Energy Tidbits

July 11, 2021

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More Signs of LNG Supply Gap Coming – A Sea Change As Asian LNG Buyers Move To Lock Up Long Term Supply

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. Asian LNG buyers are moving to lock up long term LNG supply, which we see as a sign they also see an LNG supply gap is coming. (Click Here)

2. The IEA's new natural gas/LNG forecast thru 2024 assumes a dramatic decrease in annual growth rates, Hmmm! (Click Here)

3. Trans Mountain's construction update points to increased timeline/costs as extreme heat and wildfires having an impact. (Click Here)

4. No date yet set for 7th round of JCPOA negotiations and no one expects a final deal then unless major changes in positions. (Click Here)

5. Excellent CNBC interview with Saudi Energy Minister Abdulaziz (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 16 bcf, storage now -551 bcf YoY deficit

YoY storage at -551 bcf YoY deficit

The EIA reported a 16 bcf injection for the July 2 week, which was below the 5-yr average injection of 108 bcf, and below last year's injection of 63 bcf. Storage is 2.574 tcf as of July 2, increasing the YoY deficit to 551 bcf from 510 bcf last week and storage is 47 bcf below the 5 year average vs 32 bcf below 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 (07/02/20)		5-year average (2016-20)	
Region	07/02/21	06/25/21	net change	implied flow	Bcf	% change	Bcf	% change
East	521	513	8	8	654	-20.3	578	-9.9
Midwest	638	623	15	15	758	-15.8	656	-2.7
Mountain	177	173	4	4	179	-1.1	170	4.1
Pacific	246	244	2	2	309	-20.4	286	-14.0
South Central	991	1,005	-14	-14	1,225	-19.1	1,075	-7.8
Salt	286	296	-10	-10	365	-21.6	310	-7.7
Nonsalt	705	709	-4	-4	861	-18.1	765	-7.8
Total	2,574	2,558	16	16	3,125	-17.6	2,764	-6.9

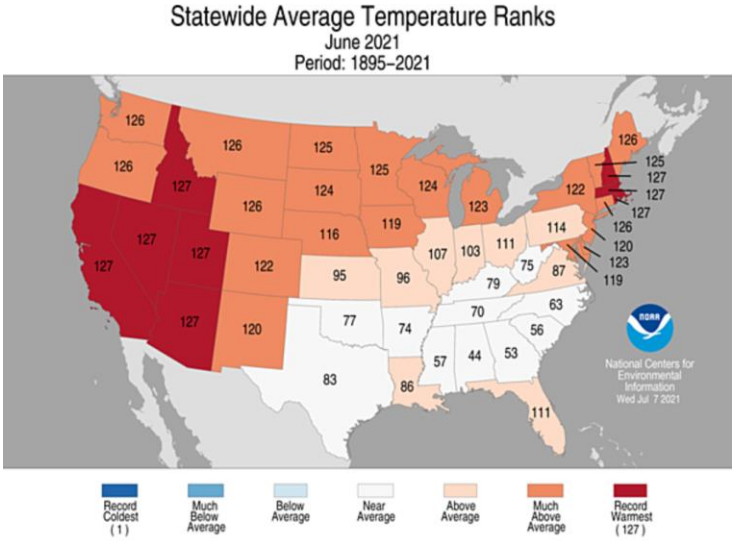
Source: EIA

Natural Gas – June 2021 was hottest in the last 127 years

Record hot June

From a weather perspective, it couldn't be better than June for natural gas demand. It was record warmth in June with the US being the hottest June in the last 127 years. It was record or near record warmest in the North, West and Florida. And were it wasn't record warmth, these states are generally hot so normal temperatures are still air conditioning temperatures. Below is the NOAA's statewide average temperature map for June 2021. [LINK]

Figure 2: US Statewide Average Temperature Ranks June 2021



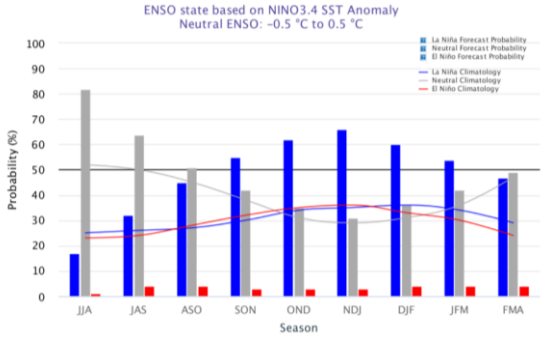
Source: NOAA

Natural Gas – 96% probability for La Nina/Neutral in key hurricane ASO season

Expecting a La Nina/El Nino summer

The CPC/IRI released its updated monthly El Nino/La Nina outlook, which is issued on the 2nd Thurs of every month [LINK]. The focus now for oil and gas is for the peak Atlantic hurricane season in Aug/Sept/Oct and the call is still for a Neutral/La Nina ASO with very little chance for El Nino conditions. The trends have shifted more to neutral conditions, but still a Normal/La Nina for the key Aug/Sept/Oct. The consensus forecast for ASO is 51% Neutral (was 57%), 45% Nina (was 36%) and only 4% El Nino (was 7%) conditions. Again, weather is never 100% the same, but El Nino summers are normally associated with low Atlantic hurricane seasons, whereas neutral/La Nina conditions are more likely normal hurricane seasons.

Figure 3: Early-July NOAA El Nino/La Nina Outlook



Source: CPC/IRI

Natural Gas – EIA forecasts US gas production to return to growth in 2022

EIA sees US gas production +2.1 bcf/d YoY in 2022

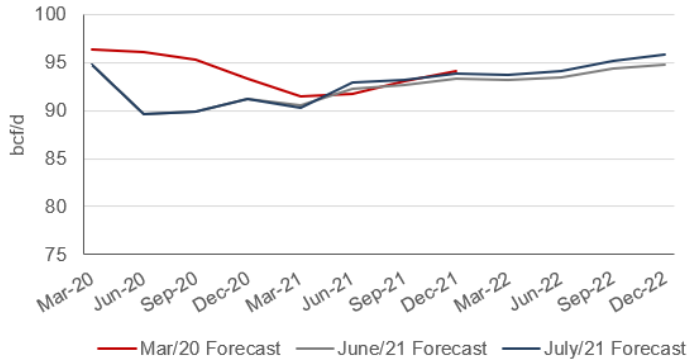
The EIA released its monthly Short Term Energy Outlook July 2021 [LINK] on Weds. (i) The forecast revised up 2021 and 2022 US natural gas production, however the EIA forecast continues to show US natural gas getting close, but not returning to the Q4/19 peak of 96.58 bcf/d, with Q4/22 US natural gas of 95.82 bcf/d (down 0.76 bcf/d from peak). (ii) The reason why natural gas gets almost back to peak levels is that natural gas prices are much stronger than forecast a couple years ago. So the pure US shale gas plays have more or less made up for lower associated gas production from oil plays. Versus year end 2019, the Haynesville is up ~1.0 bcf/d and the Marcellus up 0.6 bcf/d. (iii) For 2021, the EIA made upward revisions to all quarters except Q1. 2021 US natural gas production is forecast to average 92.55 bcf/d (up from 92.18 bcf/d previously). (iv) US natural gas production is expected to average 94.69 bcf/d in 2022 (93.93 bcf/d previously) and 2022 is up 2.14 bcf/d YoY. (v) The EIA did not provide basin specific explanations of projections but did write *"We forecast that U.S. dry natural gas production will average 92.6 Bcf/d in 2021, which would be up 1.3% from 2020. In 2022, we expect dry natural gas production to average 94.7 Bcf/d, which would be up 2.3% from 2021."* Our Supplemental Documents package includes excerpts from the EIA STEO.

Figure 4: EIA STEO US Natural Gas Supply Forecasts By Forecast Month

bcf/d	Q1/19	Q2/19	Q3/19	Q4/19	2019	Q1/20	Q2/20	Q3/20	Q4/20	2020	Q1/21	Q2/21	Q3/21	Q4/21	2021	Q1/22	Q2/22	Q3/22	Q4/22	2022
July 2021	90.01	91.57	94.01	96.58	93.06	94.79	89.68	89.83	91.15	91.35	90.31	92.88	93.17	93.8	92.55	93.65	94.1	95.16	95.82	94.69
June 2021	90.01	91.57	94.01	96.58	93.06	94.79	89.68	89.83	91.15	91.35	90.53	92.26	92.63	93.26	92.18	93.13	93.48	94.31	94.81	93.93
May 2021	90.01	91.57	94.01	96.58	93.04	94.79	89.68	89.83	91.15	91.35	90.09	90.75	91.34	92.03	91.06	91.97	92.54	93.60	94.36	93.12
Apr 2021	90.01	91.57	94.00	96.58	93.04	94.79	89.68	89.83	91.18	91.36	90.82	90.90	91.59	92.31	91.41	92.23	92.75	93.76	94.39	93.29
Mar 2021	90.01	91.57	94.00	96.58	93.04	94.79	89.68	89.82	91.08	91.34	90.50	91.04	91.71	92.13	91.35	91.87	92.25	93.28	93.90	92.83
Feb 2021	90.01	91.57	94.00	96.58	93.04	94.79	89.68	89.82	90.89	91.29	90.88	90.17	90.40	90.54	90.50	89.95	90.18	91.41	92.26	90.96
Jan 2021	90.01	91.57	94.00	96.58	93.04	94.79	89.67	89.87	88.73	90.76	87.48	87.54	88.54	89.11	88.17	88.54	88.86	90.17	91.02	89.66
Dec 2020	90.01	91.57	94.00	96.58	93.04	94.79	89.67	89.72	89.36	90.88	87.65	87.25	88.13	88.61	87.91					
Nov 2020	90.01	91.57	94.00	96.58	93.06	94.85	89.73	90.14	89.29	90.99	87.50	87.10	88.16	88.86	87.91					
Oct 2020	90.01	91.57	94.00	96.58	93.06	94.48	89.44	89.81	88.86	90.64	86.56	86.02	87.04	87.58	86.81					
Sept 2020	89.32	90.50	92.98	95.97	92.21	94.48	89.50	88.44	87.14	89.88	85.67	85.87	87.07	87.73	86.59					
Aug 2020	89.32	90.50	92.98	95.97	92.21	94.48	89.20	86.27	84.73	88.65	83.21	82.93	84.35	85.55	84.02					
July 2020	89.32	90.50	92.89	95.97	92.21	94.50	89.91	87.27	85.37	89.24	83.48	83.25	84.53	85.63	84.23					
June 2020	89.32	90.50	92.98	95.97	92.21	94.47	90.60	87.95	85.66	89.65	83.96	84.44	85.75	87.34	85.39					

Source: EIA, SAF

Figure 5: EIA STEO US Natural Gas Supply Forecasts By Forecast Month



Source: EIA, SAF

Natural Gas – US LNG exports still near all-time highs

US LNG exports near all-time highs

Although US LNG exports are down from the all-time record of 10.40 bcf/d in May, June exports of 9.03 bcf/d are still an all time high for the month. The EIA provided some color on the data and wrote *"U.S. LNG exports have reached record high levels this spring, averaging 10.3 Bcf/d from March through May, supported by high spot LNG prices in Asia and Europe, and a continuous recovery in global LNG demand. We estimate that U.S. LNG exports declined to 9.0 Bcf/d in June, likely because of planned and unplanned outages at several U.S. liquefaction facilities."* The EIA forecasts US LNG exports "*to average 9.6 Bcf/d in 2021 and 10.2 Bcf/d in 2022, surpassing pipeline exports for the first time on an annual basis in both years. Several factors support this forecast: gradual recovery in global LNG demand, high winter LNG demand, particularly in Asia, and expansions in global LNG regasification capacity in both existing and new markets in the next two years. U.S. LNG exports are projected to increase in 2022 because of commissioning of additional LNG trains at Sabine Pass and Calcasieu Pass".* The EIA forecasts US LNG exports of 9.89 bf/d in Q2/21 to decline to 9.24 bcf/d in Q3/21. We don't think this QoQ decline is market oriented, rather, we would think they are assuming some minor potential interruptions during peak Atlantic hurricane season or maintenance.

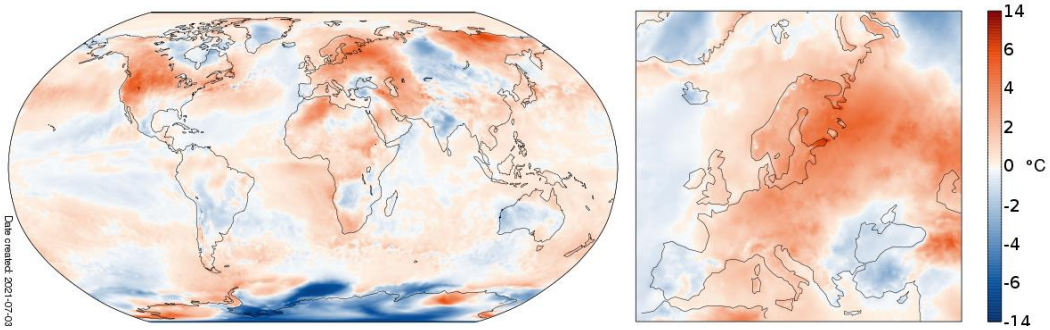
Natural Gas – It was also very hot in Europe in June

June was 2nd warmest in Europe

This past month was very positive for LNG prices because it was hot in most place of the world. June 2021 was tied for the 4th warmest June on record globally, according to a release this month by Copernicus [LINK]. The only other Junes that were hotter were June 2016, 2019 and 202. For Europe, this month was the second warmest June on record, with

average temperatures for June 2021 that were 1.5°C above the 1991-2020 average. The northern hemisphere experienced "extremely high" summer temperatures, especially western and central North America and northern Siberia. Below is Copernicus' surface air temperature anomaly map for June.

Figure 6: Surface air temperature anomaly for June 2021



Source: Copernicus

Natural Gas – Drought helping natural gas demand in Turkey

Turkey's drought helped natural gas

We have been noting drought conditions in California and Pacific NW are expected to lead to less hydrogeneration and therefore the increased natural gas demand to be the primary filler of that void. It's the reliability factor. It was interesting to see a similar story play out in Turkey. Although Turkey has drastically increased its hydropower capacity over the last 10 years (+80%), when there is not enough rainfall, natural gas must fill the gap. On Friday, The Daily Sabah reported [LINK] that the amount of water in Turkey's main dams was down 27% YoY in 2020. As a result, the share of natural gas power plants in total electricity generation grew to 22.7%, up from the lows of 18% for natural gas in 2019. This year, the demand for natural gas looks to be even greater, with water levels in main dams falling by 50% to only 858.15 bcf. Thus far, natural gas' share of electricity generation been pushed up to 27.3%. Due to these drought conditions, natural gas prices have also been impacted. Volkan Yigit, a partner at APLUS Energy said *"Just as electricity market prices fell in 2019 during the rainy season, prices climbed during the times of drought. This year, we have seen the impact of drought on electricity prices since April but we should also keep in mind the lower demand in the same month of last year due to the pandemic."* However, Yigit does expect the electricity system to find its balance, as more natural gas plants are set to return, the forecast is calling for lower temperatures and it's expected that there will be increases in wind generation. Our Supplemental Documents package includes he Daily Sabah report.

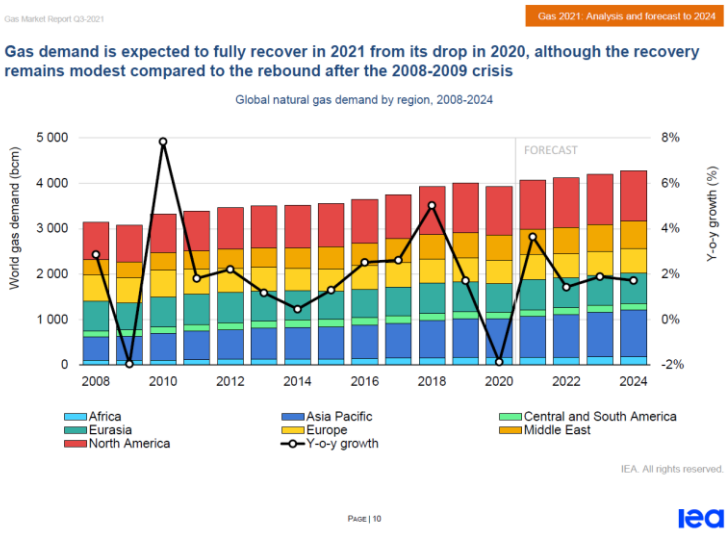
Natural Gas – We thought the new IEA natural gas forecast was bullish for LNG

IEA's new natural gas/LNG forecast thru 2024

We recognize that no one has this view and the IEA did not say this, but we thought the new IEA natural gas/LNG forecast thru 2024 really presents the expectation for a very tight LNG outlook and a LNG supply gap around 2025. (i) That is not what they say. But just look at their assumptions and it seems to be that a lot has to go right to avoid a structurally tight LNG market. And as noted below, we have to wonder how the IEA's recent Net Zero scenarios impact the assumptions and messaging in this new forecast. (ii) We believe one of the big challenges for markets will be to try to think about how the IEA has positioned itself on its mid term forecasts because of the Net Zero scenarios – don't they have to be more optimistic on the energy transition ie. we think there will be a bias to moving off fossil fuels faster than what will happen. And don't forget mid term forecasts are outlooks that don't get changed for years. This is the challenge for markets. (iii) The key assumption is that IEA assumes a lower

rate of natural gas demand growth. IEA writes "*Demand growth is, however, not expected to maintain this pace in the medium term, but rather to slow to an average 1.7% annual rate for the 2022-2024 period, equally driven by economic activity and fuel switching from coal and oil. This slower growth may still be too high to match a net-zero emissions path". "demand is set to keep growing in the coming years, albeit at a slower pace, to reach nearly 4 300 bcm by 2024, a 7% rise from pre-Covid levels*". (iv) The new IEA forecast is natural gas demand growth rate of +1.7% per annum and for natural gas to be +27 bcf/d from 2019 thru 2024 to total world consumption of 416 bcf/d in 2024. To put in perspective, the new BP historical rate thru 2020 for natural gas consumption for the past 10 years was +2.9% per year, and note that this is up from +2.6% per annum for the 10 years ending 2019. (v) This is why we think this is really a very bullish LNG forecast. There is a lot that has to go right in the IEA forecast for them to avoid a structurally tight LNG market and, most of all, they have to be right that the growth in natural gas consumption is 58% the growth rate in the last decade. And that lower natural gas growth translates into an even lesser relative growth rate in LNG. IEA forecasts LNG growth at a fraction of recent growth – "*At an annual average growth rate of 3.3% through 2024, this is much slower than the double-digit increases observed between 2016 and 2019*". Note LNG growth accelerated in the last half of the decade and BP latest estimate is that LNG imports increased by a 6.8% annual rate compared to the 10 years ended 2020. But even at this low growth rate, they warn on risk of seasonal LNG shortages. Imagine if they have a more realistic growth rate. On LNG shortages, IEA writes "*In the absence of major project delays or unplanned outages, the risk of a structurally tight market appears limited before 2024 with the possible exception of short seasonal episodes*." Our Supplemental Documents package includes excerpts from the IEA report.

Figure 7: IEA natural gas demand forecast thru 2024



Source: IEA

Natural Gas – A sea change in LNG deals? LNG buyers locking up long term supply

Sea change in LNG buyer deals

Cdn natural gas markets should be paying attention to what we call a sea change in LNG buyer deals because any LNG supply gap is positive for the potential for a LNG Canada Phase 2 FID when none is expected. It looks like we are seeing signs of a sea change in mid to long term LNG deals. It looks like we are seeing the best indicator for what Asian LNG buyers believe in the mid to long term LNG market – they are doing long term deals again

and not trying to force short term or spot linked deals. Later in the memo, we note the new long term LNG deals announced by Petronas and Qatar. After tweeting [LINK] on the Petronas deal, we think its worth noting the implications of why these deals are happening. Recall a year ago, the long term LNG chatter was all about Asian LNG buyers wanting to renegotiate away from long term deals, no surprise they wanted to initiate negotiations as LNG markets were very weak and were expected to have long term surplus supply. But now, we see record LNG prices this winter and extremely higher summer LNG buyers. Its not the time for LNG buyers to have leverage, so we believe this must be a recognition by Asian LNG buyers that there is an increasing expectation for a LNG supply gap. Its not just announced deals, but we are also seeing the confirmation from LNG suppliers of this stronger market. Last week's (July 4, 2021) Energy Tidbits memo note Cheniere's changed public stance on LNG markets and how they finally confirmed they have been seeing a big pickup in commercial discussions in 2021.

We believe the LNG long term deals are driven by Mozambique LNG deals

Last week's (July 4, 2021 Energy Tidbits) memo highlighted the changed Australia and Cheniere long term LNG market views. We believe those changed views and this week's new long term deals are being driven by the delays of 5 bcf/d of LNG supply from Mozambique. On April 28, 2021, we posted a 7-pg blog "*Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?*" [LINK] 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 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 – Petronas 10 yr LNG deal with CNOOC includes LNG Canada supply

Petronas 10 yr LNG deal with CNOOC

On Wednesday, we tweeted [LINK] on the confirmation of a big positive to Cdn natural gas with the Petronas announcement [LINK] of a new 10 year LNG supply deal for 3.0 bcf/d with China's CNOOC. (i) Petronas said "*This long-term supply agreement also includes supply from LNG Canada when the facility commences its operations by middle of the decade*". This is a reminder of the big positive to Cdn natural gas in the next 3 to 4 years – the start up of LNG Canada Phase 1 is ~1.8 bcf/d capacity. This is natural gas that will no longer be moving

south to the US or east to eastern Canada, instead it will be going to Asia. This will provide a benefit for all Western Canada natural gas. (ii) First ever AECO linked LNG deal. It's a pretty significant event for a long term Asia LNG deal to now have an AECO link. Petronas wrote "*The deal is for 2.2 million tonnes per annum (MTPA) for a 10-year period, indexed to a combination of the Brent and Alberta Energy Company (AECO) indices. The term deal between PETRONAS and CNOOC is valued at approximately USD 7 billion over ten years.*" 2.2 MTPA is 0.3 bcf/d. (iii) Reminds of LNG Canada's competitive advantage for low greenhouse gas emissions. Petronas said "*Once ready for operations, the LNG Canada project paves the way for PETRONAS to supply low greenhouse gas (GHG) emission LNG to the key demand markets in Asia."* Our Supplemental Documents package includes the Petronas release.

LNG Canada will have hugely lower GHG than any other operating facility

Its not huge yet, but we are seeing increasing LNG buyer focus on getting carbon neutral or low GHG emissions LNG cargos. Petronas highlighted how the advantage of LNG Canada having low greenhouse gas emissions. Its from March 2020, but LNG Canada noted this advantage, writing "*GHG emissions from LNG Canada's Kitimat operation will be lower than any facility currently operating anywhere in the world today: 35 per cent lower than the world's best performing facilities and 60 per cent lower than the global weighted average. LNG Canada will use B.C. natural gas that's produced and compressed using renewable electricity from the BC Hydro grid. Energy-efficient gas turbines and the latest methane mitigation technologies will also help us reach our low-emissions standards*." Our Supplemental Documents package includes the LNG Canada March 2020 brief. [LINK]

LNG Canada Phase 1 of 1.8 bcf/d is ~25% of Cdn gas exports to US

We continue to believe LNG Canada Phase 1 will represent a step change positive to Cdn natural gas. For example, it will represent approx. 25% of Cdn gas export volumes to the US. The EIA data shows US pipeline imports of Cdn natural gas as 6.83 bcf/d in 2020, 7.36 bcf/d in 2019, 7.70 bcf/d in 2018, 8.89 bcf/d in 2017, 7.97 bcf/d in 2016, 7.19 bcf/d in 2015 and 7.22 bcf/d in 2014.

Natural Gas – Qatar new 15 yr deal to supply LNG to Taiwan

Qatar 15 yr LNG deal with Taiwan

As noted above, we are seeing what looks to be a sea change for long term LNG contracts. Pre Covid, Qatar was getting pressured to renegotiate lower its long term LNG contract prices. Now, its signing 15 year deal. This week, they entered in a new long term LNG sales deal. On Thursday, Qatar Petroleum announced [LINK] that it had entered into a 15-yr LNG Sale and Purchase Agreement with CPC Corporation in Taiwan to supply it ~60 bcf/d of LNG. LNG deliveries are set to begin in January 2022. H.E. Minister for Energy Affairs & CEO of Qatar Petroleum Al-Kaabi said *"We are pleased to enter into this long term LNG SPA, which is another milestone in our relationship with CPC, which dates back to almost three decades. We look forward to commencing deliveries under this SPA and to continuing our supplies as a trusted and reliable global LNG provider."* Qatar Petroleum has had a long-standing relationship with CPC Corporation, having delivered them over 3,000 bcf of LNG since 2006. Our Supplemental Documents package includes the Qatar announcement.

Natural Gas – Waiting for a Qatar long term LNG deal or deals with India

India Qatar LNG deals coming soon?

Yesterday we retweeted [LINK] "*New India Petroleum Minister hits ground running. What else w/ Qatar but #LNG. Must be #Puri setting stage for long term LNG supply deal(s). Fits sea change of buyers seeing #LNGSupplyGap (see SAF Apr 28 blog http://safgroup.ca) & wanting to tie up LNG supply. #OOTT".* Its hard to see any conclusion after seeing what we

call a sea change in LNG buyer mentality with a number of long term LNG deals this week. Puri tweeted [LINK] "*Discussed ways of further strengthening mutual cooperation between our two countries in the hydrocarbon sector during a warm courtesy call with Qatar's Minister of State for Energy Affairs who is also the President & CEO of @qatarpetroleum HE Saad Sherida Al-Kaabi".* As noted above, we believe there is a sea change in LNG markets that was driven by the delay in 5 bcf/d of LNG supply from Mozambique (Total Phase 1 & Phase 2, and Exxon Rozuma Phase 1) that was counted on all LNG supply projections for the 2020s. Puri's tweet seems to be him setting the stage for some India company long term LNG supply deals with Qatar.

Puri just took over as India's Petroleum Minister on Thurs

In our tweet, we said Puri hit the ground running as he only took over as Petroleum Minister on Thursday. There has been an overhaul of Modi's cabinet, and Hardeep Singh Puri has been named as the new oil minister. On Thursday, Argus reported Dharmendra Pradhan, the previous Petroleum minister, had been replaced and will take over the Education Ministry. Puri will have his work cut out for him, as India is currently facing record-high retail motor fuel prices, due in part to domestic taxes that make up 60% of fuel prices. Ajay Kedia, director of Kedia Advisory in Mumbai said *"The major task at hand for Puri will be the privatisation of state-controlled BPCL, which has been delayed due to initial subdued interest among the investor fraternity coupled with the pandemic-induced slowdown."* However, Naveen Gupta, secretary general of the All India Motor Transport Congress (AIMTC), does not see Puri's arrival *"[making] any difference as the new minister too will be toeing the party line rather taking people-centric decisions. No benefit seems to accrue to the people of India in terms of a reduction in fuel or cooking gas prices."* Puri served as the Permanent Representative of India to the UN for 4 years. Previously, he served as chairman for the UN Security Council Counter-Terrorism Committee and president of the UN Security Council. Puri also has extensive experience in the Ministry of External Affairs and the Ministry of Defence. Up until now, he was the Minster of State for Housing and Urban Affairs as well as Commerce and Industry. He will maintain his position as Minister of State for Housing during his term as oil minister [LINK].

Natural Gas – BP signs 12-yr LNG supply deal with China's Guangzhou Gas

BP 12 yr LNG deal to China

We saw one other long term LNG supply deal to Asia, albeit a small deal to China Argus reported on Wednesday [LINK] that BP had signed a 12 year LNG supply deal with Guangzhou Gas (GG), a Chinese city's gas distributor, which starts in 2022. The contract prices are to be linked to an index of international crude prices. Although GG typically gets its LNG from the spot market, it used a tender in late April for ~0.13 bcf/d starting in 2022. BP's announcement looks to be for most of the tender, so it's a small deal. But it fit into the trend this week of seeing long term LNG supply deals to Asia. This was intended to secure deliveries to the firm's Xiaohudao import terminal which will become operational in August 2022. GG had previously signed a preliminary deal to buy 48.028 bcf/yr from Canada's planned Woodfibre LNG project, but due to delays to the project's start, it chose not to finalize the agreement in late Aug 2019. Our Supplemental Documents package includes the Argus report.

Natural Gas – Woodside reportedly detects corrosion at NWS LNG Train 4

North West Shelf LNG corrosion issue

Its early so we don't know how this corrosion issue will impact LNG supply at Woodside's North West Shelf LNG project. But when you hear about corrosion in pipework at a LNG facility, we certainly, at a minimum, have to put it on a watch list to see how it will impact LNG

production. and that gets increased when you are dealing with multi train LNG facilities. As we saw at Gorgon in 2020, there are the same LNG fabricators/suppliers for each train. LNG supply delays are the driving force for our bullish LNG call in April with the delays to ~5 bcf/d of new Mozambique LNG supply (Total Phase 1, Total Phase 2 and Exxon Rozuma Phase 1) that was supposed to start coming on in stages beginning in 2024. (i) On Friday morning, we tweeted [LINK] "*1/2. Must read. @PeteMilne4 reports #Woodside investigating corrosion on #NorthWestShelfLNG Train 4 (~0.6 bcf/d) "there are concerns the problem could be more widespread". Positive for 2021 #LNG prices and US LNG exports, but if more widespread .."* and [LINK] *"2/2. More widespread would add to the 2021 changing view on LNG supply in 2020s. See SAF Group Apr 28 blog "Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?".* The more widespread impact was in reference to potentially the other 4 trains at the Woodside North West Shelf (NWS) LNG project. Boiling Cold posted a report "*Concern over corrosion found at Woodside's North West Shelf LNG*" [LINK]. Boiling Cold's Milne wrote "*Woodside is investigating corrosion identified this week on a North West Shelf LNG train, and there are concerns the problem could be more widespread. Woodside started a long-planned shutdown of Train 4 of the NWS LNG plant near Karratha in mid-June. Boiling Cold understands earlier this week radiography results revealed several areas on propane pipework were corroded to less than half the original wall thickness. Such a material loss would dramatically increase the risk of flammable propane leaking – a loss of containment in industry terms - when the train is in operation. The pipework was covered in a fire protection coating called Chartek that Boiling Cold understands was found to be cracked during a 2017 inspection. Train 4 was to be shut down for maintenance last year, but the work was pushed back in March 2020 when Woodside cut costs in response to the COVID-19 driven crash in oil prices. Corrosion under pipework insulation or coatings that allows water to enter due to poor installation or later cracks is a well-known problem in the oil and gas sector and made worse by the difficulty of detecting it.".* (ii) Reuters reported [LINK] "*Woodside Petroleum WPL.AX is rectifying a corrosion issue identified during planned maintenance at the Karratha gas plant in western Australia, a company spokesperson said on Friday. "We have discussed with the regulator and are taking all necessary measures to ensure the ongoing safety of our people and operations," the spokesperson told Reuters, adding there was no material impact to Woodside's current production guidance."* We don't think this Woodside response really tells what the impact will be from the corrosion. (iii) Woodside North West Shelf LNG onshore processing is called Kawartha and is five trains for a total of 16.9 mmtpa or 2.2 bcf/d. Train 4 is one of the larger at approx. 0.6 bcf/d. Train 5 is similar. Woodside was in the planned turnaround from April to June for Train 4

Natural Gas – Algeria's Skikda LNG 0.5 bcf/d being shut down since June 11

Algeria 0.5 bcf/d Skikda LNG down since June 11

We continue to check but still haven't seen any reports for any restart of, or scheduled restart for Algeria Sonatrach's 0.5 bcfd/d Skikda LNG Plant, which was shut down on June 11. Our June 27, 2021 Energy Tidbits memo noted the Sonatrach, the operator at Skikda, release on June 19 [LINK] *"A technical incident occurred on June 11 at the Skikda LNG Complex and led to the shutdown of this complex. The technical incident was caused by a sudden failure of a gas turbine control mechanism. No other damage is to be deplored thanks to the operation of the automatic safety devices of the machine and the plant…Sonatrach has decided to carry out a thorough inspection in order to carry out the necessary repairs."* We have not seen any official update since then from Sonatrach. Skikda had problems in 2020 also due to a turbine, it was previously closed for 6 months in 2020 due to extended maintenance as a result of necessary repairs to a turbine. Sonatrach attempted to compensate for the loss by increasing exports from Arzew, but Algerian LNG exports were contrained that year to 523.5 bcf. So far in 2021, Algeria has exported 298.7 bcf of gas, or around 50% of its technical

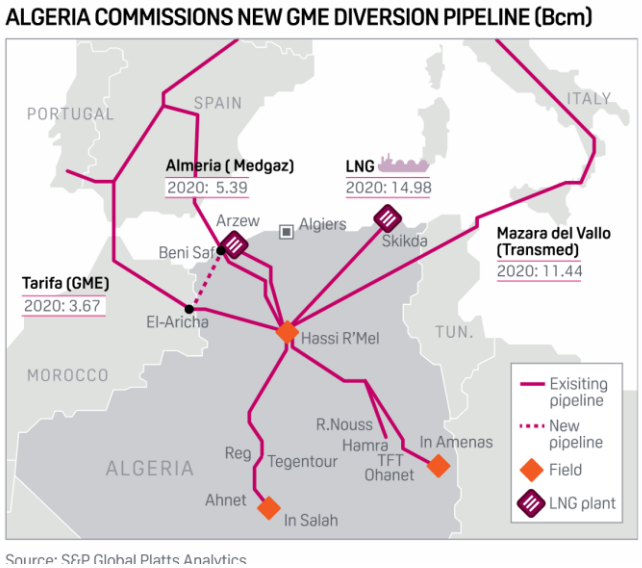
nameplate capacity. The amount lost due to the shutdown is not a huge quantity, but helps provide more support for Europe natural gas prices, in turn providing support for LNG prices and US LNG exports this summer.

Natural Gas – Algeria/Morocco gas transit issues remind of Russia/Ukraine

Algeria and Morocco gas transit issues

One of the benefits from looking for updates on a subject, in this case Sonatrach's Skikda LNG, is that we will see other stories that we may have missed. In this case, it was Platts June 30, 2021 report "*Algeria has taken 'necessary measures' to offset non-renewal of Morocco gas deal*" [LINK]. The focus of the report is on the EGPDF pipeline, which provides a way for Algeria to bypass exporting gas to Spain if it can't get a renewal of its contract to transport gas via Morocco. Reminds of Russia/Ukraine but without any invasions. The deal to transport natural gas to Spain via the GME pipeline expires on Oct 31, 2021 and Platts reported "*Morocco has reportedly opted to halt talks on the renewal of the transit deal due to worsening relations with both Algeria and Spain*." Platts writes "*Algeria sends gas to Spain via two pipelines -- the GME pipeline via Morocco and the direct Medgaz link -- with volumes totaling 9.06 Bcm in 2020, according to S&P Global Platts Analytics data. More gas was sent via the Medgaz line to Almeria (5.39 Bcm) than via the GME line to Tarifa (3.67 Bcm).*" This is equal to Medgaz 0.52 bcf/d, GME 0.36 bcf/d and total 0.88 bcf/d. The EGPDF pipeline was inaugurated on May 7. Platts wrote "*The new El-Aricha-Beni Saf pipeline was designed as a tool for Algeria to be able to maintain exports to Spain should there be issues in future with supplies via the GME line. Sonatrach began construction work on the new pipeline in 2018 to create the new "loop" between the export lines. In order to be able to move gas in that direction, the capacity of Medgaz was expanded to 10.5 Bcm/year and could be expanded further to 16 Bcm/year.*" One last tidbits is that Morocco also relies on the Algeria natural gas from the pipeline. We recommend adding the Platts story to reference libraries for its excellent recap of Algeria's natural gas export pipelines and below map. Our Supplemental Documents package include the Platts report.

Figure 8: Algeria's EGPDF (El Aricha to Beni Saf) Pipeline Inaugurated May 7, 2021



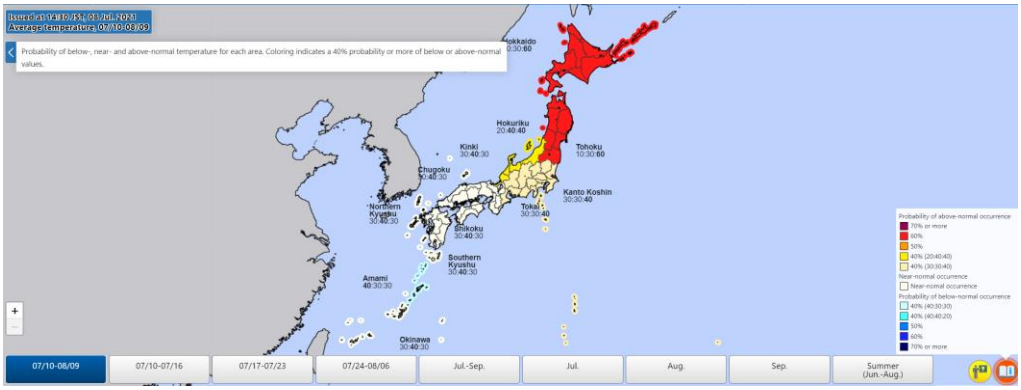
Source: Platts

Natural Gas – Japan July forecast just "okay" for natural gas

Above normal temperatures, but for less populated region of Japan

The global weather story for June was that it was warm in many places around the world including in Asia. Hot global weather has been a support for summer LNG prices. However, the updated July forecast had turned to more near-normal temperatures. Now, the most recent forecast is showing very hot weather in the north and near-normal temperatures for the rest of the country. The Japan Meteorological Agency issued an updated weather forecast for July 10th - August 9th average temperatures on Thursday [LINK]. While the forecast has certainly warmed up, the north is not the heavily populated area of Japan. The Tohoku region (red) is home to 8.68 mmm people, while the Kanto region (yellow), home to Tokyo, with a population of 43.33 mm people. As such, the support the north temperatures will lend for LNG will likely be minimal. Below is the current JMA forecast for July.

Figure 9: JMA Temperature Probability Forecast for July 10 – Aug 9



Source: Japan Meteorological Agency

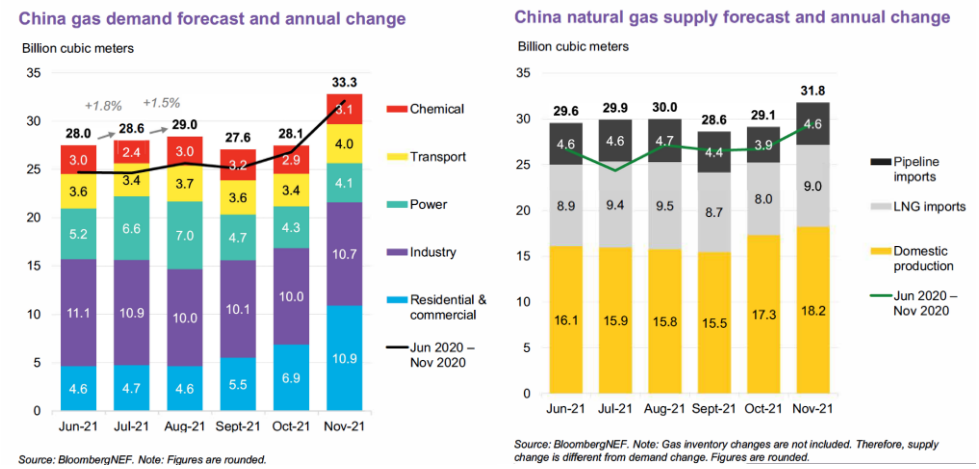
Natural Gas – High LNG prices impacting summer China LNG imports

BloombergNEF China Gas Monthly

One of our favorite BloombergNEF monthly reports was posted this week – China Gas Monthly. On Tuesday, we tweeted [LINK] "*Continued support for summer #LNG prices from China. @BloombergNEF "China Gas Monthly: More LNG Needed Despite Higher Prices". If #Nordstream2 doesn't start for Q4, there will be a mad scramble for LNG this winter. Thx @BloombergNEF Lujia Cao & Daniela Li. #NatGas".* (i) BloombergNEF doesn't say it, but its clear that China, Korea, India are all assuming Nord Stream 2 comes on in time for winter 2021/2022. If they didn't believe that, they wouldn't be passing on LNG cargoes this summer due to $13 price. We don't think any of them has any special crystal ball on weather. Because if Nord Stream 2 doesn't start up and, unless winter starts off warm pretty well everywhere, then LNG at $13 will look cheap. Bloomberg writes "*Gas supply: LNG imports to grow in July and August but high prices add pressure".* (ii) Continued solid, but not spectacular LNG demand. Domestic natural gas production and pipeline imports are both up YoY this summer and LNG tends to be the balancing items. "*BloombergNEF estimates China's gas demand in July will increase 16% year-on-year to 28.6 billion cubic meters and further increase to 29.08cm in August. July LNG imports may increase 4% from June to 6.7 million tons. Pipeline imports are estimated to reach 4.68cm in July and grow to 4.78cm in August*". (iii) Natural gas demand this summer. "*Apparent gas consumption during July to August is likely to increase steadily by 14.5% year-on-year to 57.5 billion cubic meters. Strong demand growth, especially from the industry and power sectors, is expected to boost gas consumption. • BNEF estimates June gas demand to be 28.0Bcm, up 13.6% year-on-year.* " (iv) Domestic gas production, pipeline impots and LNG imports. "*June domestic gas production is expected to increase 6% year-on-year to 16.1 billion cubic meters, down 5%*

from May. July and August gas output is forecast to rise 11 % on a yearly basis to 31. ?Bern. Domestic gas production in the third quarter is likely to grow 10% yearly to 47Bcm. • LNG imports surged 25.9% year-on-year in June, reaching 6.5 million tons". "July LNG imports could increase 6% from June, due to higher gas power demand with warmer temperatures in eastern and southern China. LNG imports in the third quarter could increase 19.6% year-on-year to 20 million tons. • Pipeline gas imports in June and July are estimated to be 4.6Bcm, maintaining a similar level to May. Russian gas deliveries are estimated to resume normal levels. Third quarter pipeline imports are estimated to total 13.7Bcm, growing at 14.8% year-on-year. (v) One of the items we have noted previously continues help summer demand – power shortages. Bloomberg writes "*Several provinces in China are facing power shortages as the global economic recovery and hot summer weather boost gas demand. Jiangsu needs to import more LNG over the summer to meet rising gas demand*". (vi) Bloomberg NEF has a good chart that shows US LNG is reasonably competitive into China. (vii) We hadn't heard of the "*deadly gas explosion in Hubei Province led to a nationwide investigation of safety risks, which could potentially impact industrial and commercial gas demand in some way*". Killed 25 and injured ~140 people, sounds like some local gas pipeline explosion. Several have been charged in this. Our Supplemental Documents package includes excerpts from the BloombergNEF China Gas Monthly

Figure 10: BloombergNEF China Gas Monthly exerpts



Source: BloombergNEF

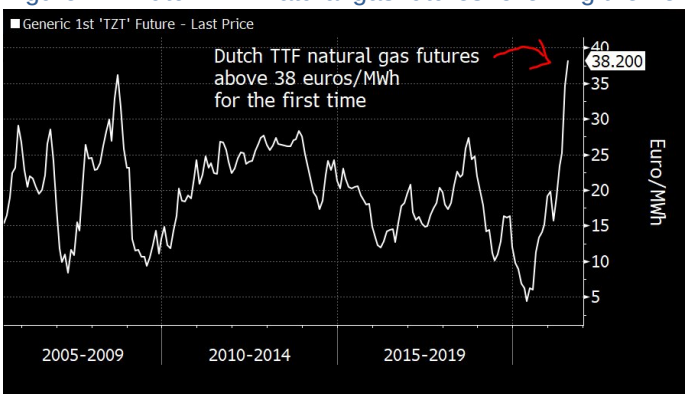
Natural Gas – Gazprom refuses to book additional capacity via Ukraine for 3 years

No additional gas capacity via Ukraine until at least 2024

One of the reasons for Europe storage continuing to be far lower than last year is that Gazprom hasn't been booking any offered extra gas capacity on pipelines via Ukraine. Rather it has been keeping to its contract volumes. On Monday, Bloomberg reported Gazprom rejected proposals for extra gas capacity via Ukraine until 2024. It was only a Bloomberg terminal July 5 headline "*Gazprom rejects extra gas capacity via Ukraine for Yrs 2021-2".* We tweeted following the release [LINK] *"Positive for summer #LNG prices. Also supports need for US LNG exports to Europe this summer, which is more support for #HenryHub #NatGas price. Europe needs to attract more LNG cargoes to refill tanks prior to winter. Thx @SStapczynski"*. Russia seems to be reminding that they will honor long term contract obligations to deliver natural gas through Ukraine, but no more than the pre-agreed amount. Despite this having long term effects, TTF prices went up 6% that day. Bloomberg's Stephen Stapczynski tweeted as well [LINK] *"Russia decides not to book extra annual natural gas pipeline capacity via the Ukraine and Poland, spooking the market amid supply crunch*

fears. Even though the auctions were for capacity starting from Oct., the front-month Europe gas benchmark jumped to a new record high." In a follow up, he also commented that *"Now more than ever, Europe's chances of dodging a winter supply crunch hangs on the start up of Russia's Nord Stream 2".* We have included the image from Stephen's tweet below, charting the Dutch TTF natural gas futures.

Figure 11: Dutch TTF natural gas futures following the news



Source: Twitter, Bloomberg

Natural Gas – Good recap of Gazprom's Europe gas markets

Gazprom recaps its European markets

Gazprom published a good marketing piece recapping their activities in the European gas market [LINK]. Russia has been supplying the European market with gas for over 50 years. Last year, Russia gas exports to Europe were 16.92 bcf/d, with most exports going to the Netherlands (4.65 bcf/d), Germany (4.02 bcf/d) and Italy (2.02 bcf/d). Gazprom noted that they use long-term contracts and take-or-pay clauses, writing *"Long-term contracts with take-or-pay clauses are fundamental to stable and sustainable gas supplies. No other contract can guarantee that producers and exporters will get returns on multibillion investments in major gas export projects and that importers will enjoy secure and uninterrupted gas supplies in the long term."* The average gas selling price in 2020 was ~US$5,050/mcf, down -32.1% from 2019. Gazprom also detailed some of its ongoing projects, the first being Nord Stream, which reached its designed capacity in 2012 and TurkStream, a pipeline from Russia to Turkey. Gas supplies through the TurkStream pipeline began January 2020. Of course, it also mentioned Nord Stream 2, on which construction is still ongoing. Below is a table of the top export destinations for Gazprom. Our Supplemental Documents package includes the Gazprom report.

Figure 12: Top 10 Gazprom Europe Export Destinations in 2020

Country	bc
Netherlands	4.65
Germany	4.02
Italy	2.02
Turkey	1.59
France	1.35
Austria	1.03
Poland	0.94
United Kingdom	0.86
Hungary	0.83
Slovakia	0.74

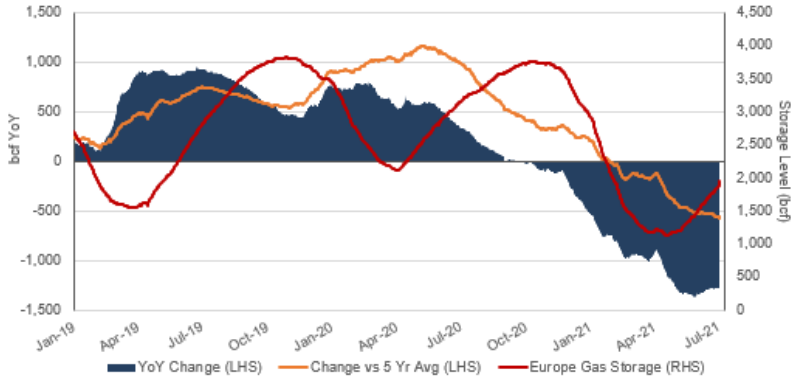
Source: Gazprom

Natural Gas – Europe storage 49.93% full vs 5 year average of 65.56%

Europe gas storage 47.64% full

We continue to see the set up for strong summer LNG price, which should support strong US LNG exports to Europe. It was a colder spring, which delayed the refill push in Europe and this is setting up support for summer prices. Additionally, the continued significant YoY deficit in Europe gas storage indicates that there will be strong demand for European LNG imports during the refill push especially since Russia, at least so far in Q2, looks like it only plans to ship contract volumes via Ukraine to Europe ie. not sending above contract levels. Plus high Asian LNG prices continue to provide the incentive for LNG cargoes to go to Asia. This is a big positive indicator for US LNG exports this summer. 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 8 is 49.93%, 32.3% less than last year of 82.23% and 15.63% below the 5 yr average of 65.56%. Europe storage 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 13: Europe Gas Storage Level



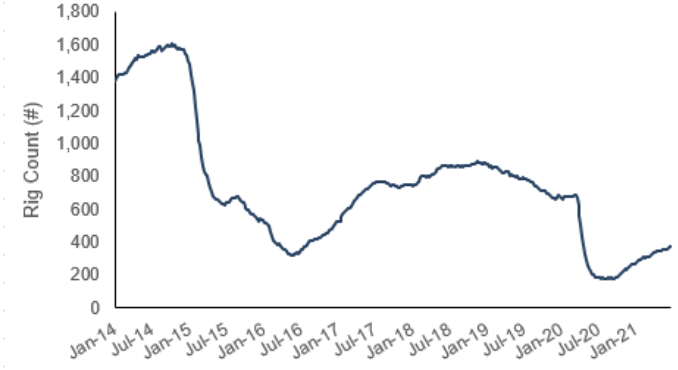
Source: Bloomberg

Oil – US oil +2 WoW at 378 oil rigs

US oil rigs +2 WoW

Baker Hughes reported its weekly rig data on Friday. This week US oil rigs were up +4 rigs WoW at 378 rigs. Permian was flat at 237 rigs. Increases came from Others (+2), and there were no decreases this week. Oil rigs have been on a strong recovery path and are +206 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 307 to 376 oil rigs (-44.95%). Below is our graph of Baker Hughes US oil rigs.

Figure 14: Baker Hughes Total US Oil Rigs



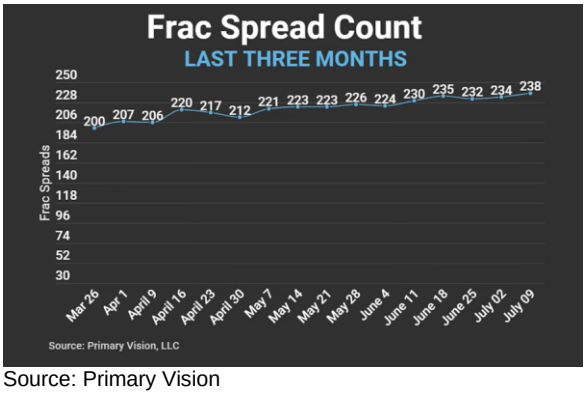
Source: Baker Hughes

Oil – Frac spreads +4 to 238 for week ending July 9

Frac spreads +4 to 238

Every week, Mark Rossano (C6 Capital Holdings) posts a YouTube recap of frac spreads for the week on the Primary Vision Network [LINK]. Frac spreads were +4 to 238 for the week ending July 9, 2021. He continues to see a steady grind up. Not really seeing any decline areas, rather just picking up a spread here and there. Expects to see a steady increase up until the normal seasonal decline that hits in mid Nov for holidays. Rossano is also seeing some increases in the Appalachia and some increases in the Williston. And the Williston is the one he want to watch the most because we should see a decent amount of increases there. Permian has been held stable but thinks will start to see increases as we progress thru July. Should see stable increases as get to 250 to 255, the near term target. Note he dropped one of his key charts this week. Below is frac spread count chart.

Figure 15 Active Frac Spreads for Week Ending July 9, 2021



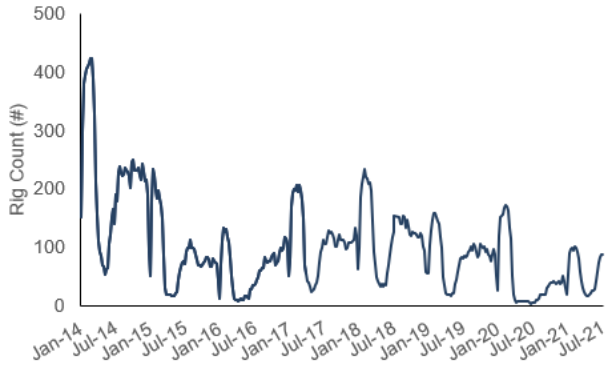
Source: Primary Vision

Oil – Total Cdn rigs +1 to 137 total rigs and up 111 YoY

Cdn rigs +1 this week

Total Cdn rigs were up 1 this week to 137 total rigs. Cdn oil rigs were up 1 to 88 rigs. Cdn gas rigs were up 1 to 48 gas rigs. The decrease came from Misc. rigs. Total rigs are now +124 since the June 26 all-time low. We were surprised by the essentially flat week for Cdn rigs, which normally keep increasing through July. We have to wonder if the increasing wildfires and very hot weather have caused some delays to rig additions. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 6 and Cdn gas rigs were 20 for a total Cdn rigs of 26, meaning total Cdn rigs are +111 YoY and total rigs are up +20 vs 2019.

Figure 16: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production up 0.2 mmb/d WoW at 11.3 mmb/d

US oil production up 0.2 mmb/d WoW

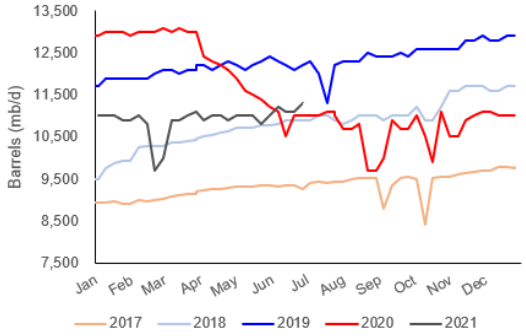
US oil production was up 0.2 mmb/d at 11.3 mmb/d for the July 2nd week, the first time production has broken above the 10.9-11.2 mmb/d range since May 2020. Lower 48 flat +0.2 mmb/d at 10.9 mmb/d. This puts US oil production up 0.3 mmb/d YoY, and is down 1.8 mmb/d since the 2020 peak of 13.1 mmb/d on 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. The EIA forecasts July at 84.301 bcf/d which is +0.050 bcf/d MoM. 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.The EIA Form 914 Actuals for April have come in 219,000 b/d higher than the weekly estimates that are noted in our Energy Tidbits memos. The actuals are also 0.202 mmb/d higher than the EIA STEO May had for April. This means they will be increasing their forecast, at least for the near term.

Figure 17: EIA's Estimated Weekly US Oil Production

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

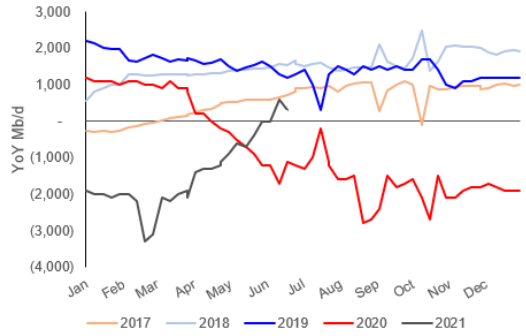
Source: EIA

Figure 18: US Weekly Oil Production



Source: EIA, SAF

Figure 19: YoY Change in US Weekly Oil Production



Source: EIA, SAF

Oil – EIA STEO expecting sustained production growth to Q4/22

EIA forecasts US oil exit in 2022 at 12.20 mmb/d

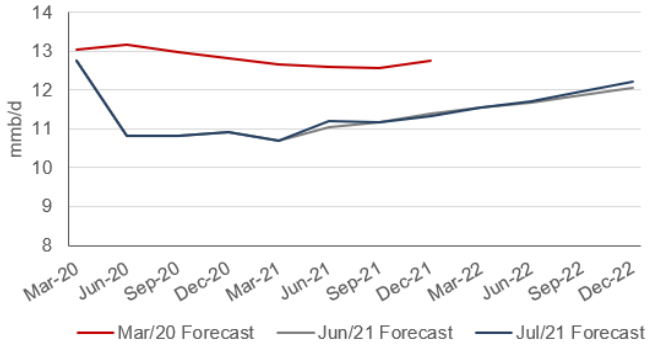
The EIA STEO had slight revisions to US oil production for 2021 and 2022 with assumed prices increasing vs last month. (i) Earlier, we noted how the EIA STEO forecasts US natural gas production not get very close to pre Covid levels, but that is not the case for oil production. The EIA forecast slightly 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). Q4/21 of 11.34 mmb/d is +0.44 mmb/d YoY vs Q4/20. Full year 2020 US oil production is at 11.31 mmb/d and is down 0.91 mmb/d YoY from 12.25 mmb/d in 2019. (ii) Full year 2021 is increased by 0.02 mmb/d vs June STEO to 11.10 mmb/d, which is down 0.21 mmb/d YoY from 2020. (iv) The EIA forecasts a shift back to YoY growth in 2022 with production averaging 11.85 mmb/d, +0.75 mmb/d YoY (was 11.79 mmb/d previously), with Q4/22 production of 12.20 mmb/d, ie still down 0.58 mmb/d from Q4/19. (v) 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".*

Figure 20: Estimated US Crude Oil Production By Forecast Month

(million b/d)	Q1/19	Q2/19	Q3/19	Q4/19	2019	Q1/20	Q2/20	Q3/20	Q4/20	2020	Q1/21	Q2/21	Q3/21	Q4/21	2021	Q1/22	Q2/22	Q3/22	Q4/22	2022
July 2021	11.83	12.13	12.25	12.78	12.25	12.75	10.81	10.81	10.90	11.31	10.70	11.20	11.17	11.34	11.10	11.54	11.72	11.95	12.20	11.85
June 2021	11.83	12.13	12.25	12.78	12.25	12.75	10.81	10.81	10.90	11.31	10.70	11.04	11.17	11.38	11.08	11.55	11.67	11.88	12.05	11.79
May 2021	11.83	12.13	12.24	12.78	12.25	12.75	10.81	10.81	10.90	11.31	10.65	10.97	11.12	11.34	11.02	11.51	11.68	11.96	12.21	11.84
Apr 2021	11.83	12.13	12.24	12.78	12.25	12.75	10.81	10.81	10.90	11.31	10.75	10.93	11.13	11.35	11.04	11.54	11.74	11.99	12.18	11.86
Mar 2021	11.83	12.13	12.24	12.78	12.25	12.75	10.81	10.81	10.87	11.31	10.79	11.06	11.27	11.46	11.15	11.67	11.84	12.16	12.41	12.02
Feb 2021	11.83	12.13	12.24	12.78	12.25	12.75	10.81	10.81	10.89	11.31	10.98	10.91	11.00	11.18	11.02	11.30	11.38	11.61	11.83	11.53
Jan 2021	11.83	12.13	12.24	12.78	12.25	12.75	10.81	10.81	10.81	11.29	11.06	11.03	11.07	11.25	11.10	11.32	11.37	11.52	11.74	11.49
Dec 2020	11.83	12.13	12.24	12.78	12.25	12.75	10.81	10.80	10.99	11.34	11.02	11.00	11.09	11.29	11.10					
Nov 2020	11.83	12.13	12.24	12.78	12.25	12.75	10.81	10.93	11.07	11.39	11.06	10.97	11.08	11.28	11.10					
Oct 2020	11.83	12.13	12.24	12.78	12.25	12.75	10.82	11.02	11.22	11.45	11.07	11.00	11.05	11.22	11.09					
Sept 2020	11.83	12.13	12.24	12.78	12.25	12.75	10.81	10.91	11.08	11.38	10.96	10.97	11.08	11.32	11.08					
Aug 2020	11.83	12.13	12.24	12.78	12.25	12.75	10.57	10.79	10.96	11.26	11.00	10.99	11.16	11.40	11.14					
July 2020	11.81	12.10	12.23	12.78	12.23	12.74	11.41	11.29	11.10	11.63	11.02	10.93	10.97	11.13	11.01					
June 2020	11.81	12.10	12.23	12.78	12.23	12.74	11.65	11.13	10.74	11.56	10.71	10.83	10.80	11.02	10.84					

Source: EIA, SAF

Figure 21: Estimated US Crude Oil Production By Forecast Month



Source: EIA, SAF

Oil – IHS on US oil hedging, 1/3 hedged at $55, which means 2/3 gets high oil price

1/3 of US oil hedged at $55

One of the oil stories to get attention this week was the FT Wednesday report "*Opec 'gets a pass to lift oil prices' as hedging losses hobble US shale*" [LINK]. No surprise the US hedge losses are higher now with WTI well over $70. We have been reporting on the issue of US oil

hedge losses, most recently in our June 20, 2021 Energy Tidbits on that week's BloombergNEF tracking of 42 producers and at the time of writing, hedging losses since Jan had reached >$11.0bn. The Financial Times report this week was that, with WTI then trading at 6-yr highs at around $75/b, according to IHS Markit, US oil hedging losses for the year will rise to a total of 19.5bn if crude remains at $75/b. The headline is all about the losses. But the FT story also notes that "*almost a third of the US's 11m barrels a day of production is being sold for just $55 a barrel, according to IHS Markit"* and we remind that means that more than 2/3 of US's 11 mmb/d is being sold at high oil prices. Our Supplemental Documents package includes the FT report.

Oil – Enbridge/Michigan mediator meeting on Line 5 set for Aug 11

Line 5 mediation

Yesterday morning, we tweeted [LINK] "*#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 that started in Aug will result in any agreement, but who knows. The parties are now scheduled to meet with mediator, former Detroit U.S. District Judge Gerald Rosen, on Aug 11 and complete the mediation process by the end of Aug. The Detroit News reporting [LINK] included some comments from Enbridge *"Enbridge wants to "work cooperatively to reconcile interests, resolve disputes and move forward" through the mediation process, spokesman Ryan Duffy said Friday. "We understand the stakes in this matter are important not only for Enbridge and the state, but for many others throughout the region that have strong interest in its outcome," Duffy said in a statement. "Meanwhile, we will continue to safely and responsibly deliver the energy the region relies upon from the Line 5 system."* Detroit News also reported "*Attorney General Dana Nessel's office declined comment due to the confidential nature of the court-ordered mediation*." Our Supplemental Documents package includes the Detroit News reporting.

Reminds Michigan wants no pipeline, not necessarily a safer pipeline

The biggest challenge that we see for Enbridge to resolve Line 5 is that Michigan's goal is shut down Line 5 pipeline forever and not to have an extremely safe Line 5 pipeline. Its why we find it hard to believe there can be a mediated result unless there is a shutdown of Line 5. If it was to get at it and have an extremely safe pipeline, its hard to argue with the concept of the Line 5 replacement tunnel. Enbridge describes the project [LINK] "*Line 5 and Great Lakes Tunnel Project. As part of our agreement with the State of Michigan, we plan to replace our existing Line 5 dual pipelines at the Straits of Mackinac with a pipeline secured in a larger underground tunnel, deep under the Straits. Lined with thick, reinforced concrete, the tunnel would protect the aquatic environment—and reduce the likelihood of environmental impact to near zero."*

Oil – What impact are heat/wildfires having on TMX construction time & cost?

TMX construction being impacted

On Thursday, we tweeted [LINK] on what looks like warning from Trans Mountain that the extreme heat and BC wildfires will be impacting the construction time and cost for the its expansion project (TMX). Trans Mountain posted its construction update [LINK], which is a good recap of the construction work in all geographic areas. On the surface, it looks like a simple update, but it includes a clear comment that construction is being impacted by the extreme heat and wildfires and that Trans Mountain is assessing that impact. This is why we tweeted *"#TMX understandable that extreme heat/active wildfires are having an impact. but "assessing the impact" on "construction of the Expansion Project". need to see what impact on expansion construction time & costs. #OOTT*". We are waiting to hear what is the impact

on construction time and costs. Trans Mountain wrote "*With extreme heat and active wildfires in several BC locations, Trans Mountain is taking extra precautions at our operations and construction sites to ensure we are doing our part to mitigate fire risks this summer. Trans Mountain's first priority is the health and safety of our workforce, their families and our communities. We are constantly monitoring the active wildfires in British Columbia and assessing their impact on our existing operations and construction of the Expansion Project*." Our Supplemental Documents package includes the Trans Mountain construction update.

Oil – Big reduction in oil sands facilities on Covid outbreaks list

Big reduction in oil sands covid outbreaks

As expected, we are starting to see a big reduction in the number of oil sands facilities still on the Covid outbreaks list. The last Wood Buffalo Covid update is as of July 7 [LINK]. There were five facilities removed from the outbreak list – Kearl Lake, Civeo McClelland Lake, Wapasu Creek Lodge, Suncor Firebag, and CNOOC Long Lake. This more than doubles the prior three oil sands facilities that were removed from the list - Suncor Mackay River, CNRL Jackfish property and the Oilsands Industrial Lodge – Fort McKay. Below, we pasted the oil sands facilities listed in June 18, 21, 24 , 29 and July 7 updates.

Figure 22: Oil Sands Facilities With Covid Outbreaks at June 18, 21, 24 and 29

July 7	June 29	June 24	June 21	June 18
Outbreaks in RMWB:	**Outbreaks in RMWB Industrial:**	**Outbreaks in RMWB Industrial:**	**Outbreaks in RMWB Industrial:**	**Outbreaks in RMWB Industrial:**
Cenovus Sunrise Lodge	MEG Energy - ongoing	MEG Energy - ongoing	MEG Energy - ongoing	MEG Energy - ongoing
Civeo Athabasca	CNRL Horizon - ongoing	CNRL Horizon - ongoing	CNRL Horizon - ongoing	CNRL Horizon - ongoing
CNRL Horizon	CNRL Albian - ongoing	CNRL Albian - ongoing	CNRL Albian - ongoing	CNRL Albian - ongoing
CNRL Albian	Kearl Lake - ongoing	Kearl Lake - ongoing	Kearl Lake - ongoing	Kearl Lake - ongoing
MEG Energy	Civeo McClelland Lake - ongoing	Civeo McClelland Lake - ongoing	Civeo McClelland Lake - ongoing	Civeo McClelland Lake - onoging
Suncor Base Plant	Wapasu Creek Lodge - ongoing	Wapasu Creek Lodge - ongoing	Wapasu Creek Lodge - ongoing	Wapasu Creek Lodge - ongoing
Suncor Fort Hills	Civeo Athabasca - ongoing	Civeo Athabasca - ongoing	Civeo Athabasca - ongoing	Civeo Athabasca - ongoing
Syncrude Mildred Lake	Cenovus Sunrise Lodge - ongoing	Cenovus Sunrise Lodge - ongoing	Cenovus Sunrise Lodge - ongoing	Cenovus Sunrise Lodge - ongoing
Syncrude Aurora	Suncor Base Plant - ongoing	Suncor Base Plant - ongoing	Suncor Base Plant - ongoing	Suncor Base Plant - ongoing
	Suncor Firebag - ongoing	Suncor Firebag - ongoing	Suncor Firebag - ongoing	Suncor Firebag - ongoing
	Suncor Fort Hills - ongoing	Suncor Fort Hills - ongoing	Suncor Fort Hills - ongoing	Suncor Fort Hills - ongoing
	Syncrude Mildred Lake - ongoing	Syncrude Mildred Lake - ongoing	Syncrude Mildred Lake - ongoing	Suncor Mackay River - removed
	Syncrude Aurora - ongoing	Syncrude Aurora - ongoing	Syncrude Aurora - ongoing	Syncrude Mildred Lake - ongoing
	CNOOC Long Lake - ongoing	CNOOC Long Lake - ongoing	CNOOC Long Lake - ongoing	Syncrude Aurora - ongoing
				CNOOC Long Lake - ongoing

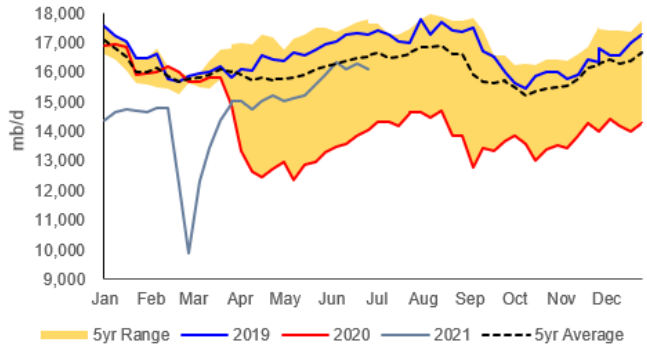
Source: Wood Buffalo

Oil – Refinery inputs +1.768 mmb/d YoY to 16.115 mmb/d, down 1.323 mmb/d vs 2019

Gasoline demand hits record high

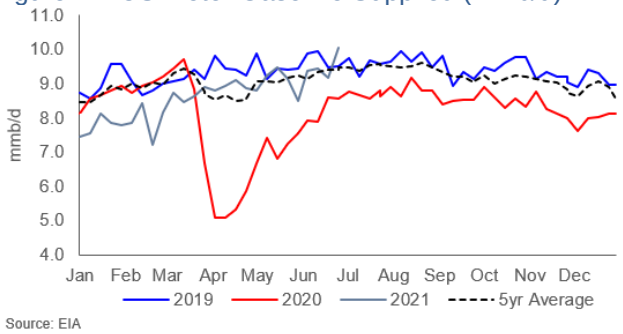
Crude inputs to refineries were up this week and were -0.184 mmb/d to 16.115 mmb/d and were +1.768 mmb/d YoY, but are still down 1.323 mmb/d vs the week ended July 5, 2019. Refinery utilization was down 0.7% this week at 92.2%, which is +14.7% YoY. Total products supplied (ie. demand) increased this week, with a 0.645 mmb/d increase to 21.547 mmb/d, and this week, motor gasoline supplied is the big story, reaching the highest level in US history, since the EIA's earliest data in 1991. This week, motor gasoline was up big being +0.870 mmb/d to 10.043 mmb/d. As of right now, the moving average for gasoline demand is 94% of where demand was in 2019. 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 23: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA, SAF

Figure 24: US Motor Gasoline Supplied (mmb/d)



Source: EIA, SAF

Oil – Shell's 100,000 b/d Scotford refinery reportedly moving into maintenance

Shell's 100,000 b/d Scotford refinery

We couldn't find any official comment from Shell Canada but, on Wed, there was a Bloomberg terminal sentence "* *Shell Scotford facility in Alberta conducts maintenance: Hotline (headline only)".* Then on Wednesday, Bloomberg terminal reported "*(Bloomberg) -- Wood Mackenzie/Genscape's U.S., Canada, Europe refinery outage alerts from Tuesday (all times Eastern unless stated): * Shell Scotford Upgrader, Canada: Sustained moderate flaring began at the upgrader at 9:21am. Similar flaring observed during late June and has previously been associated with maintenance and operational issues".* So it sounds like maintenance at the refinery. The Scotford refinery [LINK] is located in Fort Saskatchewan and processes synthetic crude oil from the Shell Scotford Upgrader. Products include gasoline, diesel, jet fuel, propane, butane and benzene. The refinery has a capacity of 100,000 b/d and is the most energy efficient refinery in Canada, using 25% less energy than the average Canadian refinery. It has operated for more than 30 years and, as a part of the greater Scotford Complex, employs over 1,300 people.

Scotford refinery will be the first to use robot dogs

Shell's Scotford refinery has hired a new team: four-legged "Spot" robots called that can perform many useful tasks at the plant. CBC [LINK] reported on March 3 that training for the robots and their handlers was underway at the refinery, upgrader, and chemical plant in Fort Saskatchewan. Conal MacMillan, Shell's external relations manager, told CBC *"The intent is to use them for some basic maintenance inspections. We'll be able to program them to their own custom routes to test our plant conditions, to help us out with some security tasks and if needed — hopefully*

not — perform autonomous emergency response missions on our site, too." The robots come from Boston Dynamic's line of Spot quadruped robots. Some of the robodogs' impressive attributes include 360-degree scanning and visual capabilities, heat detection and 3D scanning of equipment. It isn't clear yet when these robots will be operational. Our Supplemental Documents package includes the CBC report.

Figure 25: Four-legged Spot robots have cameras or arm attachments where the head would be

Source: CBC

Oil – Alberta gov takes 50% equity stake in Sturgeon Refinery

AB gov to own half of the Sturgeon Refinery

The Alberta gov is "making the best of a bad agreement" and buying a 50% stake in the Sturgeon Refinery, extending its current 30 year processing agreement by another decade. The government said in a press release on Monday [LINK] that the new deal will save tax payers $2bn over the project's life due to the improvement in the project's NPV. As we mentioned before, Energy Minister Sonya Savage referred to it as making the best of a bad deal, saying in an interview with CBC [LINK] *"Under the previous deal, we had all the risk, we took all the risk...and we had no ability to control or mitigate that risk to control costs or to have any say in how the refinery was operated. With this deal, we save $2 billion and we have a seat at the table".* As a result of the new agreement, the government will capture the value of processing bitumen both as a toll payer and a facility owner. The government will no longer need to pay processing fees and profits each month and instead is paying $425mm to North West Refining and $400mm to CNRL upfront. All in, the government will pay $26bn for the bitumen it will refine for, hopefully, a profit. Our Supplemental Documents package includes the CBC report.

Oil – US "net" oil imports up 0.557 mmb/d to 3.247 mmb/d

US "net" oil imports +0.557 mmb/d WoW

US "NET" imports were up 0.557 mmb/d to 3.247 mmb/d for the July 2 week. US imports were down 0.532 mmb/d to 5.875 mmb/d. US exports were down, being -1.089 mmb/d to 2.628 mmb/d, likely due to the pressures of the narrowing WTI-Brent spread. The export numbers this week are the lowest they have been in 5 weeks. The WoW decrease in US oil imports was driven by decreases in Saudi Arabia, Mexico, and Ecuador. Some items to note on the by country data. (i) Canada was up this week, and was +0.462 mmb/d to 3.744 mmb/d for the July 2 week, which is now ~0.05 mmb/d above the average levels in Jan/Feb of 2020. (ii) Saudi Arabia was down 249,000 b/d to 0.316 mmb/d this week. (iii) Colombia was basically flat, +15,000 mmb/d to 0.154 mmb/d this week. (iv) Ecuador was down big, -260,000 b/d to 0 b/d. (v) Iraq was up 87,000 b/d to 229,000 b/d. (v) Venezuela remained at 0 due to US sanctions. (vi) Mexico was down big by 339,000 b/d to 0.408 mmb/d.

Figure 26: US Weekly Preliminary Oil Imports By Major Countries

	May 07/21	May 14/21	May 21/21	May 28/21	June 04/21	June 11/21	June 18/21	June 25/21	July 02/21	WoW
Canada	2,924	3,806	3,549	3,147	3,971	3,644	3,435	3,282	3,744	462
Saudi Arabia	224	424	277	188	144	381	555	565	316	-249
Venezuela	0	0	0	0	0	0	0	0	0	0
Mexico	434	692	661	702	423	764	878	747	408	-339
Colombia	278	325	71	185	137	143	340	139	154	15
Iraq	235	199	184	163	173	305	151	142	229	87
Ecuador	257	80	229	226	122	96	29	260	0	-260
Nigeria	157	73	29	169	264	169	183	33	142	109
Kuwait	0	0	0	0	0	0	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0
Top 10	4,509	5,599	5,000	4,780	5,234	5,502	5,571	5,168	4,993	-175
Others	979	812	1,273	851	1,404	1,244	1,372	1,238	882	-356
Total US	5,488	6,411	6,273	5,631	6,638	6,746	6,943	6,406	5,875	-537

Source: EIA, SAF

Oil – Colombia May production 703,478 b/d, down 3.9% YoY and 5.6% MoM

Colombia output down MoM

Colombia oil production continues to be hit by the protests. On Tuesday, Colombia Ministry of Mines and Energy reported on May oil and gas production [LINK]. Our May 23, 2021 Energy Tidbits noted how the anti-governmental protests had hit oil production in May. The protests started April 28, and Colombia had reported that production had been hit by ~55,000 b/d by the second week in May. The impact of the protests would have been very small on April data, however there was a demonstrated impact on the May data. Colombia reported that May 2021 oil production was 703,478 b/d, down 3.9% YoY from 732,120 b/d in May 2020, and down 5.6% MoM vs 745,488 b/d in April 2021. The Ministry of Mines and Energy of Colombia said *"The decrease in production occurred mainly in the Andina (Tame, Arauca), Cohembí (Puerto Asís, Putumayo), Índico (Cabuyaro, Meta), Acordionero (San Martín, Cesar) and Rubiales (Puerto Gaitán, Meta) fields due to the different blockades that occurred in the country and that prevented the proper functioning of the production facilities."* The country reported drilling 3 exploratory wells in May. Our Supplemental Documents package includes the Google Translate version of the Colombia release.

Figure 27: Colombia Oil Production

million b/d	2015	2016	2017	2018	2019	2020	20/19	2021	21/20
Jan	1.036	0.986	0.860	0.860	0.899	0.884	-1.7%	0.745	-15.7%
Feb	1.030	0.955	0.864	0.823	0.893	0.878	-1.6%	0.746	-15.1%
Mar	1.023	0.917	0.804	0.856	0.885	0.857	-3.1%	0.745	-13.0%
Apr	1.029	0.915	0.857	0.865	0.891	0.796	-10.6%	0.745	-6.4%
May	1.027	0.904	0.851	0.866	0.895	0.732	-18.2%	0.703	-3.9%
June	1.010	0.888	0.857	0.864	0.892	0.730	-18.2%		
July	0.947	0.843	0.856	0.860	0.869	0.735	-15.4%		
Aug	0.968	0.827	0.858	0.866	0.883	0.742	-15.9%		
Sept	1.009	0.859	0.851	0.869	0.879	0.749	-14.8%		
Oct	1.005	0.846	0.864	0.879	0.883	0.751	-14.9%		
Nov	0.990	0.855	0.851	0.883	0.880	0.761	-13.5%		
Dec	0.999	0.837	0.870	0.889	0.882	0.759	-14.0%		

Source: Bloomberg, Colombia Ministry of Mines and Energy

Oil – Interesting, Abdulaziz seems to warn Venezuela oil could ramp up soon

Abdulaziz warns Venezuela oil could increase

Oil watchers, including Cdn heavy/medium crude, should be putting Venezuela on their watch list to see if there are conditions that will see Venezuela be able to increase oil production over the coming months. Later in the memo, we note more from an great CNBC Brian Sullivan interview with Saudi Energy Minister Abdulaziz on the UAE and OPEC+. There was one surprising Abdulaziz comment that jumped out at us and something that we hadn't heard from anybody other than Maduro ie. Venezuela production could be increasing. We

have been noting how Venezuela oil production has been surprising to the upside in 2021. We tweeted [LINK] "1/2. #Oil markets should hope @MoEnergy_Saudi Abdulaziz carries the day. how do you disagree with his logic tor why extend to Dec 2022? Interesting warning for potential of more Venezuela oil barrels coming back. See below SAF Group transcript. Great @SullyCNBC interview. #OOTT" We made a transcript of the Abdulaziz commend where he said "*we still have issue as you know with Iran. how much, when and where and by how much they will come. also there is a potential for Venezuela*". There wasn't any detail, but it jumped out at us that he chose to highlight Venezuela oil production potential as a near term risk.

Oil – OPEC+ called off reconvened meeting, no added barrels coming for now

OPEC+ called off reconvened meeting

The big surprise this week was OPEC+ and it being unable to reach any agreement following the OPEC+ meeting being reconvened until 7am MT on Monday, and then to see the OPEC Monday announcement [LINK] "*"The 18th OPEC and non-OPEC Ministerial Meeting has been called off," OPEC Secretary General, HE Mohammad Sanusi Barkindo, said in a letter to Heads of Delegation of OPEC Member Countries and non-OPEC oil producing countries participating in the Declaration of Cooperation (DoC). "Upon consultations with HRH Prince Abdul Aziz Bin Salman, Minister of Energy of the Kingdom of Saudi Arabia, and HE Alexander Valentinovich Novak, Deputy Prime Minister of the Russian Federation, Chairman and Co-chairman of the OPEC and non-OPEC Ministerial Meeting (ONOMM), the reconvened 18th OPEC and non-OPEC Ministerial Meeting has been called off," the Secretary General stated. The Secretary General noted: "The date of the next meeting will be decided in due course and we will inform you accordingly."* So despite everyone agreeing on the need to increase production and to do so by 400,000 b/d per month Aug thru Dec to add 2 mmb/d by year end 2021, Saudi and Russia were unable to get UAE to agree with an extension of the Declaration of Cooperation past it scheduled end date of April 2022. As a result, without any agreement to change, it means that OPEC+ will, at least for now, mean there are no more increases until the agreement terminates at the end of April 2022. Below is our table of the current schedules OPEC+ production increases following the OPEC+ June 1 meeting.

Figure 28: OPEC+ Quotas Post June 1 Meeting

OPEC (mmb/d)	Reference Level Production	May-July 2020	Aug-Dec 2020	Jan 2021	Feb 2021	March 2021	April 2021	May 2021	June 2021	July 2021	Jan/21 - Apr/22 per Apr/20 Agreement
Algeria	1,057	816	864	876	876	876	876	887	898	912	912
Angola	1,528	1,179	1,249	1,267	1,267	1,267	1,267	1,283	1,298	1,319	1,318
Congo	325	251	266	269	269	269	269	273	276	281	281
Equatorial G.	127	98	104	105	105	105	105	107	108	110	110
Gabon	187	144	153	155	155	155	155	157	159	161	161
Iran	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Iraq	4,653	3,592	3,804	3,857	3,857	3,857	3,857	3,905	3,954	4,016	4,016
Kuwait	2,809	2,168	2,297	2,329	2,329	2,329	2,329	2,358	2,387	2,425	2,424
Libya	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Nigeria	1,829	1,412	1,495	1,516	1,516	1,516	1,516	1,535	1,554	1,579	1,579
Saudi Arabia*	11,000	8,492	8,993	9,119	8,119	8,119	8,119	9,232	9,347	9,495	9,495
UAE	3,168	2,446	2,590	2,626	2,626	2,626	2,626	2,659	2,692	2,735	2,735
Venezuela	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total OPEC	26,683	20,598	21,815	22,119	21,119	21,119	21,119	22,396	22,673	23,033	23,031
OPEC vs. ref.	**0**	**-6,085**	**-4,868**	**-4,564**	**-5,564**	**-5,564**	**-5,564**	**-4,287**	**-4,010**	**-3,650**	**-3,652**

*Saudi Arabia quota for Feb-Apr 2021 includes voluntary 1mmb/d cut; May-July includes w ind dow n of voluntary cut

Non-OPEC	Reference Level Production	May-July 2020	Aug-Dec 2020	Jan 2021	Feb 2021	March 2021	April 2021	May 2021	June 2021	July 2021	Jan/21 - Apr/22 per Apr/22 Agreement
Russia	11,000	8,600	8,993	9,119	9,184	9,249	9,379	9,418	9,457	9,495	9,495
Kazakhstan	1,709	1,319	1,397	1,417	1,427	1,437	1,457	1,463	1,469	1,475	1,475
Oman	883	682	722	732	732	732	732	741	750	762	762
Azerbaijan	718	554	587	595	595	595	595	603	610	620	620
Malaysia	595	459	486	493	493	493	493	499	506	514	513
Bahrain	205	158	168	170	170	170	170	172	174	177	177
Sudan	75	58	61	62	62	62	62	63	64	65	65
South Sudan	130	100	106	108	108	108	108	109	110	112	112
Brunei	102	79	83	85	85	85	85	86	87	88	88
Total Non-OPEC	15,417	12,009	12,603	12,781	12,856	12,931	13,081	13,154	13,227	13,308	13,307
Non-OPEC vs. ref.	**0**	**-3,408**	**-2,814**	**-2,636**	**-2,561**	**-2,486**	**-2,336**	**-2,263**	**-2,190**	**-2,109**	**-2,110**
Total OPEC+	42,100	32,607	34,418	34,900	33,975	34,050	34,200	35,550	35,900	36,341	36,338
OPEC+ vs ref.	**0**	**-9,493**	**-7,682**	**-7,200**	**-8,125**	**-8,050**	**-7,900**	**-6,550**	**-6,200**	**-5,759**	**-5,762**

Source: Bloomberg, OPEC, SAF Group

Oil – Eid al Fitr holidays likely mean no Saudi/UAE resolve until OPEC Aug meeting

Eid al Fitr holidays

Post the breakdown of any OPEC+ July deal, the market immediately moved to think there could be a calmer heads approach and some off camera negotiations that ended up resolve the Saudi/UAE views on extension quickly. One of the reasons why we look at news and views from experts and media around the world is perspective. And normally that perspective reminds of simple differences. On Tuesday, we retweeted a Sean Evers (Managing Director Gulf Intelligence out of Dubai) tweet [LINK] *"#OPEC+ unlikely to find a resolution to impasse anytime soon -- with #Saudi due to publish August OSPs this week and the long EID holidays a week later, there will be no urgency or appetite for a deep dive of zoom call diplomacy. . . buckle in for a protracted new normal! #OOTT*". Evers has reminded of the Eid al Fitr holidays even again this morning in his Daily Silk Road "Live" podcast that after this week, the Middle East more or less shuts down for about a week for this holiday. It's a 6-day public holiday that will start ahead of the July 20 holiday, ie. Dubai shuts down for the work week starting July 18. TimeOut Dubai writes [LINK] "*What is Arafat Day? Arafat Day is the second day of the annual hajj, known as the pilgrimage, and takes place the day before the start of Eid Al Adha. What is Eid Al Adha? Translating to "feast of the sacrifice", Eid Al Adha is the latter of the two biggest Islamic holidays celebrated worldwide each year and it begins on the 10th day of Dhu Al Hijjah."*

Oil – Saudi's Abdulaziz on UAE and OPEC+ extension

Great CNBC Abdulaziz interview

As noted earlier, there was an excellent CNBC Brian Sullivan interview with Saudi Energy Minister Abdulaziz that was posted early Wed morning [LINK]. (i) Earlier, we noted our tweet on Abdulaziz warning on the risk for Venezuela oil production increases. (ii) Abdulaziz was pretty clear in his position with respect to UAE's view that it increased its capacity. We tweeted [LINK] "*No doubting @MoEnergy_Saudi Abdulaziz view on UAE position "you cannot pick a month and say this is my capacity, you've got to give it to me now. this is not the way to do it." Much more in this great @SullyCNBC interview."* (iii) We also tweeted [LINK] on Abdulaziz reminds that the Declaration of Cooperation noted extension potential. We tweeted [LINK] *"2/2. @MoEnergy_Saudi Abdulaziz reminds #OPEC+ DOC provided for Dec 2022 reviews. "The agreement will be valid until 30 April 2022, however, the extension of this agreement will be reviewed during December 2021." #OOTT".* (iv) We aren't taking sides in this dispute, but we find it hard for anyone to disagree with Abdulaziz's logic for wanting the extension to go thru Dec 2022 part of which is because they need the 3 month period for cheaters to pay back the overproduced barrels. Abdulaziz said "*if we did not put that clause, then the whole world, it would become like a ticking clock, or a ticking bomb when the end of that agreement would come. the world would live with the reality that there is still 5.8 million still to be attended to, attended for. and therefore our original concept was where we go from where we had the agreement was originally [?] to extend that agreement and start earlier the phasing out of this 5.8 million. It will gives us 9 months until the end of that agreement and with the extension it would give us another 8 months. if you take the whole volume, the 5.8 and you put it in a linear way, just a straightforward 400,000 barrel every month, that will take you to the end of September 2022. Which means if you extend the agreement even until the end of September you will barely finish the 5.8. now how could we even argue that we don't know need that extension. I don't know. But more important, why we stretch it to the end of 2022, simple, we need to have 3 months of space that we can apply the adjustment mechanism. Because there are too many things that could happen next month, the month after, in October, in November, which may bring so many barrels to the market ie. an Iranian return, that sort. So you need to have that mechanism truly available and the market can believe that you can exercise…. You need that 3 months just to make sure so you can honor what you saying to the market".* There is much more in the CNBC interview. We made a

transcript of these and other key sections. Our Supplemental Documents package includes the SAF Group transcript of sections from the Abdulaziz interview.

Oil – No plans yet for 7th round of JCPOA negotiations, positive for oil

No date yet for 7th round JCPOA

Nothing is impossible, but it looks like there is very very little chance of a near term return to the JCPOA, which means the full return of Iran oil is likely more like Nov at the earliest. And it looks the US is finding out what many thought – the best window to get a return to the JCPOA was before the Iran June 19 election. Since then, the momentum seems to have gone away. The negative this week was to find out that there is not indication of any dates for the 7th round of negotiations. We recognize that a lot of groundwork is done in the times leading up to the negotiations but, not having any proposed dates for the 7th round isn't a positive. Raisi takes over as President on Aug 3. And as we remind, no one is expecting the 7th round to be the final round unless there are some major changes in positions. The first indication of no dates for the 7th round came from an early Thursday morning Russian ambassador Ulyanov tweet [LINK]. We retweeted [LINK] the Ulyanov tweet saying "*Positive for #Oil. No date for 7th round of #JCPOA discussions, and would need a major shift in someone's position for a 7th round to be the last. looks like pointing to Iran oil return to market to at least Nov? #OOTT".* Then Thursday afternoon, US State Dept spokesperson Price said the same. We tweeted [LINK] "*US State Dept also confirms no date yet set for #JCPOA 7th round negotiations. Remind absent a major shift in positions, no one expects 7th round to be the last. Positive for #Oil, continues to point to Iran oil not coming back to maybe Nov? #OOTT*". Our Supplemental Documents package includes the Bloomberg transcript of the Price comments.

Oil – Vitol expects OPEC+ supply increase will only be a fraction of increasing demand

Vitol's near term oil view

We recognize that there was no OPEC+ decision this week, but one story that seemed to get coverage this week were last Sunday morning comments by Mike Muller, Head Vitol Asia. We tweeted early last Sunday [LINK] on Mike Muller (Head, Vitol Asia) comments on this morning's Gulf Intelligence New Silk Road "Live" July 4 podcast moderated by Sean Evers Managing Partner [LINK], and we featured the comments in last week's (July 4, 2021) Energy Tidbits. But given that most still expect OPEC+ to agree in August to get back on the adding 2 mmb/d by year end, we thought we would include the transcript we made of his comments. As usual, we love the traders perspective and Muller reminds that long term items do not really impact the near term Brent spot price. Rather the near term spot price is all about OPEC+ and he expects that whatever deal OPEC+ reaches tomorrow to increase production, it will on be a fraction of the oil demand ramp up. We created a transcript of some of Muller's comments. At 1:15 min mark. Muller said".. *fundamentals at the front end of the market are very different because everything we are talking about here is longer term like when Iranian volumes will come back to the market once there is an agreement. Not so much an if, it's a once I think. when is intercontinental business travel going to resume and allow people to consume that 2, 3 million barrel a day jet that is still missing from the global demand mix. how soon the US shale sector will start to produce marketably above the 11 point something million barrels as day we are seeing today. None of that is really going to influence the spot price of August Brent, which is the numbers I just spoke about. what's going to influence the price, of course, is OPEC. and that's why you had a very choppy price action last week when the total change on week was only 18 cents a barrel up when we spent time trading in a $3 a barrel range. But as I said it was very choppy, very volatile. So I mean, I think, lets first ay a number of things. these ministerial delegations and their political superiors are very sophisticated organizations who have done this and who have proven to us since April 2020 that they have a purpose about of what they are doing. And I think there is going to be very little doubt that whatever OPEC+ agree with regard to reinstatement of production, a*

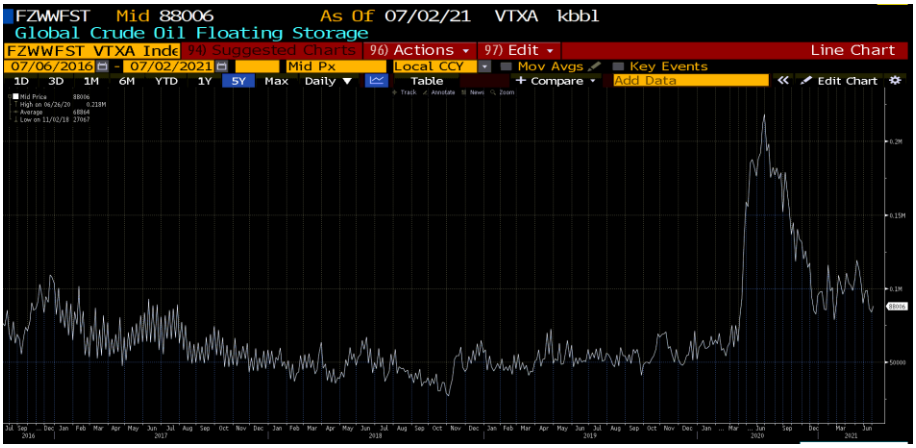
lessening of cutbacks, it will surely, whatever the outcome on Monday at 3 o'clock Vienna time, be a fraction of the amount needed to meet growing demand, which many observers and experts put at 2, 3 million barrels a day or more for summer period."

Oil – Vortexa floating storage +4.7% WoW, down 40.6% YoY

Vortexa floating storage

We won't be surprised to see revisions and unexpected weekly changes in floating oil storage over the next two months. The strong backwardation in the market provides a big disincentive for oil to go into any mid term storage. The peak of crude oil in floating storage almost one year ago. Bloomberg reported on Vortexa floating oil data that showed a WoW increase of 3.95 mmb or +4.7% WoW to 88.01 mmb on July 2 from 84.06 mmb on June 25. Note there was a significant revision to the June 25 numbers as they were adjusted upwards from 76.05 mmb. Floating storage is down -40.6% since the June 26, 2020 peak of 216.42 mmb. While the amount of crude in floating storage has declined significantly from its peak last year, it has still not returned to normal levels. For reference, Jan 24, 2019 was 50.35 mmb, and the Q1/20 trough was at 54.11 mmb on Feb 17. The average amount of floating storage over 2019-2017 for the equivalent week is 62.05 mmb. Below is a graph of the Vortexa Global Floating Storage Level over the past 5 years and a table of the past 4 years' levels of floating storage during the same week and the price of Brent that week. Our Supplemental Documents package includes the Bloomberg Vortexa report.

Figure 29: Vortexa Global Floating Storage Level (5 yr)



Source: Bloomberg, Vortexa

Figure 30: Crude Oil Floating Storage & Brent Price

Date	Vortexa Crude Oil Floating Storage (million barrels)	Brent $/b
07/02/21	88.0	$76.17
07/03/20	193.5	$42.03
07/01/19	52.1	$65.06
07/02/18	45.7	$77.30
07/03/17	55.4	$49.68

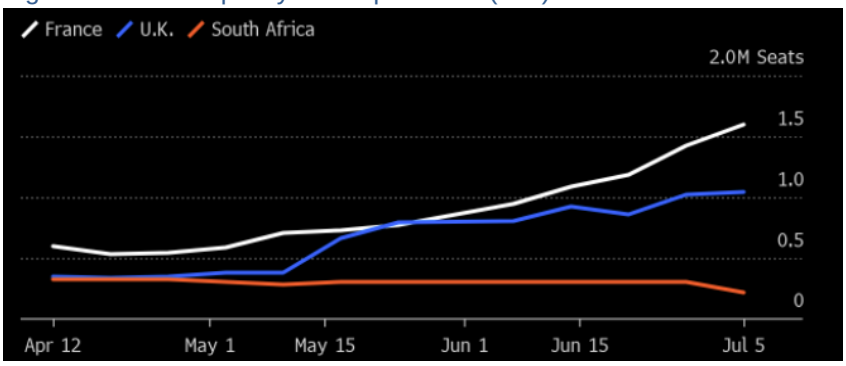
Source: Bloomberg, Vortexa

Oil – Bloomberg Oil Demand Monitor, Delta variant dampens demand in SA and AUS

Bloomberg's Oil Demand Monitor

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. We highlighted in last week's July 4th Tidbits that European air travel was recovering steadily, with last week's flight levels at 53% of 2019 levels. This week, air demand shows the same story in Europe and the UK with climbing seat capacity levels across the board. However, the story is not the same globally. In South Africa and Australia, airline seat capacity has plummeted amidst a third wave of infections. Australia has imposed citywide lockdowns and limited commercial flight arrivals to contain the delta variant. While UK is also experiencing an increase in Covid cases, it has not translated much into the death toll and as such the government is continuing with its plan to remove social distancing restrictions on July 19. China's airline recovery is the strongest among major markets – its seat capacity is now 3% higher than 2019 levels. Mexico is the next closest, at just 13% less than 2019, with the US close behind at 18%. The US and China's success is due largely to their large domestic air travel networks, which do not have the same international restrictions. Our Supplemental Documents package includes the Bloomberg Oil Demand Monitor.

Figure 31: Seat capacity levels per week (mm)



Source: Bloomberg, Eurocontrol

Oil & Natural Gas – Should be great Q2 oil & gas, even better in Q3

Very strong Q2 oil and gas prices

Its still at least a couple weeks until we start to see some early US oil and gas companies start to report Q2/21 results, but everyone should be expecting to see strong Q2 financial results. Later in the memo, we note Shell's Q2 update this week. The theme for oil and gas companies will be much like seen in the Shell Q2 update – very strong cash flow, stronger balance sheets and, for many, increased shareholder returns. The difference from Shell Q2 update is that the vast majority of these companies will be saying its because there were very strong oil and gas prices. There isn't any doubt here. After the close on June 30, we tweeted [LINK] "*Going to be a great Q2 reporting for Cdn #Oil #NatGas sector. Note June 30 closing prices WTI $73.52, EdPar $71,.67, WCS $59.52, HH $3.74, AECO $3.43. ~>10% higher than Q2 average. Q3 should be an even better quarter. #OOTT".* Even with the small pullback in prices since June 30, prices are still above Q2 averages and, as good as Q2 will be, the set up for Q3 reporting looks even better.

Figure 32: Oil & Natural Gas Average Quarterly Prices Thru Q2/21

Quarter	Brent	WTI	EdPar	WCS	HH	AECO
Q1/18	$67.00	$62.90	$57.26	$37.11	$3.09	$2.06
Q2/18	$74.41	$67.83	$60.78	$49.88	$2.84	$1.23
Q3/18	$75.27	$69.69	$59.81	$42.32	$2.92	$1.25
Q4/18	$68.18	$59.41	$36.53	$25.63	$3.78	$1.62
Q1/19	$62.91	$54.49	$50.28	$43.79	$2.92	$2.55
Q2/19	$68.58	$59.96	$54.41	$47.46	$2.55	$1.13
Q3/19	$61.95	$56.48	$52.43	$43.91	$2.37	$1.00
Q4/19	$62.51	$56.83	$50.61	$37.98	$2.36	$2.46
Q1/20	$51.28	$46.73	$39.75	$28.55	$1.91	$2.04
Q2/20	$31.14	$27.67	$21.84	$18.02	$1.70	$2.00
Q3/20	$42.70	$40.87	$36.83	$31.13	$1.98	$2.26
Q4/20	$44.47	$42.67	$37.92	$31.34	$2.47	$2.65
Q1/21	$60.51	$57.75	$54.17	$45.83	$3.39	$3.13
Q2/21	$68.43	$65.89	$61.93	$53.11	$2.76	$2.95

Source: Bloomberg

Future people shortage in oil and gas

Oil & Natural Gas – the inevitable skilled people shortage in the Cdn oil and gas sector

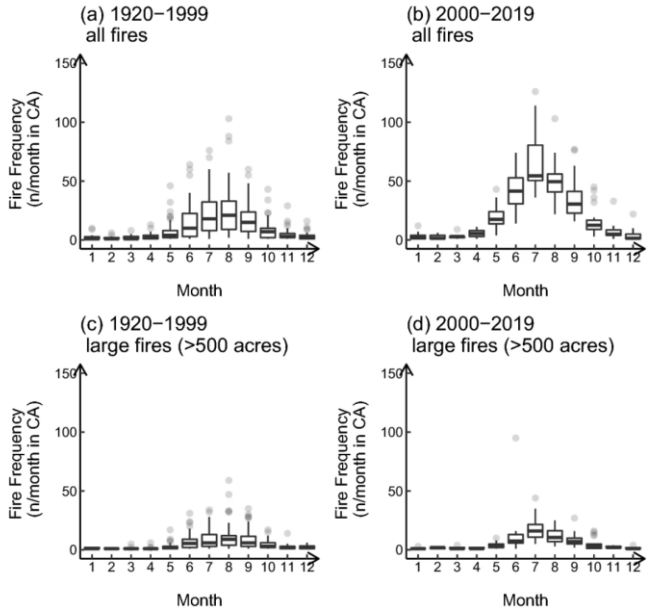
The climate change side better hope they are right in how fast they believe the world will not need oil and natural gas to provide reliable, affordable and accessible energy to all of the world including in Canada. Because there is the set up of major skilled people shortage emerging in the coming years in the Cdn oil and gas patch. The reality is that many petroleum engineers retired in the mid 2000's after making a lot of money and then a lot were laid off after the financial crisis years. There was already a building shortage of experienced technical professionals. And with post financial crisis layoffs, young people, many advised by their oil industry parents, said plan for a different future. Now, there is no choice for these young people, at least in Calgary the heart of the oil patch, to look for another profession. Yesterday we tweeted [LINK] "*The set up for skilled #Oil #NatGas people shortage if the world, incl Canada, needs reliable, affordable and available energy from #Oil #NatGas longer than aspirations of #EnergyTransition. No longer a choice at U of C, to enter oil & gas engineering program. #OOTT".* On Thursday, CTV News reported [LINK] "*The University of Calgary has suspended admission for its oil and gas engineering bachelor program amidst a downturn in Canada's energy sector and a transition towards a more renewable future. In fact, enrollment for the program has hit an all-time low with only about 10 students registered over the course of the last two years. Those existing students will still be able to complete their studies, but Prof. Arin Sen, head of the department of chemical and petroleum engineering said the university has no intention to abandon oil and gas studies."* Our Supplemental Documents package includes the CTV report.

Wildfire season just started

Electricity – Just moving into peak California wildfire season

The big growing story in the west is wildfires. We are seeing wildfires in Oregon restrict power and increasing wildfires in California. We remind that peak wildfire California season has just started. And everyone knows the wildfire risk increases with the continued drought conditions. Our June 13, 2021 Energy Tidbits included the below charts from Nature.com Scientific Reports paper "*Spatial and temporal pattern of wildfres in California from 2000 to 2019"* [LINK] that reminds peak wildfire season is now and that wildfires have increased over the past 20 years. The charts show the seasonal wildfire activity.

Figure 33: California – All Fires and Large Fires 1920-1999 and 2000-2019



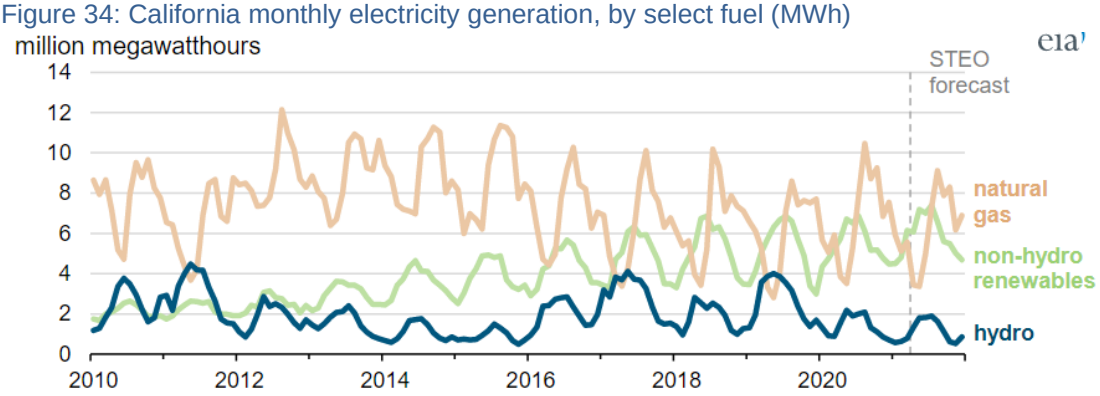
Source: Nature.com

Electricity – California's hydro generation hit hard by historic drought

Hydro being hit hard by drought

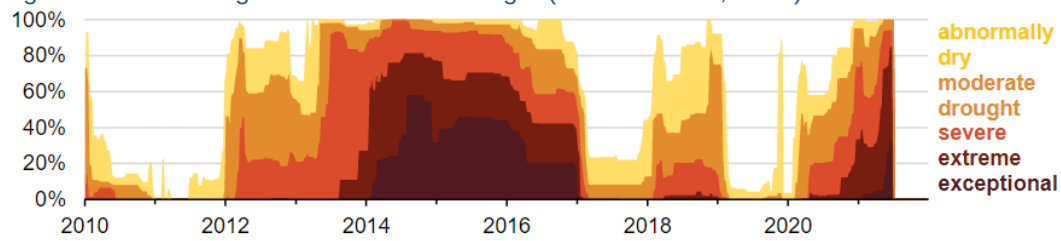
The other big issue is the Western United States is currently experiencing historic drought conditions, from which California is the most severely affected. The EIA reported on Wednesday [LINK] that as a result of this drought, they anticipate California's hydroelectric generation will be significantly reduced. In the first four months of 2021, hydroelectric generation has been 37% less vs 2020 and 71% less than 2019. This year's snowpack in California was well below normal, with measurable snow only present at 3/131 monitoring stations on June 1. The meltwater from what snow that was there could not even reach reservoirs as the soil and streams were so dry the water was instantly absorbed. California's largest reservoir, Shasta Lake, is at 48% of its average capacity. Lake Oroville's (second largest) is at 40%, and its water level is expected to fall even lower, which will force the Edward Hyatt Power Plant to shutdown for the first time since it first started operating in 1967. Last time California had a drought, it led to hydroelectricity's total power generation share falling from 49% in 2011 to 34% in 2015, which pushed natural gas' share from 24% to 37% in the same years. The state even had to implement its first ever mandatory water restrictions. The EIA expects hydroelectric generation this year to be 19% less than last year, decreasing form 16.8 mm MWH in 2020 to 13.6 MWh. This is a positive for natural gas as it's share of the electricity mix will likely increase to fill the gap. Below is a chart of California's monthly electricity generation by fuel and the percentage of drought in the state over the years.

Figure 34: California monthly electricity generation, by select fuel (MWh)



Source: EIA

Figure 35: Percentage of California in drought (2020-June 29, 2021)



Source: EIA

Energy Transition – An election will bring risk/costs exposure to Cdn oil & gas

Increasing climate costs

There is going to be an increasing focus on added risks/costs to the Cdn oil and gas sector over the next 3 months into what we believe will be a mid-October national election. And, unfortunately, we believe that focus will be on increased risks and costs as the Liberals announce an acceleration of their climate change actions against fossil fuels. With the worst of Covid behind, the Liberals have moved off their bottom and the polls point to them being very close to a majority. We believe the Liberals will increase their climate ambitions much more than most expect in their desire to be a global leader in climate change actions. Last week's (July 4, 2021) Energy Tidbits noted the Liberals accelerating their ending of sales of any ICE vehicles to 2035. In the release, the Liberals Minister of Environment Wilkinson said "*Cutting our transportation emissions is one of the most readily achievable and economically beneficial paths Canada can take on the road to net-zero emissions by 2050. That's why we are committed to aligning Canada's zero-emission vehicles sales targets with those of the most ambitious North American jurisdictions*." We believe this is indicative of what we will see rolled out in their pre-election actions and n their election platform.

The big new negative, its now the law to hit climate targets

Last week's (July 4, 2021) Energy Tidbits highlighted that its official, there is now no turning back from a major Liberals negative to the Cdn oil and gas sector. Its now the law for the Cdn government to be on track to meet 2030 emissions targets. We are surprised that this Bloomberg report received no headlines. On Wednesday, Bloomberg reported the Canadian Net-Zero Emissions Accountability Act received Royal Assent, which means the bill is now law. We have warned on this bill since last year because it is now the law for the government (Liberals) to lay out the specific plans to meet emissions reduction targets by 2030 so they can ensure Canada is on track for Net Zero 2050. Our concern is that this means the Liberals

have to take big emissions reduction actions right now. And the bill obligates them to have 2023, 2025 and 2027 progress reports so they can see where they are and adjust the emissions reduction plan. As we have been warning, it means the Liberals will be taking more aggressive action and their defence is "it's the law" "we have to do it", "we are following the law, we have to stay on track or get back on track". We have been warning that the oil and gas sector have to be prepared for more aggressive emissions reduction hitting them as part of the Liberals upcoming election platform. Our Supplemental Documents package includes the Bloomberg report.

PBO said it will take extraordinary measures to hit Liberals emissions targets

The other big reason for our warning is a still overlooked Parliamentary Budget Officer's June 23 report "*Beyond Paris: Reducing Canada's GHG Emissions by 2030*" [LINK], which we highlighted in our July 4, 2021 Energy Tidbits. This report is an easy read and worth the time. We expect this report to be featured in the run up to the next election. It is the updated PBO analysis on the effective required carbon tax to get to Liberals emissions targets. Note the updated PBO analysis estimates a lower level of added carbon tax is needed for Canada to catch up to and meet its Paris climate goals by 2030 than their Oct 2020 analysis. We have to wonder about that difference, but putting that aside, this new PBO analysis is formatted to step thru the effective carbon tax cost to get to Paris, then what the Liberals put out in Dec 2020, and then what the Liberals said in the Budget 2021, But, it important to note that the PBO does not put (and they say so) the remaining effective carbon tax to get to what they Liberals have promised in April that is a higher target than in the Budget 2021. In other words, the PBO effective carbon tax is low compared to what the Liberals have last promised in April. And that is before any of this round of promises in the election. The PBO notes that the Liberals Budget 2021 has a target to reduce Canada's GHG emissions to 468 Mt by 2030. They included a good table that estimates an additional carbon price of $211 is needed. Note that this is below the Oct estimate and that is to meet the Budget 2021 emissions target, whereas the Oct estimate was based on a lesser emissions target. It is important to note that the new PBO analysis says the Liberals have already promised more than their analysis, which ties to the Budget 2021. The PBO wrote "*This report does not provide detailed analysis of the Government's April announcement to further reduce emissions to between 40 and 45 per cent below 2005 levels (that is, 438 Mt and 402 Mt, respectively). While technologies to achieve this reduction are currently available, the scale and speed of the changes will make it challenging to achieve."* Like any cost or other reduction plan, we would expect that taking the emission reductions from Budget 2021 to a further 40 to 45% reduction below 2005 levels will be more than incremental costs. Its always easier to do the first cuts. It's the last cuts, the last mile that cut the deepest and hurt the most. The PBO even warns on this saying to get to the 40% extra, not the 45% is tough and to get to the 45% will take extraordinary measures. Its worth noting these extraordinary measures, one example is "*oil sands improve emission efficiency by an additional 50 per cent over what is already achieved in the reference case*". The bottom line is that carbon taxes have to go way higher to achieve the Liberals targets and we suspect the true accounting will put the number well over $300/tonne. The PBO also estimates the sectors that get hit the hardest, no surprise its oil and gas. Our Supplemental Documents package includes excerpts from the PBO report.

Energy Transition – Shell forgot to mention oil & gas prices in its positive Q2 update

Shell's strong Q2 financial results

One of the interesting Energy Transition themes that seems to be emerging quickly is how energy transition leaders message any positives from oil and gas as they accelerate the move away from oil and gas. Or in the case of Shell this week, its how they forgot to highlight the highlight of their Q2 update release on Wed – very strong oil and gas prices. We couldn't help tweet [LINK] "*#BigOil messaging under #EnergyTransition. #Shell debt down, shareholder distributions up. Would it have hurt to say due to high #Oil #NatGas prices? Like it or not, level of shareholder distributions for coming years will be driven by oil & gas, not #RenewableEnergy #OOTT*". Shell wrote "*Strong cash generation supports additional shareholder distributions in the second half of 2021 As a result of strong operational and financial delivery, combined with an improved macro-economic outlook, Shell will move to the next phase of its capital allocation framework and, subject to final Board approval, increase total shareholder distributions to within the range of 20-30% of CFFO, starting at the Q2 results announcement. The level of additional distributions will be determined with full visibility of the Q2 financial results. In the second quarter, Shell expects to have further reduced its net debt, although the extent of the reduction will be moderated by working capital movements. In conjunction with the increased distributions, Shell will retire its net debt milestone of $65 billion and will continue to target further strengthening of its balance sheet and AA credit metrics. 2021 cash capex will remain below $22 billion."* Our Supplemental Documents package includes the complete Shell release.

Demographics – UN Top Happiest Countries in 2020

One of the many items that we downloaded but didn't write up in our Energy Tidbits memos due to other breaking news was the United Nations World Happiness Report in April [LINK], Finland was once again ranked the world's happiest country and has taken the top spot since 2016. Both Canada and the US placed in the Top 20, placing 14th and 19th respectively. All of the least happy countries resided in Africa or Asia. To measure "happiness" the primary data used was through Gallup's World Poll. Gallup used Life Evaluations in its World Poll, asking respondents to evaluate their current life as a whole on a scale of 1-10, ten being the best possible life. The sample size is typically 1000 people per country and weighted averages are used to make data representative. They also measured Negative Emotions to attempt to qualify the results. People were asked if they had experienced any of the three following emotions a lot in the preceding day: worry, sadness, and anger. An interesting takeaway from that data was that worry and sadness showed statistically significant increases in 2020 vs 2017-2019 data. Clearly, the pandemic had a material impact on negative emotions. Below is a table which ranks the top 10 happiest and least happy countries according the report.

Figure 36: Top 10 Happiest and Least Happy Countries

Rank	Top 10 Most Happy	Top 10 Least Happy
1	Finland	Zimbabwe
2	Iceland	Tanzania
3	Denmark	Jordan
4	Switzerland	India
5	Netherlands	Cambodia
6	Sweden	Benin
7	Germany	Myanmar
8	Norway	Nambia
9	New Zealand	Egypt
10	Austria	Kenya

Source: United Nations World Happiness Report

Demographics – Studies show writing by hand is superior for learning

Writing out items is best for learning

No surprise, writing things out helps learning. Science Blog reported [LINK] on a Johns Hopkins University study that showed that handwriting helps people learn certain skills better, and by a wide margin, than if they were to learn the same materials through typing or watching videos. Brenda Rapp, a Johns Hopkins professor of cognitive science, and Robert Wiley, professor at UNC, conducted the experiment by teaching 42 people the Arabic alphabet. The participants were split into three groups of learners: writers, typers and video watchers. After learning through six sessions, each group was tested on how well they learned the new knowledge – beyond just being able to recognize the letters. The other more telling measures were being able to actually use the letters to spell new words and read unfamiliar words, and the writing group was significantly better in all of those things and required less time to reach that level of learning. In the end, the writing group ended up with more of the skills needed for expert adult-level reading and spelling. The study's team says the science behind the writing group's success is that in writing something down, one is providing a perceptual-motor experience that *"unifies what is being learned about the letters (their shapes, their sounds, and their motor plans), which in turn creates richer knowledge and fuller, true learning."*

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

@Energy_Tidbits on Twitter

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

LinkedIn – Look for quick energy items from me on LinkedIn

Look for energy items on LinkedIn

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

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.

California earthquake warning system is helping

There was a big 6.0 earthquake in a rural area by the California/Nevada border and a number of aftershocks. It was interesting to see some of the Twitter expert comments on the new California "ShakeAlert" earthquake warning system and how it was inaccurate in not warning that it was going to be a big 6.0 earthquake. However, we liked the Bakersfield.com reporting "*What ShakeAlert warning system got wrong — and right — about this week's 6.0 quake in California*" [LINK] that noted that Californians didn't care about that, they liked the fact that they got a warning so they could take action. Bakersfield.com wrote "*Such details didn't matter to some California residents, who welcomed the warning in time to take action. "It worked. The whole point is to give you a little notice," said a Lodi-based wine industry consultant who asked that his name not be used. He rushed from his office to the safety of a bathroom when the system's app issued a startling emergency alert. "It's*

really worth it." "I was just working at my computer and I saw the phone shake and buzz, then a notification popped up. My computer is right next to a window and the glass could have shattered," he said. With his daughter, "we both got down on the floor next to the sink and we started feeling the rolling waves." Our Supplemental Documents package includes the Bakersfield.com report.

Cdn sprinter Harry Jerome in the news 57 years after Tokyo 1964 Olympics

Its probably only baby boomers who remember Cdn sprinter Harry Jerome, who at one time had tied the world record for both the 100 yard and 100 metre dash. That as in the old days when they had 100 yard dash. And he really burst onto a broader Cdn attention when he won bronze at the Tokyo 1964 Olympics. Harry grew up in Vancouver and was one of the early Cdn athletes to go train under famed Bill Bowerman at the University of Oregon. And that Oregon connection is why he was in the news this week. On Thursday, Yahoo News posted [LINK] the AFP story that wrote "*On the same day the Olympics opens this month, Sotheby's will put on sale running shoes made by Nike's co-founder for 1960s Olympian Harry Jerome that could fetch $1 million. The rare pair of track and field spikes designed by Bill Bowerman for Jerome, a Canadian sprinter who won 100-metre bronze at the 1964 Tokyo Games, features a red arrow that was a prelude to the famous Nike swoosh logo. Sotheby's in New York will put the white lace-up shoes on sale online from July 23 to August 2."*

Figure 37: Harry Jerome spikes worn at Tokyo 1964 Olympics

Source: Yahoo News

Anyone has grocery shopped has seen "shrinkflation"

On Tuesday, there was a good NPR story that highlighted something everyone who has grocery shopped has seen – shrinkflation. The NPR story was "*Beware Of 'Shrinkflation,' Inflation's Devious Cousin"* [LINK]. The story is about how food products prices may not have changed, but are being sold in smaller portions so the effective price is higher. Who hasn't picked up a cereal box and thought that box looks smaller than it used to look. Well you were probably right. NPR writes "*Downsizing and shrinkflation both refer to the same thing: companies reducing the size or quantity of their products while charging the same price or even more. "Downsizing is really a sneaky price increase," Dworsky says. "Consumers tend to be price conscious. But they're not net-weight conscious. They can tell instantly if they're used to paying $2.99 for a carton of orange juice and that goes up to $3.19. But if the*

orange juice container goes from 64 ounces to 59 ounces, they're probably not going to notice." Our Supplemental Documents package includes the NPR story.

Figure 38: Cocoa Puffs

Source: NPR

Who is playing old National Bank Financial golf balls in Mexico?

It's the familiar faces in strange places golf ball find this week. Found this National Bank Financial Ping golf ball on Mountain 7 at Palmilla Golf Club. It was in some bushes just off the fairway, so washed it up as it looked new. Hit, what I thought was a good 5-iron on Mountain 8 and it went like a good 6-iron. So I am blaming it on someone using and losing an old NBF golf ball. Either that or our NBF friends need to switch to Titleist. You can tell the Canadian Covid travel rules have got Canadians travelling. Its normally not the time of year for many Canadians down in Los Cabos (myself included) and there have been at least a couple of foursomes playing at the course.

Figure 39: National Bank Financial logo golf ball in Los Cabos, Mexico

Source: SAF Group

Who doesn't love National French Fry Day?

July 13 is National French Fry Day, which has to be a favorite food holiday for many people. In Canada, it was the big treat for baby boomers in the 60s to get fries and gravy, or to go to your first chip truck in the 70s. In that era, chip trucks in parts of Ontario and Quebec were really the only food trucks. Or in Europe to be in Belgium (the home of French Fries, not France) to go to a Fritkot (basically looks like a fancy food stand at the Stampede) for frites with mayonnaise. Can't wait until Tuesday. The last time we wrote about Fries was after Covid hit. Our April 26, 2020 Energy Tidbits highlighted how Belgians were being asked to eat more French Fries to help with the potato surplus that emerged with the Covid shut down in Belgium.