gaffigan is a Gen X but only missed being a baby boomer by a couple years. Clearly some of his jokes are stuff that will be connect with baby boomers and older Gen X such as *"if it weren't for bacon, you wouldn't even know what a water chestnut is?"* and "*once*

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you put bacon in a salad, its no longer a salad, its become a game of find the bacon in the lettuce".

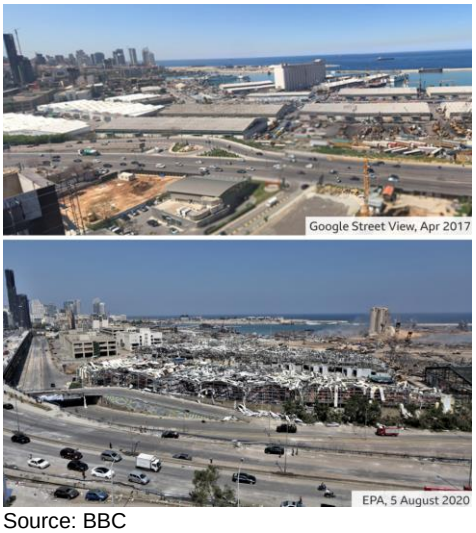
58% of US flight attendants have had >5 unruly passenger incidents in 2021

We have all seen the Twitter videos that pop up of some US air passenger going Cujo on a flight attendant and think that this is rare. Going Cujo may be rare, but, unfortunately for flight attendants, air passengers are increasingly taking out frustrations, whatever on flight attendants. The numbers are staggering. The Association of Flight Attendants has nearly 50,000 members. The AFA reported this week [LINK] "*85 percent of Flight Attendants dealt with unruly passengers, nearly 1 in 5 experienced physical incidents in 2021. After new survey, Flight Attendants Union Calls on FAA, DOJ to take action, make "zero-tolerance" policy permanent. A new national survey of nearly 5,000 flight attendants released today by the Association of Flight Attendants-CWA, AFL-CIO (AFA) found that over 85 percent of all respondents had dealt with unruly passengers as air travel picked up in the first half of 2021. More than half (58%) had experienced at least five incidents this year. A shocking 17 percent reported experiencing a physical incident."* This is crazy and its not like the flight attendants are responsible for the travel frustrations. And to any, let alone 1 in 5 have experienced a physical incident shouldn't be tolerated. Our Supplemental Documents package includes the release.

Massive Beirut explosion was only a year ago, Aug 4, 2020

It seems like it was a lot longer than a year ago that the massive Beirut port explosion occurred at jus before 6pm local time. There was approx. 200 people killed in the explosion and, thankfully, there weren't more than that from this massive explosion that wiped our a good chunk of the port. We remember being glued to the TV and all the confusion initially on what caused the explosion. Ultimately, it was attributed to the detonation of ~2,700 tonnes of ammonium nitrate stored in a warehouse for more than seven years. There was a good WSJ Dec 10,2020 post mortem "Beirut Explosion: What Happened in Lebanon and Everything Else We Know" [LINK]. Our Supplemental Documents package includes the WSJ report.

Figure 47: Devastation on the Beirut dockside



Source: BBC

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The latest Airbnb is Swimply, rent out backyards and pools for an hour or two

Perhaps if there were more homes with swimming pools in Alberta, we wouldn't have been surprised to see the WSJ report [LINK] on "*An 'Airbnb for Pools' Is Making a Splash This Summer. Swimply reports surge in demand amid pandemic, rising pool-chemical costs Guests used the pool at Jim and Lisa Battan's home outside Portland, Ore., earlier this month. The pool was booked three times within the first two hours of being listed through online platform Swimply in September.*" Basically people rent out their backyard pools for an hour or two or more. We went to the Swimply website [LINK] and noted they are letting people know "*Joyspace coming soon. List more than just pools. Basketball courts, private gyms, and even home studios. Put your Joyspace on our waitlist.*"

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