Energy Tidbits

April 11, 2021

Produced by: Dan Tsubouchi

If Real Progress Is Made At JCPOA Apr 14, Will Blinken Leave Brussels to Meet With Zarif?

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. Blinken is at NATO next week, wonder if he will leave to meet Zarif if real progress made at JCPOA April 14 meeting? (Click Here)

2. Biden's Made in America Tax Plan seems like more to put US on an irreversible path to Net Zero. (Click Here)

3. Total's likely Mozambique LNG delay/deferral has major implications to global LNG markets. (Click Here)

4. Equinor's release on its big hydrogen power project in UK forgot to mention it will be sourced via natural gas (Click Here)

5. Reminder the Montney natural gas play with condensate has best economics of any US/Can play. (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 20 bcf, storage now -235 bcf YoY deficit

YoY storage at -235 bcf YoY deficit

The EIA reported a 20 bcf injection (vs 22 bcf injection expectations) for the April 2 week, which was above the 5-yr average injection of 8 bcf, but below last year's injection of 38 bcf. Storage is 1.784 tcf as of Apr 2, increasing the YoY deficit to 235 bcf from 225 bcf last week and storage is now 24 bcf below the 5 yr average. March was very warm (see below), but its been a good winter for gas storage moving from ~200 bcf YoY surplus to start the winter to end of winter at -235 bcf YoY. 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 (04/02/20)		5-year average (2016-20)	
Region	04/02/21	03/26/21	net change	implied flow	Bcf	% change	Bcf	% change
East	305	307	-2	-2	382	-20.2	303	0.7
Midwest	398	401	-3	-3	475	-16.2	400	-0.5
Mountain	115	112	3	3	92	25.0	106	8.5
Pacific	198	194	4	4	202	-2.0	194	2.1
South Central	768	749	19	19	867	-11.4	806	-4.7
Salt	235	226	9	9	264	-11.0	248	-5.2
Nonsalt	533	523	10	10	604	-11.8	558	-4.5
Total	1,784	1,764	20	20	2,019	-11.6	1,808	-1.3

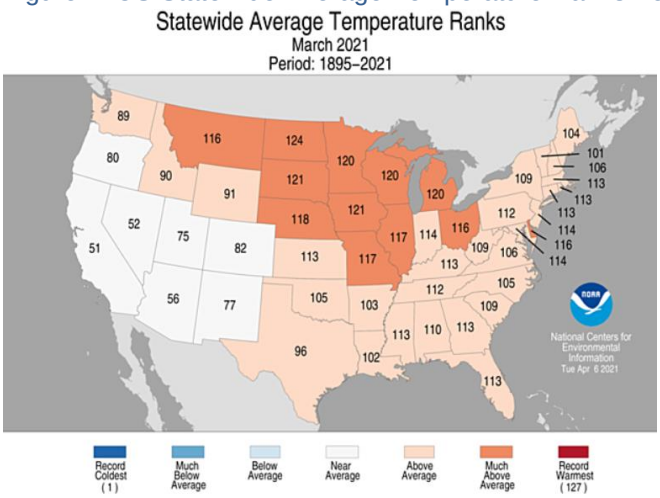
Source: EIA

Natural Gas – March was hot, 14th warmest in last 127 year

A very hot winter

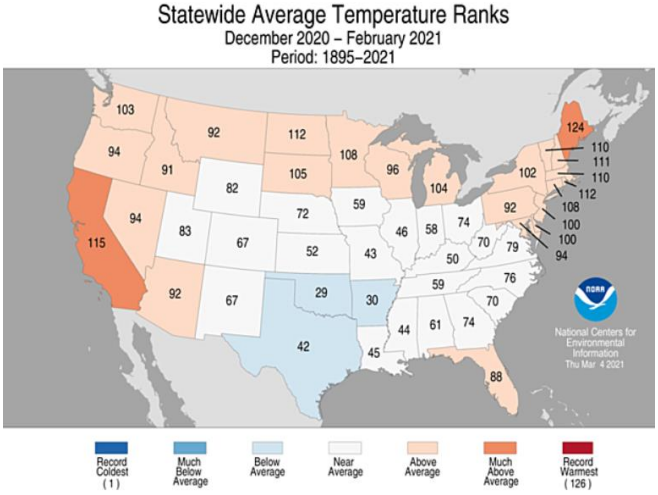
It has been a terrible winter for natural gas demand. NOAA reported this week that March was very hot, the 14th warmest in the 127 years. Couple that with NOAA previously reporting that Dec/Jan/Feb was the 28th hottest in the last 126 years, its why we say its impressive that US gas storage went from +200 bcf YoY at the start of the winter to -235 bcf YoY to end winter. Below is the NOAA's statewide average temperature map for March 2021 [LINK] and its statewide average temperature maps for D/J/F [LINK].

Figure 2: US Statewide Average Temperature Ranks Feb 2021



Source: NOAA

Figure 3: US Statewide Average Temperature Ranks Feb 2021



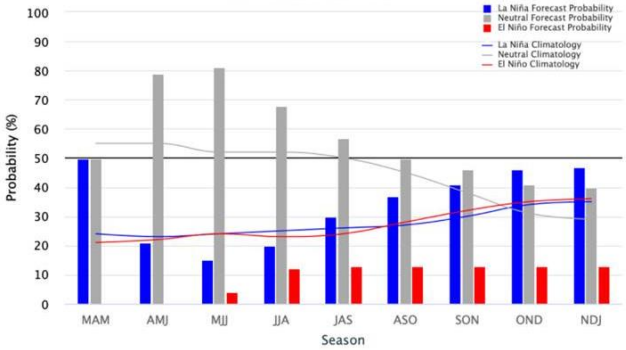
Source: NOAA

Natural Gas – 87% probability for La Nina/Neutral in key hurricane ASO season

La Nina/El Nino focus to turn to summer

The CPC/IRI released its updated monthly El Nino/La Nina outlook is issued on the 2nd Thurs of every month [LINK]. The focus for La Nina/El Nino now moves to the summer and hurricane season. NOAA said *"A transition from La Niña to ENSO-Neutral is likely in the next month or so, with an 80% chance of ENSO-neutral during May-July 2021".* The trends are the unchanged, with only very small reduction to the Normal/La Nina conditions. NOAA continues to expect Neutral/La Nina probability for the summer and the peak Atlantic hurricane season, which Aug/Sep/Oct. They call for 13% chance of El Nino conditions, was 10% last month. The forecast for ASO is 37% La Nina (was 44%), 50% Neutral (was 46%) and only 13% for El Nino (was 10%) 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 4: Early-April NOAA El Nino/La Nina Outlook



Source: CPC/IRI

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

EIA forecasts US gas production +1.88 bcf/d YoY in 2022

The EIA released its monthly Short Term Energy Outlook April 2021 [LINK] on Tues. (i) The EIA forecast continues to show US natural gas not returning anywhere near the Q4/19 peak of 96.58 bcf/d, with Q4/22 US natural gas of 94.39 bcf/d (down 2.19 bcf/d from peak). (ii) For

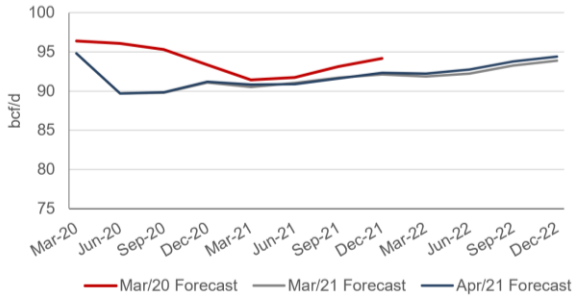
2021, the EIA made upward revisions to Q1 and Q4. EIA increased its Q1/21 forecast by 0.32 bcf/d to 90.82 bcf/d and Q4/21 by 0.18 bcf/d to 92.31 bcf/d. 2021 US natural gas production is forecast to average 91.36 bcf/d (up from 91.34 bcf/d previously). (iv) US natural gas production is expected to average 93.29 bcf/d in 2022 (92.83 bcf/d previously), up 1.88 bcf/d YoY. (v) Note for those that read the STEO, there was a mistake in their explanation of why natural gas production forecast is increased. The EIA wrote *"The increase in production in 2021 reflects higher forecast natural gas prices as well as higher forecast crude oil prices, which we expect will contribute to more associated natural gas production, especially in the Permian region"*. The EIA did increase its oil price forecast, which would have increased associated natural gas in their forecast model, but actually reduced its HH forecast in March to $3.15 in 2021 and $3.23 in 2022 versus the Feb STEO of $3.27 in 2021 and $3.28 in 2022. Our Supplemental Documents package includes excerpts from the EIA STEO.

Figure 5: 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
Apr 2021	90.01	91.57	94.00	96.58	93.06	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	93.06	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	93.06	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	93.06	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	93.06	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					
May 2020	89.32	90.50	92.98	95.97	92.21	94.28	91.08	88.03	86.05	89.84	84.21	84.09	85.03	86.22	84.89					
Apr 2020	89.32	90.50	92.98	95.88	92.19	94.47	93.24	90.71	88.43	91.70	86.18	86.49	87.95	89.26	87.48					

Source: EIA, SAF

Figure 6: EIA STEO US Natural Gas Supply Forecasts By Forecast Month



Source: EIA, SAF

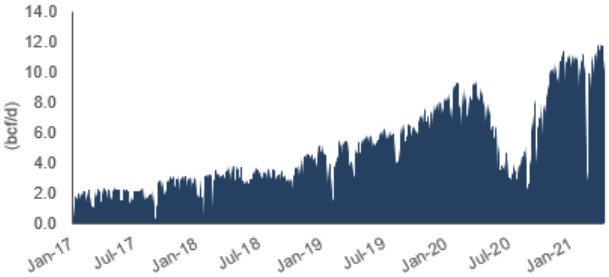
Natural Gas – US LNG feedgas flows decline due to maintenance season beginning

LNG feedgas flows decline 1.8 bcf/d April 1 to April 8

US LNG exports have been extremely strong since November, reaching new record highs each month. The record US LNG exports had been mainly driven by Asia temps fueling demand. However, while the data for Feb will be released at the end of April, we can expect that Feb will show a rather significant decline MoM for Jan levels due to the extreme weather experienced. Natural gas flows to LGN export terminals had averaged 10.4 bcf/d in Jan but fell to 8.3 bcf/d in Feb, hitting a low of 1.4 bcf/d on Feb 16. Flows recovered well in March, averaging 11.1 bcf/d. However with maintenance season beginning LNG flows fell from 11.9 bcf/d April 1, to a six-week low of 10.1 bcf/d on April 8 and should see April down MoM vs March. Reuters reported on the decline [LINK] and wrote *"Traders said it was unlikely feedgas in April would top March's record due to the Corpus reduction and other maintenance later this month, including expected work at Cameron LNG in Louisiana".* It is

also interesting to note that US LNG exports are beginning to near full capacity available, which according to Reuters is ~10.5 bcf/d.

Figure 7: Net US LNG Flows to Export Terminals



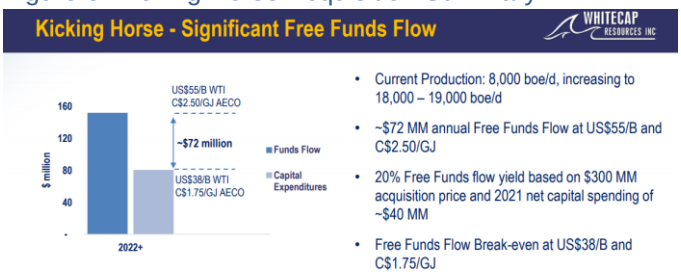
Source: Bloomberg

Natural Gas – Reminder liquids rich Montney gas has best economics in US/Can

Significant free funds flow in WCP acquisition

Perhaps the most overlooked upside in the US and Canada oil and natural gas plays is that the best economics is in the Montney natural gas play where there is associated liquids in the form of condensate. These wells still produce well over 50% in the form of natural gas, but the condensate is a huge value upside. On Monday, Whitecap announced the acquisition of Kicking Horse Oil & Gas [LINK]. Kicking Horse's assets consist of ~8,000 boe/d (68% natural gas and 32% liquids of which ~90% is condensate) of production in the Montney natural gas play area of Kakwa. The acquired assets are expected to generate significant free funds flow with very quick payouts. On Monday we tweeted [LINK] *"Overlooked. Cdn #Montney #NatGas wells with associated liquids, if condensate, are likely the best economics of any US/CAN play. No wonder $WCP latest acquisition generates big free cash flow, wells have ~1 yr payout. Payout is the key factor for a free cash flow model. #OOTT".* Whitecap is expecting to increase production in the area from 8,000 boe/d currently to 18,000 – 19,000 boe/d in 12-15 months, generating ~$72mm of free funds flow in FY2022 at US$55 WTI and C$2.50/GJ AECO. 2021 capex is expected to be $75mm with 2022 slightly increasing to $80mm on funds flow of $152mm. They expect to spend $80mm to keep production flat at 18,500 boe/d drilling 8-10 wells per year.

Figure 8: Kicking Horse Acquisition Summary



	2021(1)	2022	2023-2026
Average Production (boe/d)	**5,500**	**18,500**	**18,500**
($MM)			
Funds Flow	$45	$152	$608
Capital Expenditures	($75)	($80)	($320)
Free Funds Flow	($30)	$72	$288
Cumulative Free Funds Flow (2)	**($40)**	**$22**	**$310**

Source: Whitecap

Natural Gas – Hard to see Total resumes Mozambique LNG development anytime soon

More violence in Mozambique

Our last two Energy Tidbits have noted our view that we find it hard to believe that Total resumes its Mozambique LNG Phase 1 development much before year end 2021. Recall that Total had shut down development for 3 months due to the security risk, restarted on Wed March 24, 3 days of violence/attacks followed and then Total suspended operations on Sat March 27. Last week, Total reportedly pulled all staff out of Mozambique. This week, there was even more. We apologize in advance for the gruesome details, but this week, Reuters [LINK] reported "*Twelve people, possibly foreigners, were found beheaded following an attack claimed by Islamic State on the northern Mozambique town of Palma, a local police commander told the state broadcaster. Commander Pedro da Silva told journalists visiting the town, near natural gas projects worth $60 billion, that he could not be sure of the nationalities of the 12 people, but he believed they were foreigners because they were white*." Especially after this week's reports, we just don't see how the Total board can approve a restart to development for some period. We previously said we think the timeline of at least a 1 year delay is the minimum planning assumption. Total originally planned for a 2024 completion of Phase 1. The question will be what happens after another restart? We did not get our detailed blog written this week, but hope to do so this week as we believe this is a significant factor on LNG markets.

Natural Gas – Japan contract-based Jan spot LNG prices still high in Feb

Japan March contract based spot LNG prices down MoM to $6.60

This week, the Japan Ministry of Economy, Trade, and Industry reported [LINK] Japan contract-based spot LNG price for March was $6.60, which was down big MoM from February of $12.70 and January at $18.50. January had record Asian LNG prices with the cold weather, multiple LNG supply interruptions and some nuclear outages in Japan. With the return to warm weather Japan was experiencing all month it is no surprise that prices were down. March's price, though a big MoM decline is still up 94.1% YoY. As a reminder, the Japan contract spot-based price is not JKM price, as they define this price as *"Spot-LNG" refers to LNG that are traded on a cargo to cargo basis, and does not mean term contracts of LNG (so-called long, medium, short-term contracts). In addition, for spot- LNG, the price of which is linked to a particular price index (for example the Henry Hub link, and the JKM link) is excluded from these statistics"*. Below is our table of monthly Japan LNG import prices.

Figure 9: Japan LNG Contract Base Spot Price $/mmbtu

	2014	2015	2016	2017	2018	2018/2017	2019	2019/2018	2020	2020/2019	2021	2021/2020
Jan		$10.20	$7.10	$8.40	$11.00	31.0%	$8.30	-24.5%	$5.90	-28.9%	$18.50	213.6%
Feb		$7.60	$6.50	$8.50	$10.60	24.7%	$7.50	-29.2%	$3.40	-54.7%	$12.70	273.5%
Mar	$18.30	$8.00	n/a	$6.30	$8.80	39.7%	$6.40	-27.3%	$3.40	-46.9%	$6.60	94.1%
Apr	$16.00	$7.60	$4.20	$5.70	$9.10	59.6%	$5.20	-42.9%	$2.40	-53.8%		
May	$14.80	n/a	$4.10	$5.70	$8.20	43.9%	$5.40	-34.1%	$2.20	-59.3%		
June	$13.80	$7.60	n/a	n/a	$9.30	n/a	$5.50	-40.9%	$3.80	-30.9%		
July	$11.80	$7.90	$5.80	$5.60	$10.00	78.6%	$4.70	-53.0%	$4.20	-10.6%		
Aug	$11.40	$8.10	n/a	$5.80	$10.70	84.5%	$5.30	-50.5%	$3.40	-35.8%		
Sept	$13.20	$7.40	$5.70	$6.90	$10.60	53.6%	$5.40	-49.1%	$4.50	-16.7%		
Oct	$15.30	$7.60	$6.10	$8.20	$10.70	30.5%	$5.50	-48.6%	$6.00	9.1%		
Nov	$14.40	$7.40	$7.00	$9.00	$10.80	20.0%	n/a	n/a	$6.80	n/a		
Dec	$11.60	$7.40	$8.00	$10.20	$9.20	-9.8%	$6.40	-30.4%	$7.40	15.6%		

Source: Japan Ministry of Economy, Trade and Industry

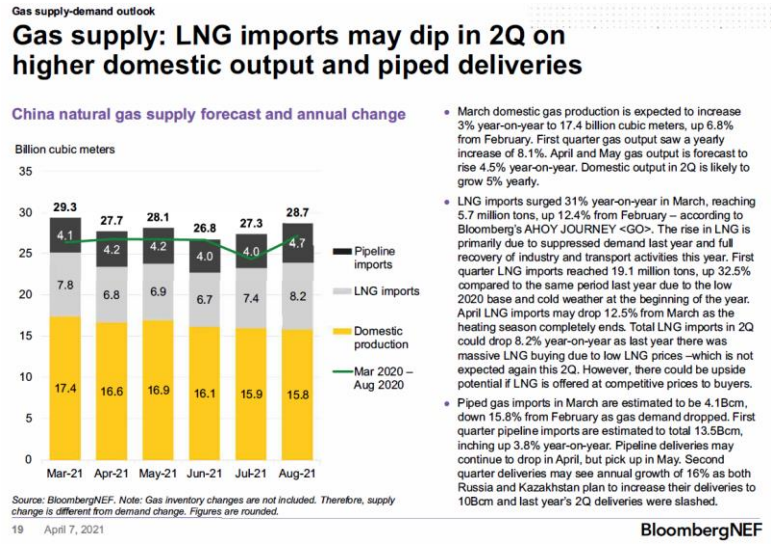
Natural Gas – Continued YoY increases in China gas production and pipeline imports

China Gas Monthly

BloombergNEF posted its China Gas Monthly this week and, as usual, there is great data and insights. We passed one of their summary slides below as it reinforced the key China natural gas/LNG themes. The big picture is LNG demand growth from China isn't the global LNG demand theme it was in the 2015 to 2019 period. China domestic natural gas production returned to growth, call it approx. 0.8 bcf/d YoY in Q2. Pipeline imports continue to increase (ie. Power of Siberia from Russia) call it approx. another 0.2 bcf/d YoY in Q2.

And China LNG imports in Q2 down approx. 0.8 bcf/d YoY. This is shoulder season, which is why LNG imports get squeezed, but the concept is that China continues to see YoY increases in domestic natural gas production and gas pipeline imports that are squeezing out the LNG import growth rates. Our Supplemental Documents package includes excerpts from the Bloomberg China Gas Monthly.

Figure 10: China Gas Supply



- March domestic gas production is expected to increase 3% year-on-year to 17.4 billion cubic meters, up 6.8% from February. First quarter gas output saw a yearly increase of 8.1%. April and May gas output is forecast to rise 4.5% year-on-year. Domestic output in 2Q is likely to grow 5% yearly.
- LNG imports surged 31% year-on-year in March, reaching 5.7 million tons, up 12.4% from February – according to Bloomberg's AHOY JOURNEY <GO>. The rise in LNG is primarily due to suppressed demand last year and full recovery of industry and transport activities this year. First quarter LNG imports reached 19.1 million tons, up 32.5% compared to the same period last year due to the low 2020 base and cold weather at the beginning of the year. April LNG imports may drop 12.5% from March as the heating season completely ends. Total LNG imports in 2Q could drop 8.2% year-on-year as last year there was massive LNG buying due to low LNG prices –which is not expected again this 2Q. However, there could be upside potential if LNG is offered at competitive prices to buyers.
- Piped gas imports in March are estimated to be 4.1Bcm, down 15.8% from February as gas demand dropped. First quarter pipeline imports are estimated to total 13.5Bcm, inching up 3.8% year-on-year. Pipeline deliveries may continue to drop in April, but pick up in May. Second quarter deliveries may see annual growth of 16% as both Russia and Kazakhstan plan to increase their deliveries to 10Bcm and last year's 2Q deliveries were slashed.

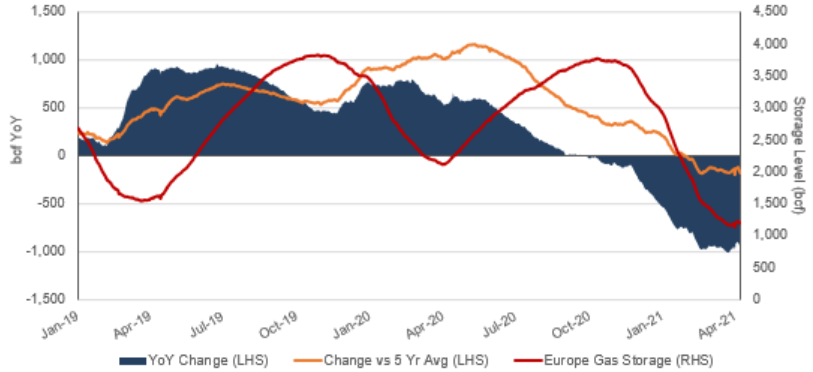
Source: BloombergNEF

Natural Gas – Europe storage 30.41% full vs 5 year average of 36.21%

Europe gas storage 35.39% full

Winter looks like it has finally come to an end in Europe and our focus for Europe gas storage is now turning to how quickly it fills off the low point this winter. It was cold through March which had delayed the refill push. This winter has been another good reminder that Europe gas storage is the key indicator for the near term strength of global LNG markets. The big draw in Europe gas storage this winter was the indicator that it has been a good winter for LNG prices. Additionally, the significant YoY deficit in Europe gas storage at the end of winter indicates that there will be strong demand for European LNG imports during the refill push. Europe gas storage started the winter (Nov 1) at basically full levels at 94.66% and has dropped by 65.76% to be 28.90% at Apr 1. This 65.82% 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. So massive draw vs last year and the last 5 years. Storage at Apr 1 of 28.90% looks to be the bottom for withdrawal season. Storge level has since increased 1.51% to 30.41% as of April 8 to 5.80% below the 5 year average of 36.21% and 24.69% below last years level of 55.10%. 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 11: Europe Gas Storage Level



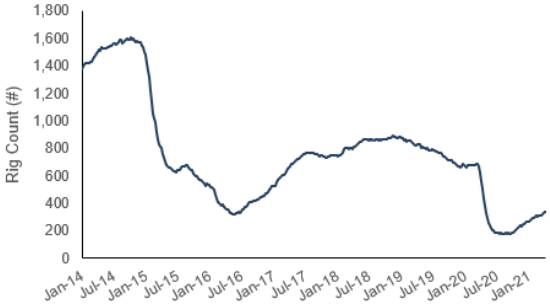
Source: Bloomberg

Oil – US oil rigs flat at 337 oil rigs

US oil rigs flat this week

Baker Hughes reported its weekly rig data on Friday. US oil rigs were flat at 337 oil rigs as of Apr 9. There was an increase in Eagle Ford +1 and a decrease in Others -1. Oil rigs have been on a strong recovery path and are +165 off the bottom of 172 in the Aug 14 week. US oil rigs have been modestly increasing as WTI was at and had increased over $60 for several weeks. We may see some modest increases or perhaps even a pause with WTI closing below $60 this week. US oil rigs hit their 2020 peak at 683 on March 13 and have since fallen by 346 to 337 oil rigs (-50.7%). Below is our graph of Baker Hughes US oil rigs.

Figure 12: Baker Hughes Total US Oil Rigs



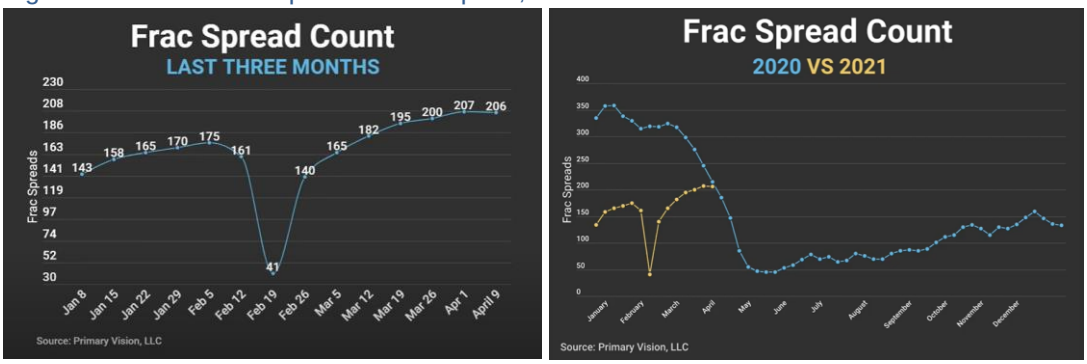
Source: Baker Hughes

Oil – Frac spreads -1 to 206 as of April 9

Frac spreads -1 to 206

Every week, Mark Rossano posts a YouTube recap of frac spreads for the week on the Primary Vision Network [LINK]. He reported US frac spreads were down 1 to 206 as of April 9. He expects frac spreads to range around 205 to 215 thru April and into May. Rossano is seeing more activity in smaller basins like the Uinta. He expect the Permian and Texas in general to be fairly flat. And there could be some small increases in the Bakken if DAPL looks like nothing will happen into 2022. Below are his two key frac spread graphs.

Figure 13: Active Frac Spreads as of April 4, 2021



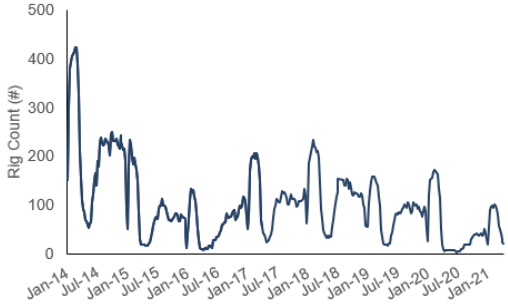
Source: Primary Vision

Oil – Total Cdn rigs down 11 to 58 total rigs and up 23 YoY

Cdn rigs -11 this week

Baker Hughes reported total Cdn rigs were down 11 this week to 58 total rigs. The continued decline this week was expected with the end of winter drilling. Cdn oil rigs were down 5 to 19 rigs. Cdn gas rigs were down 6 to 39 gas rigs. Total rigs are now +45 since the June 26 all-time low. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 9 and Cdn gas rigs were 32 for a total Cdn rigs of 41, meaning total Cdn rigs are +23 YoY but total rigs are down 8 vs 2019. Below is our graph of Baker Hughes Cdn oil rigs.

Figure 14: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production -0.2 mmb/d to 10.9 mmb/d

US oil production -0.2 mmb/d

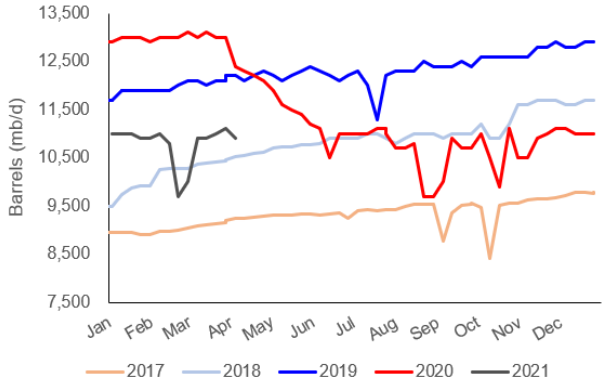
US oil production was down 0.2 mmb/d to 10.9 mmb/d for the April 2 week, and Lower 48 was down 0.3 mmb/d to 10.4 mmb/d. This puts US oil production down 1.5 mmb/d YoY and is down 2.1 mmb/d since the 2020 peak of 13.1 mmb/d on March 13. The EIA April STEO released on Tuesday revised down US oil production for the remainder of 2021 by 0.11 mmb/d to 11.04 mmb/d, down 1.74 from Q4/19 peak of 12.78 mmb/d. YoY growth returns in 2022 with average production of 11.86 mmb/d, +0.82 mmb/d YoY with Q4/22 production of 12.18, down 0.6 mmb/d vs Q4/19. This reduction was mainly due to lower than expected activity levels outside of the Permain. The EIA DPR has the expectation of continued MoM declines in March and April, which we believe is due to the Texas freeze hammering completions for two weeks. The EIA forecasts April at 7.458 mmb/d which is -47,000 b/d MoM. The EIA Form 914 actuals for December came in 38,000 b/d higher than the EIA weekly estimates for December, much closer than the 246,000 b/d over estimate in the actuals for November which had been due to hurricane activity in early Nov.

Figure 15: 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								

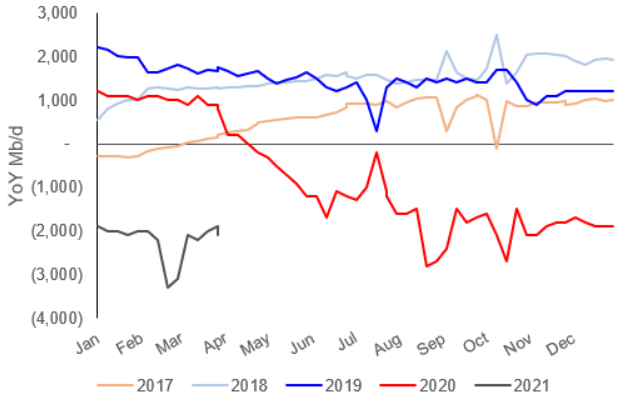
Source: EIA

Figure 16: US Weekly Oil Production



Source: EIA, SAF

Figure 17: YoY Change in US Weekly Oil Production



Source: EIA, SAF

Oil – EIA STEO lowers US oil production forecast for 2021 and 2022

EIA forecasts US oil exit in 2021 at 11.35 mmb/d

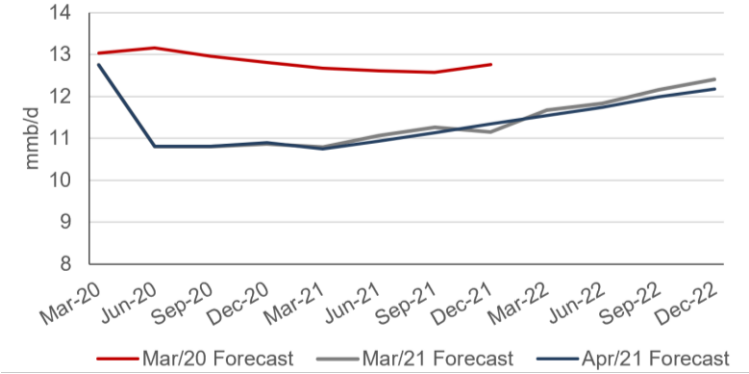
Despite forecasting higher WTI prices, the EIA STEO revised down its 2021 and 2022 US oil production with lower assumed drilling, but still showing growth. Note they must have changed their model assumptions on US oil plays outside the Permian. (i) The EIA forecast lowered its US crude expectations thru 2021, and still not returning anywhere near the Q4/19 peak of 12.78 mmb/d, with Q4/21 US crude of 11.35 mmb/d (down 1.43 mmb/d from peak). Q4/21 of 11.35 mmb/d is +0.40 mmb/d YoY vs Q4/20. Full year 2020 US oil production is at 11.31 mmb/d and is down 0.94 mmb/d YoY from 12.25 mmb/d in 2019. (ii) Full year 2021 is decreased by 0.11 mmb/d vs Mar STEO at 11.04 mmb/d, which is down 0.27 mmb/d YoY from 2020. (iv) The EIA forecasts a shift back to YoY growth in 2022 with production averaging 11.86 mmb/d, +0.82 mmb/d YoY (was 12.02 mmb/d previously), with Q4/22 production of 12.18 mmb/d, ie still down 0.58 mmb/d from Q4/19. (v) It is important to note that the EIA looks like it is changing its model assumptions with respect to oil prices and rig activity for play areas outside the Permian. Normally with higher WTI price assumptions, the EIA model would crank out increased US oil production. But this month, the EIA wrote *"We are forecasting lower production despite higher expected crude oil prices (about $2/b higher in both 2021 and 2022) because we now forecast that rig activity in producing areas outside the Permian—such as Bakken, Eagle Ford, and Anadarko—will be lower than previously expected".*

Figure 18: 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
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	12.1	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					
May 2020	11.81	12.10	12.23	12.78	12.23	12.81	11.78	11.23	10.93	11.69	10.81	10.89	10.83	11.07	10.90					
Apr 2020	11.81	12.10	12.23	12.78	12.23	12.73	11.98	11.29	11.04	11.76	10.96	11.08	11.00	11.08	11.03					

Source: EIA, SAF

Figure 19: Estimated US Crude Oil Production By Forecast Month



Source: EIA, SAF

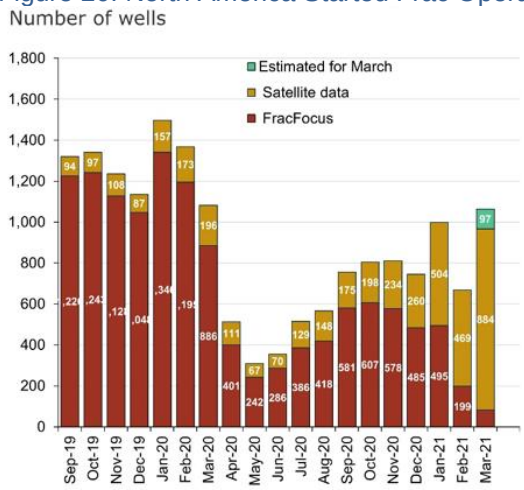
Oil – Rystad update: Permian oil output to grow in Q2 as fracking reaches 12-mth high

Rystad- Permain oil output to grow in Q2

We are big fans of Rystad and RBN blogs and one of the reasons is that they provide details and numbers to support their views. On Friday, Rystad posted its frac update blog [LINK]. A key item to note is that the number of completed wells in the Permian during Q1 2021

exceeded the level required to keep output flat of ~300 unconventional well completions per month. For March, Rystad wrote *"The Permian was disproportionally hit by the Texas winter crisis in February and activity in the region grew significantly in March. We have already detected 429 started frac operations in March, while February 2021 ended up at 260 wells".* Production is expected to rise in Q2, but likely slow down again later this year as the average frac count has dropped from >100 in mid-march to 65. This level is below the level needed to continue to keep production flat. Nearly all basins have reached at least the level to keep production flat, however Bakken and Anadarko basins are struggling to outpace natural declines still. Our Supplemental Documents package includes the Rystad blog.

Figure 20: North America Started Frac Operations



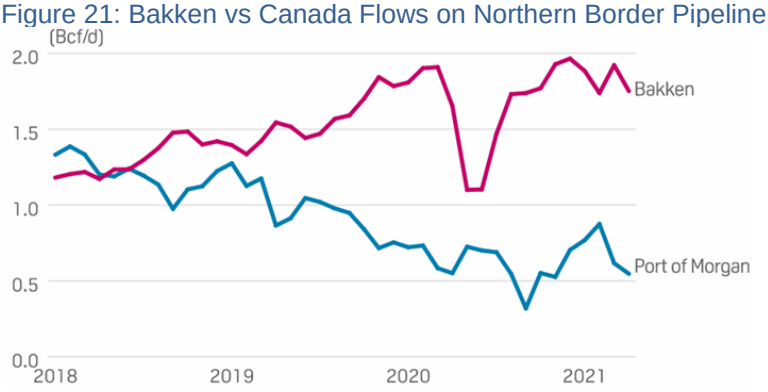
Source: Rystad

Oil – Platts call for Bakken oil and natural gas to slightly decline

Platts expecting declining Bakken production

Oil production in the Bakken has declined MoM for the last 3 months as natural declines overtake muted drilling activity. Platts posted an article on the declining share of Bakken natural gas flows on the Northern Border pipeline [LINK]. Bakken Shale production has declined 0.1 bcf/d WoW to 2.1 bcf/d on April 1, while Williston shows a similar decline from 2.2 bcf/d to 2.1 bcf/d. Flows on the pipeline have declined in tandem, falling to 1.7 bcf/d April 1-4, which is the lowest since the extreme cold in mid-February. For summer, Platts wrote *"Platts Analytics expects Bakken production to average 2 Bcf/d throughout April before falling month over month. The summer is expected to average 1.8 Bcf/d and reach as low 1.7 Bcf/d by October. This should continue to weaken Bakken flows along Northern Border, allowing West Canada to utilize more capacity to send a total of 3.7 Bcf/d this summer, an additional 700 MMcf/d over summer 2020".* As gas production in the Bakken is almost 100% associated gas from oil wells, the expectation for decreased gas production must stem from an expectation of declining oil production, not surprising given Bakken rig/completions levels that have been much below the level needed to keep production flat. Our Supplemental Documents package includes the Platts report.

Figure 21: Bakken vs Canada Flows on Northern Border Pipeline



Source: Platts

Oil – Looks like DAPL status is still up in the air until at least late April

DAPL decision still a couple weeks away

It looks like it will be a couple weeks before we hear if Dakota Access PipeLine (DAPL) will be shut down. We really don't understand why many aren't on Twitter. Yes, we know that there is a lot of fiction out there, but we saw a great example on Friday of legitimate reporters tweeting on the US District Court hearing on DAPL). Our Friday lunch time tweet noted the tweets from the hearing from Bismarck Tribune's Amy Sisk (we reference her monthly reports on North Dakota oil production) [LINK] and Platts' Jordan Bloom [LINK]. There was no decision made on Friday, and the surprise for the hearing was tha the US Army Corps of Engineers did not make a recommendation for a decision. As a result, it looks like the decision is flipped to the court and Judge Boasberg. Sisk tweeted "*#DAPL court hearing just ended. The Corps has not made a decision on whether to shut down the pipeline; still evaluating it. Standing Rock is "deeply disappointed." Judge Boasberg says he's surprised the Corps has not made a decision, which may well now fall to him.*" Bloom posted a full report post the hearing that said "*US District Judge James Boasberg, who previously ordered the 570,000 b/d pipeline shuttered last year before his order was halted on appeal, will rule as soon as late April on whether to close the pipeline while a more thorough environmental review is conducted by the Army Corps that could last until early 2022*." Notwithstanding this next late April ruling, our long time industry contacts tended to share a view that no shutdown was likely until the environmental review was completed but with the caveat that any operating problems could lead to an immediate shutdown thereafter. That potential seemed to be reflected in the Bloom reporting "*Boasberg granted Energy Transfer 10 days until April 19 to update its arguments against closure, as well as the economic consequences of a pipeline shutdown, especially with higher oil prices in 2021 and the coronavirus vaccine rollout well underway that should further boost oil demand*." Our Supplemental Documents package includes the Platts reporting.

Oil – Occidental CEO warns on risk to Biden's federal lands impact on US production

Occidental warns on Biden federal lands review

Occidental CEo Vicki Hollub received a lot of headlines for her views on carbon tax and her not just stepping in line with other the API and other large oil companies that a carbon tax is right. She was widely quoted ""*A carbon tax would be bad for a lot of the industry, a carbon tax would be bad for the consumers and especially for those consumers who are more disadvantaged from an economic standpoint*" and the punch line "*a carbon tax is not what we're pushing at all*." As a result her comments on what the Biden administration will do on its review of fossil fuels leasing program on federal lands were mostly overlooked. She didn't give specifics on the size of the potential impact but does worry that Biden is likely to hit the federal lands unless he has a strong emissions reduction plan for oil and gas. We would

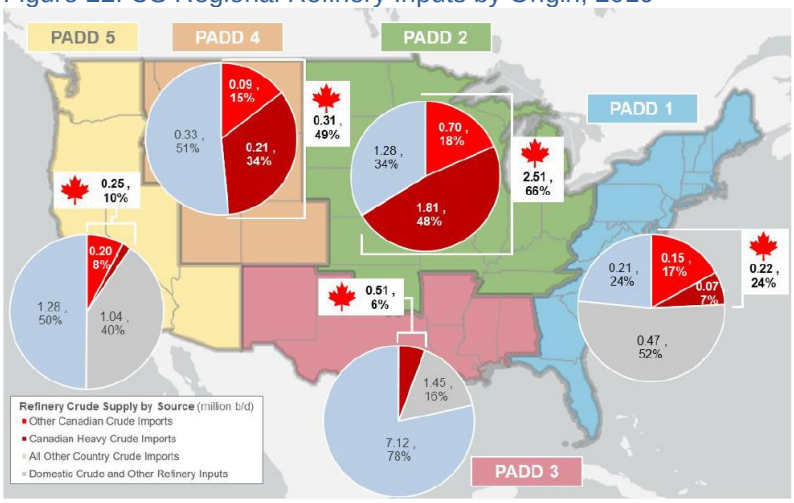
expect Occidental would have some good contacts in Washington, but we are in a different camp and believe the federal lands will be hit no matter what Biden has separately on oil and gas emissions. Regardless, Bloomberg reported "*Oil producers must provide palatable options for the Biden administration or risk having "extreme measures" forced upon them, Hollub said. "In the absence of a good plan on how to continue to lower emissions from the existing production that we have in the U.S., President Biden and his administration are going to feel forced to do something on their own," she said. "And I think that something would be to further limit leasing on federal lands. There could be a production impact.""* Our Supplemental Documents package includes the Bloomberg report.

Oil – API reminds of US/Can interdependence on oil

Canada provides 58% of US heavy oil supply

API released a good report detailing oil and products trade between the US and Canada [LINK]. Total liquids trade between the US and Canada has doubled since 2010, growing from 2.75 mmb/d to 5.5 mmb/d in 2019. Nearly all of the crude oil exported from Canada to the US is refined in the central US with 3.3 mmb/d of the 3.8 mmb/d total was refined in PADD 2, 3, and 4. In total PADD 2 refineries are the most dependent on Canadian crude at 66%, followed by PADD 4 at 49%. The US is reliant on Cdn heavy oil for the majority its heavy oil supply, making up ~58% of US heavy oil supply in 2019, a significant increase over 24% in 2010. In terms of economic benefit, US refineries processing Canadian heavy oil has grown from $4.0b to $6.1b in 2019, with a large share ($5.0b) going to Midwest (PADD 2) refiners. Illinois derives the largest economic benefit of any state, reaching $2.163b in 2019. Our Supplemental Documents package includes the API report.

Figure 22: US Regional Refinery Inputs by Origin, 2019



Source: API

Oil – Enbridge says its tunnel is build back better

Enbridge continuing push for Line 5 tunnel

With the ultimate fate of Enbridge's Line 5 pipeline still uncertain with the government of Michigan's efforts to shut it down, Enbridge is trying its best to manage the messaging around it. With the main concerns surrounding the line is spill risk in the Great Lakes at the Straits of Mackinac, Enbridge had proposed and received approval for the tunnel project to encase the pipeline. However, Gov Whitmer has stated her opposition to not only the pipeline, but also the tunnel project. Enbridge Enbridge's CEO stated in an interview covered by Bloomberg [LINK] *""Under the theme of 'Build Back Better' that the president has been talking about, it fits exactly," Al Monaco said. "That's what we are doing: We are modernizing*

an existing piece of infrastructure with a tunnel that reduces the risk to as close to zero as humanly possible, and we are doing it on our dime". While the tunnel may not fit exactly under Biden's infrastructure plan where there is a huge overriding push for every dollar to have a climate change angle, the underlying justification for the project makes sense from a climate-risk angle.

Covid risks to oil sands turnarounds

Oil – Covid adds risks for oil sands turnarounds to take a little longer than planned

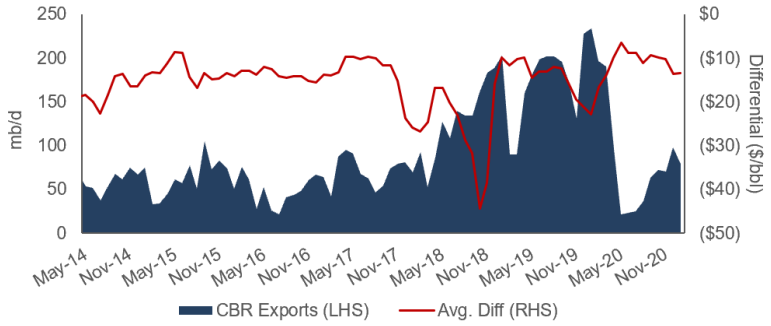
Our Energy Tidbits memos have been noting how US refinery operators have been extending turnaround times with changing procedures due to Covid. So we shouldn't have been surprised by the Reuters story "*COVID-19 surge complicates busy maintenance season for Canada's oil sands*" that warns on the risk to the spring oil sands maintenance turnaround times are more likely to be longer than shorter. [LINK]. Reuters notes that there has been more difficulty getting the skilled trades to the oil sands for maintenance season. Skilled trades come from all over Canada for these big projects. Reuters wrote "*Suncor and Syncrude said they have not had any issues yet in securing tradespeople. Syncrude is extending the duration of its maintenance to reduce numbers of workers on site. Two industry sources said it would last around 75 days instead of the usual 45. "Having spent a year working with our COVID-19 protocols, we are comfortable in proceeding with this event," said Syncrude spokesman Will Gibson".* Syncrude's overview of it 2021 turnaround [LINK] noted its was to start mechanical work on April 1, but did not give any specific end date. Our prior comments (See our Feb 28, 2021 Energy Tidbits) referenced a Bloomberg report that week "*Suncor is scheduled to perform maintenance on its U2 upgrader in 2Q, cutting output of light synthetic crude by 130k b/d * Syncrude plans to shut the 8-3 coker at upgrader in April, cutting output by 70k b/d during 2Q".* Our Supplemental Documents package includes the Reuters report.

Cdn crude by rail imports to Gulf Coast

Oil – Cdn crude by rail imports to Gulf Coast down 155,000 b/d YoY in Jan to 79,000 b/d

The EIA posted its monthly "U.S. Movements of Crude Oil by Rail" [LINK] last Wednesday, which also had good insights on Cdn crude by rail. Canadian CBR volumes to PADD 3 (Gulf Coast) were 79,000 b/d in January, which is down 19,000 b/d MoM from December, however is still down big YoY being -155,000 b/d vs Jan 2020. Tighter WCS to WTI differentials were the key factor in the low crude by rail volumes in Dec/Jan. Below is our graph of Cdn CBR exports to the Gulf Coast.

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



Source: EIA

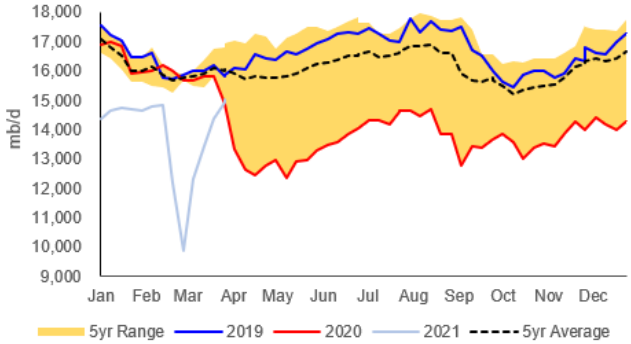
Refineries continuing to ramp up

Oil – Refinery inputs +0.103 mmb/d YoY to 15.044 mmb/d

Crude inputs to refineries continued to ramp up this week and were +0.103 mmb/d to 15.044 mmb/d, and are +1.410 mmb/d YoY. Refinery utilization increased slightly this week, being

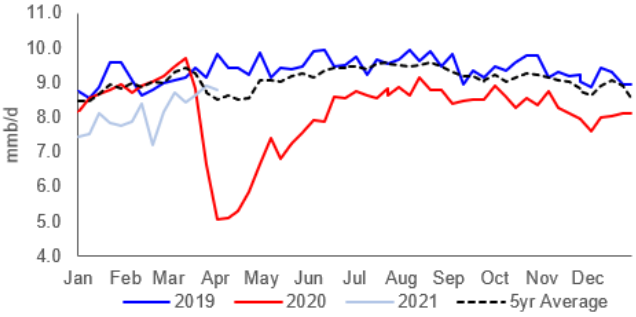
+0.1% to 84.0%, which is +8.4% YoY. Total products supplied (ie demand) decreased this week and was -1.077 mmb/d to 19.236 mmb/d for the Apr 2 week, and motor gasoline demand decreased, being -0.109 mmb/d to 8.781 mmb/d. Gasoline consumption in the US is expected to continue to rise into the summer, 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 24: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA, SAF

Figure 25: US Motor Gasoline Supplied (mmb/d)



Source: EIA, SAF

Another Europe refinery conversion

Oil – Exxon likely converting 120,000 b/d refinery in Norway to and import terminal

We continue to see more announcements or expectations for refineries to either close or convert to import terminals. Last week, we saw an announcement out of Europe, Repsol shut the CDU at its 120,000 b/d Puertollano refinery in Spain. This week, we saw an announcement of what we expect will lead to Exxon converting their 120,000 b/d Slagen refinery in Norway into a fuel import terminal. Exxon did not say they were converting the refinery, but only said they were evaluating the potential for a conversion. It is our view that Exxon wouldn't make such a statement unless it was going to happen. We believe that if they weren't going to ultimately convert the refinery, they would just shoot down any speculation. Exxon wrote *"Refineries in Europe operate in an increasingly challenging market, characterized by falling demand and strong competition, leading to overcapacity in the market. In Norway, demand has decreased for road transportation fuels".* Again, this is a

good reminder that renewed restrictions in Europe is limiting mobility increases and fuel demand. Our Supplemental Documents package includes the Exxon statement and the Exxon overview of the Slagen refinery from their website.

Oil – Pertamina says all refinery units are operating but no word if at full volumes

Pertamina refinery explosion

On March 29 we had seen tweet on an explosion at the Pertamina Balongan refinery, east of Jakarta. The fire was concentrated at the refinery's storage tanks, with no impact on the processing plant. Reuters wrote [LINK] *"Separately, Nicke told local media that only four storage tanks were affected, out of the total 72 tanks in Balongan with total capacity of 1.35 million kilo litres".* Initially the company had expected operations to be restored in 4-5 days from March 28. However, the fire wasn't put out until the Wednesday, ~2 days since the explosion. On Monday, Bloomberg reported that *"Indonesia's state energy holding firm Pertamina expects operations at its Balongan refinery to return to normal by end of this week after recent fire, according to Djoko Priyono, president director of Kilang Refinery Internasional".* And on Friday Bloomberg reported that the refinery had returned to normal operations on Wednesday. However, we found it hard to believe that a fire that took two days to extinguish wouldn't cause significant damage to the storage tanks or surrounding infrastructure. Even if it was just the tanks that were affected, they are an integral part of the refinery's ability to run at normal capacity and these tanks can't just be rebuilt over night. In the Pertamina release on Friday [LINK] they stated that they are operating all units, but did not say if the refinery was back to operating at full volumes on a continuous basis. Our Supplemental Documents package includes the Google Translate version of the Pertamina release.

Oil – Major fire at Pemex's Minatitlan 285,000 b/d refinery

Extended outage could bring more imports to USGC

In the long term, based on Pemex's 2021-2025 plan, support for increased Cdn heavy oil demand from the Gulf Coast remains due to refining capacity increases outpacing production increases. However, for the coming weeks, there could be more Mexican heavy looking for a home following a fire at Pemex's 285,000 b/d Minatitlan refinery [LINK]. The fire started on Wednesday at a pump for moving gasoline and was put out at 2AM ET on Thursday. We have yet to see a timeline for resumed operations. Our concern is that any extended outage would mean more Mexico crude looking for home and therefore increased Mexico heavy/medium oil going to the US Gulf Coast.

Oil – US "net" oil imports down 0.141 mmb/d to 2.830 mmb/d

US "net" oil imports -0.141 mmb/d WoW

US "NET" imports were down 0.141 mmb/d to 2.830 mmb/d for the Apr 2 week. US imports were up 0.119 mmb/d to 6.264 mmb/d and US exports were up, being +0.260 mmb/d to 3.434 mmb/d. The WoW increase in US oil imports was driven by increases from Mexico and Iraq. Some items to note on the by country data. (i) Canada was down slightly this week, and was -0.252 mmb/d to 3.414 mmb/d for the Apr 2 week, which is now ~0.285 mmb/d below the average levels in Jan/Feb of 2020. Also note that PADD 2 imports were also down, being -119,000 b/d and Canada is almost all of this market. (ii) Saudi Arabia was down 0.87 mmb/d to 0.258 mmb/d this week. (iii) Colombia up 136,000 b/d to 258,000 b/d this week. (iv) Ecuador was up 37,000 b/d to 284,000 b/d. (v) Iraq was up 157,000 b/d to 245,000 b/d. (v) Venezuela remained at 0 due to US sanctions. (vi) Mexico increased 141,000 b/d to 0.635 mmb/d.

Figure 26: US Weekly Preliminary Oil Imports By Major Countries

	Feb 5/21	Feb 12/21	Feb 19/21	Feb 26/21	Mar 5/21	Mar 12/21	Mar 19/21	Mar 26/21	Apr 02/21	WoW
Canada	3,730	3,681	2,831	3,648	3,635	3,448	3,418	3,666	3,414	-252
Saudi Arabia	282	237	143	368	251	308	280	345	258	-87
Venezuela	0	0	0	0	0	0	0	0	0	0
Mexico	446	471	355	602	362	278	618	494	635	141
Colombia	336	346	200	285	286	0	92	122	258	136
Iraq	114	227	0	68	141	165	105	88	245	157
Ecuador	105	186	55	114	59	127	132	247	284	37
Nigeria	0	70	50	89	0	44	161	86	161	75
Kuwait	0	0	0	0	0	0	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0
Top 10	5,013	5,218	3,634	5,174	4,734	4,370	4,806	5,048	5,255	207
Others	844	680	965	1,118	921	953	816	1,097	1,009	-88
Total US	5,857	5,898	4,599	6,292	5,655	5,323	5,622	6,145	6,264	119

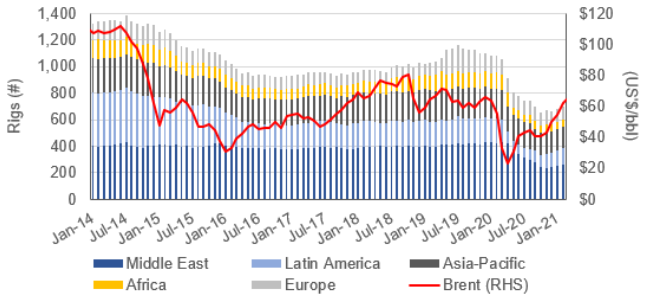
Source: EIA, SAF

Oil – Baker Hughes International rigs +14 MoM to 715 rigs in March

Asia-Pacific drove most of MoM increase

Similar to last month, there is not necessarily any major takeaway from Baker Hughes monthly update for international rig counts, rather just points to a continued modest recovery in activity levels. International activity is increasing modestly but is still down 33% YoY. We expect to see continued strengthening with oil prices hovering around $60 and continued demand recovery with vaccine rollouts. Total international rigs increased 14 MoM to 701 in March. The MoM increase was mainly driven by a 9 rig increase in the Asia-Pacific Region. Rigs in Latin America are continuing to recover well, being up 63 rigs from 62 in May 2020, reaching 125 in Mar. Similarly, Argentina had bottomed at zero in April, and has since recovered to 39 rigs, while Mexico had bottomed at 35 in August and has since increased 9 to 44 rigs in February. However, while rigs have recovered to a reasonable level, all areas are still down big YoY. Total international rigs are down 33% YoY in March with the Middle East making up most of that decline. Rigs in the Middle East were -167 YoY to 261 in Mar. Saudi Arabia has had the largest YoY decline and is down 54 YoY. Below is our graph of international rigs by region and avg monthly Brent price.

Figure 27: Baker Hughes International Rig Count and Brent Price



Source: Baker Hughes, Bloomberg

Oil – Still waiting for Pemex to lower 2021 production and refinery throughput forecast

Pemex forecasts still too high

We are still waiting for Pemex to lower its 2021 and 2022 forecasts. (i) One way or another, we expect that AMLO's priority for Pemex will be a benefit to Cdn heavy/medium oil by reducing the amount of Mexico oil available for export. AMLO's priority continues to be to crank up refining throughput volumes to process more Mexico crude oil so Mexico can eliminate imports of petroleum products. Pemex has not hit any forecasts and still looks to be too high, but the result should still be processing more Mexico oil. (ii) Last week's memo noted our March 31 tweet [LINK] on the Bloomberg report that the Finance Ministry reduced its forecast for Mexico oil production to 1.794 mmb/d. This was not a Pemex forecast, but we

still think its high, but noted its well below the Pemex Jan 28 forecast of 1.944 mmb/d. Our tweet noted that they need to average >1.8 mmb/d for the last 10 months to hit 1.794 mmb/d. (iii) This week, Bloomberg alerted that Pemex released its 2021-2025 plan. Pemex posted a 282-pg 5 yr plan dated March 22, 2021 on its Spanish website "*Plan de negocios de Petroleos Mexicanos Y Sus Empresas Productivas Subsidiarias 2021-2025*" [LINK]. (iv) For production, the new 5 yr plan is unchanged for 2021 at 1.944 mmb/d and, as noted above, still way too high. Vs the prior long term term 2020-2024 forecast, now 2022 is 2.033 (was 2.011), 2023 is now 2.079 (was 2.088), and 2024 is now 2.164 (was 2.236). Interestingly, this new forecast shows Mexico oil peaks in 2024 and starts to decline thereafter as 2025 is 2.161 mmb/d and 2026 is now 2.109 mmb/d. (v) For refining volumes, they put in the actual for 2020 of 591,000 b/d 'vs the prior plan of 681,000 b/d. However the new plan is unchanged for 2021 thru 2024, which means the forecast looks way too high for 2021 at 1.114 mmb/d. The rest of the forecast is 1.200 mmb/d for 2022, 1.520 for 2023, 1.565 for 2024, 1.658 for 2025 and 1.658 for 2026. (vi) Our tweet [LINK] was "*Positive for Cdn oil to PADD 3 if @Pemex 2021-26 plan works ie. 0.3 mmb/d less for export. Refinery thruput and #Oil prod both look high, but should still be less exports. AMLO priority is MEX refineries process more = less oil for export #OOTT."* We think both production and refinery throughput forecasts are too high, but the net impact should be less exports. Our Supplemental Documents package includes excerpts from the new 2021-2025 plan vs the prior Pemex forecast thru 2024.

Oil – Venezuela shifts diluent to refining means lower oil production

PDVSA shifts diluent to refining

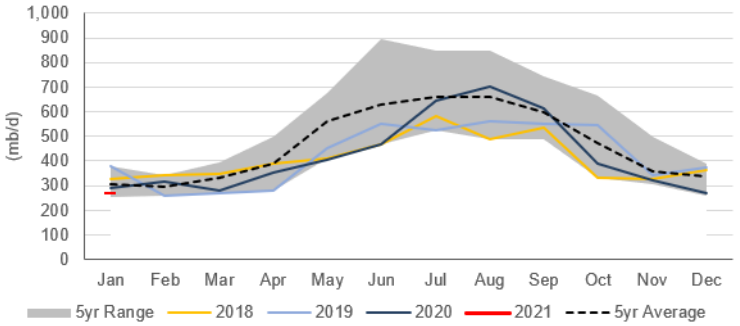
There was good insight from Argus on why Venezuela oil production has dipped. Last week's (April 4, 2021) Energy Tidbits noted the Bloomberg survey for OPEC March oil production that estimated Venezuela was down 30,000 b/d to 440,000 b/d. On Friday, we tweeted [LINK] on the Argus Apr 8 report "*Venezuelan crude flow recedes on diluent gap*". [LINK] Argus noted how PDVSA has limited diluent so has to choose to allocate to either blending with 10-12 API Orinoco heavy crude so it can be transported or used in refineries to increase gasoline and diesel products. For now, Argus noted PDVSA is allocating a priority to increasing gasoline and diesel output. This is also a reminder that wit more diluent, Venezuela is in position to increase its oil production. And its why our tweet ended "*VEN drastically needs Iran diluent"*. Our Supplemental Documents package includes the Argus report.

Oil – Reminder most of Saudi production increases goes to domestic electricity

Entering peak season for direct use demand

It is important to remember that Saudi Arabia's decision to add back its voluntary 1 mmb/d extra cuts will not mean it will all come back onto export markets. Saudi Arabia direct use of crude oil for electricity generation tends to begin to increase each month after February as electricity demand ramps up. The largest increases usually comes between March to April with use for generation peaking July to August. During this time most of the incremental increases to Saudi production will go towards meeting electricity generation demand. Under the new OPEC agreement, Saudi Arabia will be increasing production by 363,000 b/d in May (113,000 b/d under agreement, 250,000 b/d unwinding of voluntary cuts), 465,000 b/d in June (115,000 b/d under agreement, 350,000 b/d unwinding of voluntary cuts), and 548,000 in July (148,000 b/d under agreement, 400,000 b/d unwinding of voluntary cuts). This would put Saudi Arabia's July quota of 9.495 mmb/d from 8.119 mmb/d in April. Below is our graph of JODI data for Saudi Arabia direct use of crude for electricity generation.

Figure 28: Saudi Direct Use of Crude Oil for Electricity Generation



Source: JODI

Oil – Is JCPOA Apr 14 meetings a make or break meeting?

Is JCPOA Apr 14 meeting a make or break?

We have to wonder if the JCPOA meetings in Vienna on April 14 are a make or break event? We aren't reviewing all of the comments on the JCPOA meeting this week as the key takeaways from the vast majority of reports is similar – the first JCPOA meetings were to the positive but they also emphasized that no significant progress was made. But the parties agreed to meet again on April 14. We suspect that the parties will want to see some sort of real progress at the April 14 meeting and not just leave the meetings with a similar message of positive but no significant progress. The first meetings were to feel out the other side to see if the messages were the same as indicated prior to the meetings. That is over now and we believe there will be a need to see progress. Its why yesterday we tweeted [LINK] "*#JCPOA Apr 14 meeting could be a big one. No progress will be a step back after solid 1st week. @SecBlinken in Brussels for NATO next week. No chatter for potential side trip for a @JZarif face2face. Is this to try to get Iran to get serious & make moves at JCPOA Apr 14? #OOTT.*" Blinken is scheduled to be in Brussels next week for NATO meetings. We thought it was interesting that we haven't seen any real chatter of Blinken possibly taking a side trip from Brussels to go to Vienna for a potential face-to-face meeting with Zarif. We expect this lack of chatter on a potential trip is simply a reminder to Iran its time to get serious on making a deal and, if so, it means that April 14 could be the pivotal meeting to see if a deal can be reached in the near term. Think of the significance if the April 14 meeting went well with some real progress and if that led to the first face-to-face with Iran via Blinken/Zarif meeting?

Oil – Not seeing usual warnings this year on terrorism potential during Ramadan

Monthly long Ramadan starts April 13

We hope it's a good sign for a peaceful Ramadan, which is 10 days earlier this year, and starts the evening of Tues April 13, and ends the evening of Wed May 12. We are now only two days away. And we have been tracking and are pleasantly surprised to see no security threat warnings so far, only the implementation of a nation-wide curfew in Morocco for all of Ramadan from 8pm to 6am. This is different than in prior years so we hope this means it will be a peaceful Ramadan. We look to the US Overseas Security Advisory Council [LINK] for Security Alerts that typically refer to Ramadan and, in prior years, have noted that "martyrdom during the month may hold a special allure to some". It is described by the LiveScience [LINK] "*Ramadan is the most sacred month of the year in Islamic culture. Muslims observe the month of Ramadan, to mark that Allah, or God, gave the first chapters of the Quran to the Prophet Muhammad in 610, according to the Times of India. During Ramadan, Muslims fast, abstain from pleasures and pray to become closer to God. It is also a time for families to gather and celebrate*

Oil – Expect OPEC to lower its India oil demand forecast this week

India hits new record Covid cases

OPEC issues its Monthly Oil Market Report on Wed and we expect they will lower their oil demand forecast for India. India will be an oil market watch story over the coming weeks to see how it responds to the rapidly rising Covid cases. One of the reasons for the small pull back in oil is India and how it has just hit new record cases of Covid, exceeding 100,000 cases vs the prior records in Sept. The other concern is that it appears to be another new variant and not the Brazil variant. Its far from clear how this will impact India's recovery. India is significant for the global oil markets. OPEC's March Monthly Oil Market Report forecasts India oil demand in 2021 at 4.99 mmb/d, or +0.60 mmb/d YoY and unchanged from the Feb MOMR. Pre Covid, India oil demand was 4.91 mmb/d in 2019. We expect OPEC MOMR's this week will show a lower forecast for India 2021 oil demand. Below is the OPEC MOMR oil demand forecast for 2021.

Figure 29: OPEC MOMR March World Oil Demand 2021 vs 2020 (mmb/d)

							Change 2021/20	
	2020	1Q21	2Q21	3Q21	4Q21	2021	Growth	%
World oil demand								
Americas	22.53	23.85	24.55	24.34	24.12	24.22	1.69	7.51
of which US	*18.39*	*19.40*	*19.96*	*19.94*	*19.77*	*19.77*	*1.38*	*7.52*
Europe	12.44	12.15	13.01	13.55	13.63	13.09	0.66	5.29
Asia Pacific	7.10	7.30	7.18	7.17	7.64	7.32	0.22	3.13
Total OECD	**42.07**	**43.30**	**44.74**	**45.07**	**45.39**	**44.64**	**2.57**	**6.11**
China	13.09	12.55	14.27	14.93	15.05	14.20	1.11	8.49
India	4.40	4.96	4.56	4.83	5.61	4.99	0.60	13.60
Other Asia	8.13	8.35	8.96	8.57	8.47	8.59	0.46	5.60
Latin America	6.01	6.13	6.27	6.46	6.40	6.32	0.31	5.08
Middle East	7.60	7.89	7.64	8.28	7.93	7.94	0.34	4.50
Africa	4.09	4.41	3.99	4.16	4.47	4.26	0.16	3.98
Eurasia	5.00	5.43	5.17	5.14	5.60	5.34	0.34	6.77
of which Russia	*3.28*	*3.57*	*3.37*	*3.37*	*3.58*	*3.47*	*0.19*	*5.93*
of which Other Eurasia	*1.72*	*1.86*	*1.81*	*1.77*	*2.02*	*1.87*	*0.14*	*8.37*
Total Non-OECD	**48.32**	**49.74**	**50.87**	**52.36**	**53.52**	**51.63**	**3.31**	**6.86**
Total World	**90.39**	**93.04**	**95.61**	**97.43**	**98.91**	**96.27**	**5.89**	**6.51**
Previous Estimate	90.26	93.22	95.92	97.02	97.94	96.05	5.79	6.41
Revision	0.12	-0.18	-0.31	0.40	0.97	0.22	0.10	0.10

*Note: * 2020 = Estimate and 2021 = Forecast. Totals may not add up due to independent rounding. Source: OPEC.*

Source: OPEC

Oil – Indian refiners cut Saudi crude imports by just 5% for May loadings

India's cuts to Saudi imports limited for May

We have been saying India and Saudi Arabia are in a tit-for-tat on India's displeasure with Saudi Arabia's oil policy that has kept oil price higher than desired, and Saudi Arabia's suggestion that India use some of that cheap oil it put in storage in Q2/20 when prices crashed. India has been stating that they will begin to diversify its oil exports to get cheaper prices, however this has proven to be a difficult task due to the very low transportation costs of Saudi crude along with Indian refineries already geared to process Saudi crude. Argus reported on Friday [LINK] that the cut to Saudi import volumes for May scheduled loadings were weak, reducing volumes to 305,000 b/d in May, just 5% vs pre-covid levels. Argus wrote *"Indian state-run refiners can anyway obtain higher margins from processing Mideast Gulf crudes, even if other sources are cheaper, as their refineries are geared towards taking Middle East supplies, a top refining official said".* While India may have a desire to diversify imports partly to prove a point to Saudi Arabia, it will be a difficult task. Our Supplemental Documents package includes the Argus report.

India's Live Mint news warned of this last week

Last week's (April 4, 2021) Energy Tidbits highlighted India's Live Mint report on April 2 "*Oil marketing companies may find it tough to shift to non-Opec crude"* [LINK] on the reality that it isn't easy to replace Saudi crude oil supply. Its not just finding

suppliers, its finding suppliers that will supply at lower all in costs (ie. including transportation) and supply oil that runs with India refinery specifications. All oil is not the same. Live Mint wrote "*State-owned refiners are likely to face a challenge in attempts to find a reliable crude oil supplier, according to the three persons, all of whom requested anonymity. They also spoke about the increased costs involved in importing non-Opec crude because of additional freight charges. "We have been building our refineries substantially on Middle Eastern crude not only because of the availability of a variety of crude cocktails but also because we are ensured a continuous and voluminous supply, something other countries promise often but fail to deliver," said one of the three people cited above."*

Not near peak oil demand yet

Oil – Vitol doesn't see peak oil demand for at least a decade

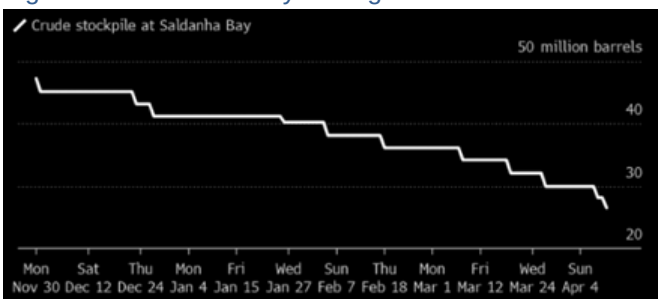
Peak oil demand calls have been a notable topic through 2020, with some believing that peak oil demand may have been in 2019. Vitol released their 2020 volumes and review report on Tuesday, which included a comment on their peak oil view [LINK]. (i) For peak oil, Vitol wrote *"We continue to believe that demand for oil will not peak for another decade".* While their call for peak oil is a way out, they are continuing to invest now to position for it, focusing on wind, solar, and renewable natural gas. (ii) Vitol is expecting a recovery in most sectors in the back half of the year, however Vitol expects that aviation fuel demand will remain below 2019 levels *"for some time".* (iii) No surprise, see medium term power demand growth being met through increasing demand for LNG, natural gas, and LPG as the transition away from coal continues. Vitol wrote *"At present, and until large scale battery capacity has grown significantly, there will be a need for gas fired generation to help manage the intermittency associated with renewable solar and wind generation".* Our Supplemental Documents package includes the Vitol report.

Inventories down 44% since late Nov

Oil – Saldanha Bay inventories continue to decline

We continue to see data indicators that global oil inventories built up in the early day of Covid shutting down the world are being worked down. We have been noting the work down of inventories at Saldanha Bay in South Africa that began in December. Last week we noted the 9th tanker to load at Saldanha, bringing stocks down to 34.5 mmb as of March 18. Two more tankers load this week, each with a cargo of 1.74 mmb, with another VLCC set to arrive on April 15. Crude stocks at Saldanha Bay have decline 21 mmb or 44% since late Nov. Our Supplemental Documents package includes the Bloomberg report.

Figure 30: Saldanha Bay Storage Level



Source: Bloomberg

Vortexa and Braemar floating storage

Oil – Vortexa floating storage +7.8% WoW, Braemar up by 7

The Suez Canal flows weren't fully back to normal until last Saturday night so data from Vortexa as of Apr 2 would still be impacted by some tankers that had loaded and were

waiting somewhere for the blockage to end and the built up traffic to clear. Another point to note is that floating storage seems to be more or less bouncing around for the past few months at about double historical levels (see 5 yr chart below). (i) Bloomberg reported on Vortexa floating oil data that showed a WoW increase of 8.23 mmb or +7.8% WoW to 113.35 mmb on April 2nd from 105.12 mmb on March 26. Floating storage is down 48.8% since the June 28 peak of 221.3 mmb. The Middle East was up 33% WoW to 7.99 mmb, while Europe was down 35% WoW to 6.81 mmb. (ii) Bloomberg later reported on the Braemar data. Braemar doesn't estimate the barrels of oil in floating storage but notes there was an increase of 7 VLCC in floating storage to 42, which is the highest since Feb 2. Total tankers of 229 as of Apr 6 is +14 WoW. Our Supplemental Documents package include the Bloomberg Vortexa report.

Figure 31: Vortexa Global Floating Storage Level (5yr)

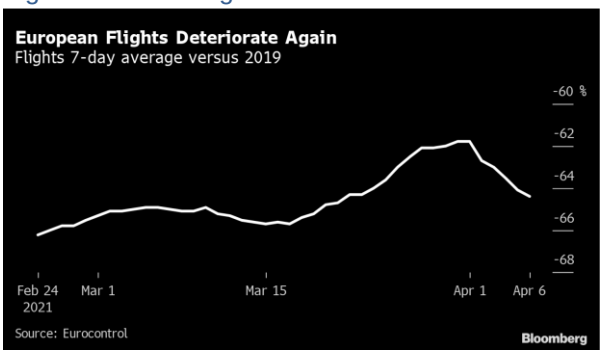
Source: Bloomberg, Vortexa

Oil – Bloomberg Oil Demand Monitor, Europe's lockdown slows mobility recovery

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. Lockdown measures across Europe are continuing to reduce fuel demand and general mobility, along with air traffic. Traffic in Poland was down 19% versus 2019 numbers this week and was only down 12% two weeks ago. Air traffic in Europe was slowly recovering since hitting a low in mid-Feb but is now hitting another dip at the beginning of April with eh renewed lockdowns. Global seat capacity is still 42% behind where it was in 2019, and among major markets, the U.K. and Singapore remain furthest behind compared to the same week in 2019. John Grant, OAG's chief analyst said *"The second quarter of 2021 looks like it may well be at least, for the next six weeks, pretty flat with many countries still impacted by travel lockdowns and quarantine requirements,"* Grant said in a note. *"Airlines seem to be increasingly hoping for a very strong late summer surge through August and perhaps September".* Our Supplemental Documents package includes the Bloomberg Oil Demand Monitor.

Figure 32: Passenger Vehicle Miles Traveled



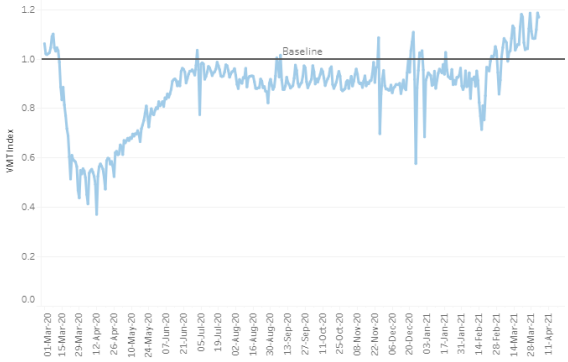
Source: Bloomberg, OAG Aviation

Oil – US passenger vehicle miles travelled above baseline since early March

US VMTs above 1.0 since early March

Since mid to late summer, US VMTs had been below baseline levels except for 6 times, each of which coincided with a major US holiday – July 4, Labor Day, Thanksgiving, Christmas, New Year's Eve, and Martin Luther King Jr. Day. However as of early March, US VMTs have now clearly broken out above the baseline level [LINK]. VMTs have now reached a peak of 1.2, which had not been seen since the pandemic began. With increasing vaccinations and continued state openings we will continue to see increasing mobility in the US. Below is the DOT VMTs.

Figure 33: Passenger Vehicle Miles Traveled



Source: US Department of Transportation

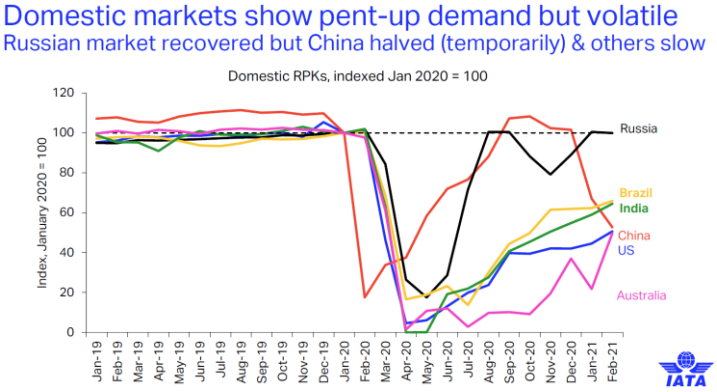
Oil – Domestic air travel recovering in most countries

Global domestic RPKs 51% below Jan levels

On Wednesday, the International Air Transport Association (IATA) released its update for global air travel and cargo [LINK]. The data only goes till February, when air travel was still weak while cargo has continued to recover. Global demand, measured in cargo tonne-kilometers (CTKs), rose by 9% in Feb compared to the previous year, however passenger kilometers (RPKs) are down big, with International RPKs down 88.7% and Domestic RPKs -51% YoY. Air cargo markets are faring far better than air passenger markets, but cargo is facing a capacity shortage, with freighters being highly utilized and much of the capacity available in passenger fleet grounded. Remember a lot of air cargo is carried in the belly of passenger planes. Domestic air travel for many markets has shown considerable increases, however there was a massive decline in China with RPKs halving from above Jan 2020

levels to roughly 50% from late Dec to Feb. Our Supplemental Documents package includes the IATA release.

Figure 34: Domestic Travel RPKs Indexed to Jan 2020



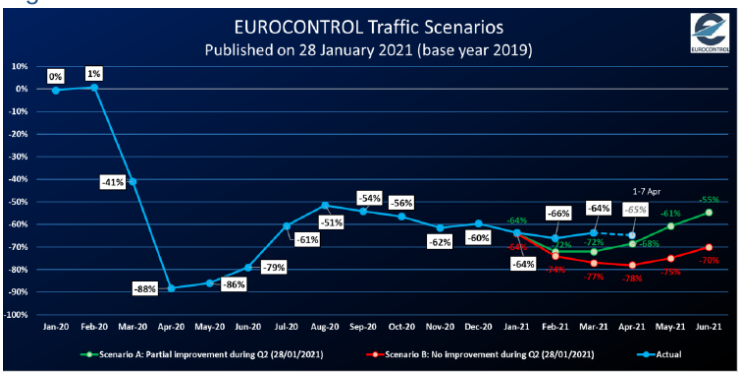
Source: IATA

Oil – European air travel continues to struggle

Eurocontrol air traffic update

Eurocontrol posted its new slide deck "*Covid-19 Eurocontrol Comprehensive Assessment Impact on European Aviation"* [LINK]. It is an excellent slide deck for a recap of Europe air travel and also some insights on international travel. European passenger air traffic is still struggling, Eurocontrol wrote "*10,954 flights (35% of 2019 levels) on Wednesday 7 April 2021, dropping 8% (975 flights since 31 March 2021)".* After having reached a record high at the end of March (Easter), traffic is now decreasing. However European air traffic for April 1-7 is 65% below 2019 levels, slightly above their upside scenario which has flights at -68% in April. Active cargo traffic has contributed to this slight outperformance, but remains -6% below 2019 levels and falling. Also, note that European airlines are gearing up for a big increase in flights "note *that a significant proportion of flight operations for some of the largest airlines are actually non-commercial, i.e. training flights and circular flights to maintain pilot ratings".* Our Supplemental Documents package includes excerpts from the Eurocontrol slide deck.

Figure 35: Eurocontrol: Traffic Scenarios/Actual vs 2019



Source: Eurocontrol

Oil – IMF upgrades world economic outlook

2021 GDP growth revised up 0.5%

The IMF released their updated global economic outlook on Tuesday which increased global real GDP growth for 2021 and 2022 [LINK]. GDP growth in 2021 was revised upwards by

0.5% vs their January forecast to 6.0% and 2022 was increased 0.2% to 4.4%. The recoveries that are driving this upgrade are mostly from advanced economies, while emerging markets and low income developing countries are falling further behind on the path to recovery. The IMF wrote *"Recoveries are also diverging dangerously across and within countries, as economies with slower vaccine rollout, more limited policy support, and more reliance on tourism do less well".* The diverging recovery path between low income and advanced economies is expected to have lasting effects, reversing gains in poverty reduction, adding 95 million additional people than previously forecasted into the extreme poor group globally. Part of this divergence is due to the limited fiscal and policy support available for remediation within the low income countries. The US is driving a significant portion of the upgrade to global GDP, with 2021 growth for the US increasing 1.3% from Jan to 6.4% in 2021 and +3.6% in 2022. The IMF wrote *"This makes the United States the only large economy projected to surpass the level of GDP it was forecast to have in 2022 in the absence of this pandemic".* China was the only country to reach and surpass pre-pandemic GDP in 2020 growing 2.3% YoY, and is expected to increase 8.4% in 2021, +0.3% vs Jan forecast and grow 5.6% in 2022. Our Supplemental Documents package includes excerpts from the IMF outlook.

Figure 36: IMF World Economic Outlook Growth Projections

		PROJECTIONS	
(real GDP, annual percent change)	2020	2021	2022
World Output	-3.3	6.0	4.4
Advanced Economies	-4.7	5.1	3.6
United States	-3.5	6.4	3.5
Euro Area	-6.6	4.4	3.8
Germany	-4.9	3.6	3.4
France	-8.2	5.8	4.2
Italy	-8.9	4.2	3.6
Spain	-11.0	6.4	4.7
Japan	-4.8	3.3	2.5
United Kingdom	-9.9	5.3	5.1
Canada	-5.4	5.0	4.7
Other Advanced Economies	-2.1	4.4	3.4
Emerging Market and Developing Economies	-2.2	6.7	5.0
Emerging and Developing Asia	-1.0	8.6	6.0
China	2.3	8.4	5.6
India	-8.0	12.5	6.9
ASEAN-5	-3.4	4.9	6.1
Emerging and Developing Europe	-2.0	4.4	3.9
Russia	-3.1	3.8	3.8
Latin America and the Caribbean	-7.0	4.6	3.1
Brazil	-4.1	3.7	2.6
Mexico	-8.2	5.0	3.0
Middle East and Central Asia	-2.9	3.7	3.8
Saudi Arabia	-4.1	2.9	4.0
Sub-Saharan Africa	-1.9	3.4	4.0
Nigeria	-1.8	2.5	2.3
South Africa	-7.0	3.1	2.0
Memorandum			
Emerging Market and Middle-Income Economies	-2.4	6.9	5.0
Low-Income Developing Countries	0.0	4.3	5.2

Source: IMF

Oil & Natural Gas – Klotzbach forecasts above normal Atlantic hurricane season

Above normal hurricane season expected

While it may be early, the beginning of April is when we start to see hurricane forecast groups release their initial hurricane forecasts for upcoming Atlantic hurricane season which runs from Jun 1 – Nov 30. The well regarded Philip Klotzbach and his team at Colorado State University issued their first forecast for the season on Thursday [LINK] calling for another

above-normal year. The CSU forecasters wrote *"We anticipate that the 2021 Atlantic basin hurricane season will have above-normal activity. Current weak La Niña conditions may transition to neutral ENSO by this summer/fall, but the odds of a significant El Niño seem unlikely. Sea surface temperatures averaged across the tropical Atlantic are currently near average, while subtropical Atlantic sea surface temperatures are warmer than normal. We anticipate an above-average probability for major hurricanes making landfall along the continental United States coastline and in the Caribbean".* The above average forecast isn't surprising give the current El Nino forecast is for Neutral/La Nina conditions, while El Nino summers are usually associated with lower hurricane activity. Our Supplemental Documents package includes excerpts from the Klotzbach forecast.

Figure 37: CSU Forecast for 2021 Hurricane Activity

Forecast Parameters	CSU Forecast for 2021	Average for 1981-2010
Named Storms	17	12.1
Named Storm Days	80	59.4
Hurricanes	8	6.4
Hurricane Days	35	24.2
Major Hurricanes	4	2.7
Major Hurricane Days	9	6.2
Accumulated Cyclone Energy+	150	106

Source: CSU, Philip Klotzbach

Actual hurricanes tend to be way more than early season hurricane forecasts

We tweeted [LINK] on the new Klotzbach forecast because we know most tend to ignore the early April forecasts for the hurricane season with the rationale that they tend to be wrong. We don't disagree that they tend to be wrong. But what we always remind is that these early season April hurricane season forecasts tend to be light. Our tweet said "*Well regarded @philklotzbach 1st forecast for 2021 Atlantic #hurricane is for above average season. Worth noting 4 of 5 last years, actual #hurricane activity significantly exceeded April forecasts, ie. Apr 20 was similar fcast & turned out to be well above average. #Oil #NatGas."* This is overlooked because most don't read the full 34 pages of the forecast and included on page 34 is the below table that we included in our tweet.

Figure 38: CSU Hurricane Season Forecast History

2016	18 April	Update 1 June	Update 1 July	Update 4 August	Obs.
Hurricanes	6	6	6	6	7
Named Storms	13	14	15	15	15
Hurricane Days	21	21	21	22	27.75
Named Storm Days	52	53	55	55	81.00
Major Hurricanes	2	2	2	2	4
Major Hurricane Days	4	4	4	5	10.25
Accumulated Cyclone Energy	93	94	95	100	141
Net Tropical Cyclone Activity	101	103	105	110	155

2017	6 April	Update 1 June	Update 5 July	Update 4 August	Obs.
Hurricanes	4	6	8	8	10
Named Storms	11	14	15	16	17
Hurricane Days	16	25	35	35	51.25
Named Storm Days	50	60	70	70	91.25
Major Hurricanes	2	2	3	3	6
Major Hurricane Days	4	5	7	7	19.25
Accumulated Cyclone Energy	75	100	135	135	226
Net Tropical Cyclone Activity	85	110	140	140	231

2018	5 April	Update 31 May	Update 2 July	Update 2 August	Obs.
Hurricanes	7	6	4	5	8
Named Storms	14	14	11	12	15
Hurricane Days	30	20	15	15	26.75
Named Storm Days	70	55	45	53	87.25
Major Hurricanes	3	2	1	1	2
Major Hurricane Days	7	4	2	2	5.00
Accumulated Cyclone Energy	130	90	60	64	129
Net Tropical Cyclone Activity	135	100	70	78	128

2019	4 April	Update 4 June	Update 9 July	Update 5 August	Obs.
Hurricanes	5	6	6	7	6
Named Storms	13	14	14	14	18
Hurricane Days	16	20	20	20	23.50
Named Storm Days	50	55	55	55	70.00
Major Hurricanes	2	2	2	2	3
Major Hurricane Days	4	5	5	5	9.50
Accumulated Cyclone Energy	80	100	100	105	132
Net Tropical Cyclone Activity	90	105	105	110	141

2020	2 April	Update 4 June	Update 7 July	Update 5 August	Obs.
Hurricanes	8	9	9	12	13
Named Storms	16	19	20	24	30
Hurricane Days	35	40	40	45	34.75
Named Storm Days	80	85	85	100	118
Major Hurricanes	4	4	4	5	6
Major Hurricane Days	9	9	9	11	8.75
Accumulated Cyclone Energy	150	160	160	200	180
Net Tropical Cyclone Activity	160	170	170	215	225

Source: CSU, Philip Klotzbach

Oil & Natural Gas – Biden jobs reality, would you ask Tom Brady to play linebacker

Unions don't buy Biden's ease of job transition

We have to believe both sides of the aisle in the US give Transportation Secretary Buttigieg credit for being an intelligent sharp person. But we couldn't help but tweet [LINK] on his appearance last Sunday on ABC This Week with George Stephanopoulos. Our tweet called the Q&A as textbook vs real life reminder from a Boilermakers Local 154 (Pennsylvania) that the Biden energy transition plan's view on jobs isn't reality. They keep talking about and inferring about transitioning workers from oil and gas and other hard hit industries into high paying jobs in the renewable energy space ie. solar. The Boilermakers union don't buy this argument and don't mind saying so. For some reason, we just can't see Canadians saying it this simply as the Liberals have a similar job thesis for the energy transition. We give Buttigieg credit as he gave as good as a non answer as possible, but we doubt the union member would feel any differently. The ABC transcript [LINK] was "*STEPHANOPOULOS: There is some skepticism out there in some parts of the labor community. Shawn Steffee from the Boilermakers Local 154 in Pennsylvania talked about this focus green new jobs. And he said, "They keep saying, we're going to transition you into solar jobs. That's not how it works. We build power plants, petrochemical plants and maintain steel mills. Would you ask Tom Brady to play middle linebacker just because he's a football player?" BUTTIGIEG: Yeah, I'm not saying we're going to take a machinist and turn them into a computer programmer. What I'm saying is that we're going to have jobs for insulators on these building retrofits and painters and -- and carpenters, all good union jobs. We're going to have auto workers, union auto workers, I hope, making cars one way or the other. Why not have them leading the revolution into electric vehicles, which, by the way, there is a very hot competition for with China and a lot of other places. We're not talking about extremely mysterious job creation here. We're talking about jobs that already exist that we can understand. If you're a specialist in -- in dealing with mining, we've got to cap a lot of mines, too, and that's going to create a lot of jobs. So I understand there is hesitation, especially because, you know, frankly, there have been a lot of moments where promises have not been kept to labor, which is one of the reasons why I think having the most pro-labor president we've had in a very long time is going to work very well for workers. And it's one of the reasons why we're seeing workers right there alongside a lot of other advocacy and community groups lining up in support of this bill."*

Energy Transition – Equinor's release forgot to say it was blue not green hydrogen

Equinor's hydrogen is from natural gas

We continue to see more support for our view that the only major hydrogen of scale for the 2020s will be sourced from natural gas and not from wind/solar. That doesn't mean there won't be hydrogen from wind/solar, its just that it can't compete against hydrogen from natural gas. We understand that companies want to get the maximum green excitement when they announce an energy transition project like Equinor did this week with its big UK "*first-of-a-kind hydrogen and carbon capture projects in the Humber*" [LINK]. This is especially so with European companies that are trying to be at the leading edge of the energy transition. But we do find it disappointing, if not annoying, that they don't mention the basics of the project in the release. Its why we tweeted [LINK] "*Reminder #BlueHydrogen from #NatGas with #CCS will be the hydrogen of scale for now. @Equinor & @SSE announced "first-of-a-kind hydrogen and carbon capture projects" in UK. Not in release, but linked video reveals hydrogen source is #NatGas."* The release included an short video wherein Equinor says "*one of the powers stations will use natural gas and we will capture the CO2 post combustion. The other power station will use hydrogen which we will get from reforming natural gas and capturing the CO2".* It may be annoying but it doesn't take away from the project that has two parts: the Keadby 3 "*900MW power station fuelled by natural gas and fitted with carbon capture technology to remove the CO2 from its emissions. The captured CO2 would then be transported using shared pipelines before being securely stored under the Southern North Sea".* And "*Keadby Hydrogen power station would have a peak demand of 1,800MW of hydrogen, producing zero emissions at the point of combustion. It would be the world's first major 100% hydrogen-fired power station, securing at-scale demand for hydrogen in the region for decades to come."* Our Supplemental Documents package include the Equinor release.

Energy Transition –Bird fatalities from wind turbines doesn't get much attention

Wind turbines drive a significant amount of bird fatalities

All we can say is that it's a good thing the Cdn oil sands aren't killing a fraction of the birds that are killed every year by wind turbines. The story of bird fatalities by wind turbines is one that has not seen a lot of coverage by media, especially relative to all the publicity and coverage surrounding the deaths of migratory birds landing on oil sands tailing ponds. This is despite the number of deaths from tailings ponds is very small relative to estimates from wind turbines. Beyond Nuclear International provided an estimate of bird fatalities due to wind turbines [LINK]. Three prior studies done in 2013-2014 found that a range of 234,000-573,000 (average of ~366,000) birds were killed by wind turbines based on data from 2012. However with the energy transition push, the number of wind turbines has grown by around 47% since 2012. Adjusting for this growth puts estimates at around 538,000 bird fatalities per year. But projecting mortality based on energy production is more commonly used as it takes into account the size of wind turbines which puts the fatality count even higher, pushing the numbers up to 681,000. After accounting for the vast amount of undetected bird deaths, the number is in excess of 1.17 million bird deaths due to wind turbines. An additional consideration is bird fatalities due to collisions with powerlines and electrocutions, so to get a fulsome picture of the impact collisions with and electrocutions from power lines built for transmission of wind power would also need to be considered.

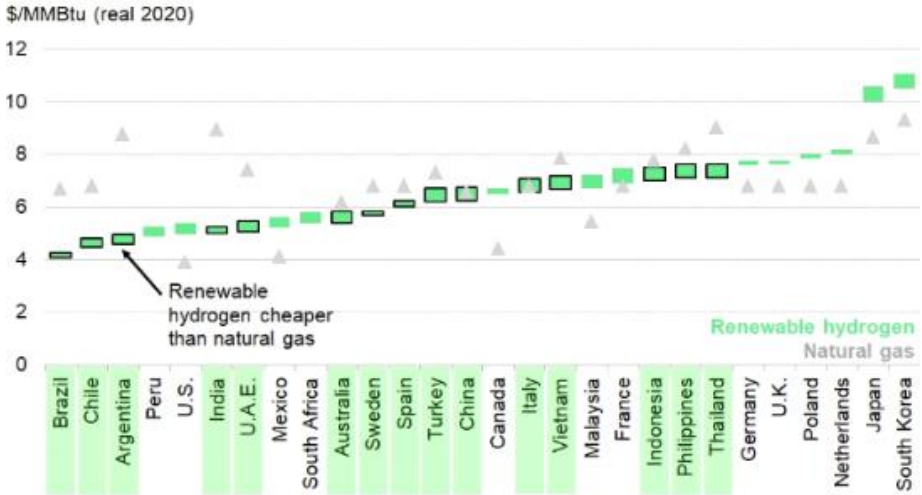
Energy Transition – BloombergNEF hydrogen from renewables can't compete for now

Hydrogen from renewables vs natural gas

As noted above, we continue to see more support for our view that the only major hydrogen of scale for the 2020s will be sourced from natural gas and not from wind/solar. On Friday, we tweeted [LINK] on a BloombergNEF estimate for how long it will take for hydrogen from renewables to be economically competitive with hydrogen from natural gas or natural gas itself. BloombergNEF models it could be close to 2050 before hydrogen from renewables can compete. Bloomberg's story "*Hydrogen From Renewables Can Undercut Natural Gas By*

2050: BNEF" wrote "*The cost of green hydrogen has the potential to fall rapidly as wind and solar power costs dip. BloombergNEF research shows green H2 could cost under $8 per million British thermal units by 2050 in most countries. This is less than the expected natural gas prices in 15 of the 28 markets BNEF modeled. Reaching such low costs requires significant demand growth."* Bloomberg included the below chart. Our Supplemental Documents package includes the Bloomberg brief.

Figure 39: Renewable hydrogen vs natural gas



No Hydrogen cheaper than gas: renewable hydrogen vs. natural gas price, 2050 (Note: Assumes our optimistic electrolyzer cost scenario. The H2 cost range reflects a diversity of electrolyzer types, from alkaline (ow) to PEM (high). The natural gas prices include transportation costs, while the hydrogen price does not.)
Source: BloombergNEF

Made in America Tax Plan

Energy Transition – Biden tax plan, more to put US on irreversible course to Net Zero

The US Treasury Dept followed up on Biden's American Jobs Plan infrastructure plan this week with Made in America Tax Plan. Last week's (April 4, 2021) Energy Tidbits reviewed the infrastructure plan including the tax actions included therein. This week's Made in American Tax Plan expands on the tax bullets in the American Jobs Plan. The tax plan goes thru all the points such as a fairer system, higher corporate tax rates, minimum tax, getting rid of international loopholes, etc. We aren't including any detailed review of each tax item. Rather, we think the most important takeaway from the tax details is that it reinforce that Biden wants to put the US on irreversible path to much lower emissions ie. Net Zero. The plan does not specifically say this irreversible course. But that is the takeaway. And this is the big picture for energy, especially oil and gas. The tax plan makes no bones about it, the tax plans Biden is going to do are to move away from fossil fuels to clean energy. The tax plan reminds on the Biden priority to only have carbon free electricity by 2035. This is the game changer to energy and the theme that we have highlighted since last July – it is prominent in the tax plan. This is the big concern for oil and natural gas but, in particular for natural gas for the 2020s. The point is not that he can do it, its that he puts the US on an irreversible path to there. This was our July 28, 2020 blog "*Biden To Put US On "Irreversible Path to Achieve Net-Zero Emissions, Economy-Wide" Is a Major Negative To US Natural Gas in 2020s"*". Our Supplemental Documents package includes the Biden Made in America Tax Plan and our July 28, 2020 blog.

Energy Transition – Japan to raise its 2030 emissions cut target to at least 40%

Japan to raise its 2030 emissions cut target to at least 40%

We are expecting to see more country announcements of increasing emissions reduction targets in the next 10 days ahead of the Biden climate summit on Apr 22/23. The momentum for climate change/emissions targets is only going to accelerate with COP-26 scheduled to take place in Glasgow in Nov. The major participants will want to have plans and announcements out at least a few months prior. A Kyodo news agency reported on Wednesday [LINK] that Japan is looking to raise its 2030 greenhouse gas emissions-reduction target to at least a 40% decrease on 2013 levels, up from its original target of 26%. The government is aiming to finalize the 2030 target by the June G7 summit. This is part of Japan's goal of being carbon neutral by 2050. Elsewhere, the EU has also raised it 2030 emission cut targe to at least 55% from 40% of 1990 levels, while the UK has said it would increase its 2030 target to 68% from 57%. The new Japan target fits the theme we have been highlighting – the raising of climate change ambitions now, well ahead of COP-26 Glasgow in Nov and in anticipation of Biden's Apr 22/23 Climate Summit.

Energy Transition – Trucks with electric powertrains that are natural gas charged

Natural gas needed for heavy duty trucks

The energy transition is happening, but we continue to see a range of examples that show the demise of oil and natural gas won't happen as quickly as desired by the Net Zero side. The reality remains that renewable energy isn't able to replace fossil fuels in critical applications. One of these applications is for heavy duty trucks. But there is also a technique in messaging that helps ensure there is less anti fossil fuels objection to new developments. A case in point as noted above in the Equinor new hydrogen release that forgot to mention the hydrogen was from natural gas. On Wednesday, we tweeted [LINK] on the Hyliion release "*Hyliion Forms Hypertruck Innovation Council to Advance Electrification Solutions for Commercial Transportation Industry*" [LINK]. We tweeted "*Sounds more #EnergyTransition friendly, wonder about full cycle diff between @hyliion truck electric powertrain is natural gas charged vs @WestportDotCom truck with #CNG powered engine? #NatGas.*" Hyliion writes "*the Hyliion Hypertruck ERX electric powertrain is natural gas charged and for use in Class 8 commercial trucks. The Hypertruck ERX intends to provide a long-haul, electric powertrain solution delivering lower operating costs, emissions reductions, and superior performance to the global commercial trucking industry*". As our tweet indicated, it certainly sounds a lot more friendly to the anti fossil fuel side for electric power trains than a compressed natural gas power engine a la Westport and Cummins. We highlighted Westport because of our Feb 5, 2021 tweet [LINK] "*Nice win for $WPRT, stock +>40% after market. 1,000 heavy duty trucks that run on renewable or non-renewable #NatGas. Also reminds still don't have non-fossil fuels solution for heavy duty transportation.*" Reuters reported [LINK] on a deal between Amazon and a JV of Cummins and Westport Fuel Systems, whereby "*Amazon.com Inc has ordered more than 1,000 truck engines that run on compressed natural gas as it tests ways to shift its U.S. fleet away from heavier polluting trucks, the company told Reuters on Friday*." Below is the Hyliion slide from our tweet and the Westport slide showing the comparison of heavy duty transportation for compressed natural gas. But we wonder what is the full cycle difference? Both are powered are by natural gas. Our Supplemental Documents package includes the Hyliion release.

Figure 40: The Hyliion Hyperturck ERX

Source: Hyliion

Figure 41: Westport: CNG Advantages

Future Heavy-Duty Transportation Fuel and Technology Mix

Difference Compared to Diesel

Heavy Duty Truck, 400 mile daily range @ current costs and technologies:

Fuel System	Fuel Storage Size (cubic feet)	Fuel + Storage Weight (pounds)	Propulsion System Cost (approximate)	Daily Fueling Time (minutes)	Daily Fuel Cost (US West Coast)
Spark Ignited CNG	5X	+550	+$40,000	+5	-$20
HPDI	3X	+700	+$50,000	Same	-$50
H2 Fuel Cell	6X	+950	+$110,000	+10	+$100
Battery Electric	15X	+17,500	+$300,000	+70 (@ 700kW) +470 (@ 120kW)	-$70

For long-haul commercial vehicle applications which require extended range, battery electric and fuel cell technologies are not commercially available, nor economically viable.

Information based on latest estimates from multiple industry sources and may vary

Westport Fuel Systems | Nasdaq:WPRT / TSX:WPRT | PAGE 11

Source: Westport

ESG – BlackRock to undergo an independent racial audit of its operations

BlackRock undergoes racial audit

It will be interesting to watch how large company boards and managements approach the issue of racial diversity under the new ESG priority. It gained some headlines this week with Bloomberg reporting "*BlackRock Inc. is breaking ranks with peers on Wall Street by doing a deep dive into its business to see how it may have contributed to racial inequities in the financial system. The world's largest money manager plans to undergo an independent racial audit of its operations, following a request from a shareholder. Companies including Airbnb Inc. and Facebook Inc. have taken similar steps in the past few years. By contrast, Goldman Sachs Group Inc., Citigroup Inc. and Wells Fargo & Co. are asking shareholders to vote against proposals calling on them to do such audits, saying they've already taken measures to address racial injustice. JPMorgan Chase & Co. and Citigroup even went as far as asking regulators to block the resolutions; their appeals were denied."* It will be interesting to see if these types of audits can lead to focused specific issues for action. Gender diversity gives one clear action point to correct – don't hold back women and add more women to management and boards. Our Supplemental Documents package includes the Bloomberg report.

Capital Markets – Norway wealth fund, no more new emerging markets

Norway wealth fund, no more new emerging markets

The Norwegian Minister of Finance announced at a press conference on Friday [LINK] the Norwegian Sovereign Wealth Fund will be cutting their number of holdings by 25-30%, along with no additional allocations to new emerging markets. This will result in the number of holdings being reduced from 8,000 to ~6,600. While they will continue to hold their current emerging market exposure, they will not be adding additional exposure in new emerging market countries. The Minister of Finance wrote *"There is also an increased risk associated with the environment, social conditions and corporate governance, so that the work with responsible management can be more challenging. The return also varies more, and country-specific conditions affect the risk to a greater extent".* Norway continues to be a leader in ESG principles guiding their investment restrictions. However in this case, it doesn't seem as strict as how they would look at a sector like oil sands because Norway is not moving to take any of their existing 22 emerging markets countries out of the investible universe. Our Supplemental Documents package includes the Norway announcement.

Capital Markets – Forbes' 35th Annual Billionaires List

Forbes' Billionaires List

Forbes released its 35th Annual Billionaires List on Tuesday [LINK], which, despite the pandemic was a record year for wealth increases. There was an unprecedented number of new billionaires (493 newcomers), and a $5 trillion increase in wealth for the group YoY from $8 trillion to $13.1 in 2021, with 86% of billionaires finishing the year richer than they were a year prior. Jeff Bezos held onto his 1st place position for the fourth year running at $177 billion and Elon Musk saw his fortune grow $126.4 billion to $169 billion, earning the #2 spot, improving from 31st spot last year. The top 20 richest are worth $1.917 trillion- a 68% increase from 2020. Three new people have eclipsed the $100 billion mark this year, Elon Musk, Bernard Arnault, and Bill Gates. Concentration of billionaires remains in the US at 724, up 110 YoY. However, China is catching up increasing 242 YoY to 614. For Canadians, David Thomson (Thomson Reuters) ranks 33 at $41.8 billion. The table below shows the YoY change in Top 20 Billionaire net worth.

Figure 42: Forbes Top 20 Billionaires – 2021 & 2020

Ranking	2021	Net Worth (US$b)	2020	Net Worth (US$b)	YoY
1	Jeff Bezos	$193.4	Jeff Bezos	$113.0	$80.4
2	Elon Musk	$169.0	Bill Gates	$98.0	$71.0
3	Bernard Arnault & Family	$168.1	Bernard Arnault & Family	$76.0	$92.1
4	Bill Gates	$129.5	Warren Buffet	$67.5	$62.0
5	Mark Zuckerberg	$113.3	Larry Ellison	$59.0	$54.3
6	Larry Ellison	$99.8	Amancio Ortega	$55.1	$44.7
7	Warren Buffet	$99.6	Mark Zuckerberg	$54.7	$44.9
8	Larry Page	$97.7	Jim Walton	$54.6	$43.1
9	Sergey Brin	$94.7	Alice Walton	$54.4	$40.3
10	Francoise Bettencourt Meyers & Family	$80.3	Rob Walton	$54.1	$26.2
11	Amancio Ortega	$77.4	Steve Ballmer	$52.7	$24.7
12	Mukesh Ambani	$76.2	Carlos Slim Helu & Family	$52.1	$24.1
13	Steve Ballmer	$74.5	Larry Page	$50.9	$23.6
14	Carlos Slim Helu & Family	$67.7	Sergey Brin	$49.1	$18.6
15	Alice Walton	$66.1	Francoise Bettencourt Meyers & Family	$48.9	$17.2
16	Jom Walton	$64.4	Michael Bloomberg	$48.0	$16.4
17	Rob Walton	$63.6	Jack Ma	$38.8	$24.8
18	Zhong Shanshan	$62.6	Charles Koch	$38.2	$24.4
19	Ma Huateng	$60.2	Julia Koch & Family	$38.2	$22.0
20	Michael Bloomberg	$59.0	Ma Huateng	$38.1	$20.9
TOTAL		**$1,917.1**		**$1,141.4**	**$775.7**

Source: Forbes

Capital Markets – NY adds personal income tax surcharge on millionaires

xxxx

We have to believe New York's new millionaires tax will be followed by many other states and countries as way to increase revenues to fund budget deficits and increasing debt levels from fighting Covid. This focus is on high income earners but we also expect to see increased govt grabs on wealth. The new New York budget includes what is called a "*Personal Income*

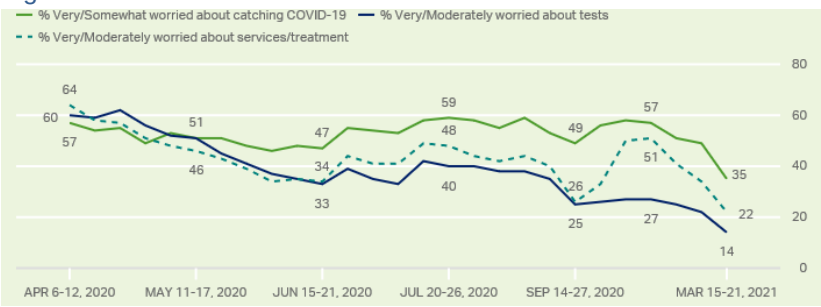
Tax Surcharge" that should raises $2.8b in FY2022 , rising to $3.3b in FY2023. The new surcharge means the personal income tax increases from 8.82% to 9.65% for those making over $1mm, to 10.3% on income between $5 to $25mm, and to 10.9% on income over $25mm. New York will be followed by other states. But this will also lead to more high income earners moving to places like Florida and Texas. Our Supplemental Documents package includes the New York Times reporting

Less worry about catching Covid

Demographics – Americans worries on Covid at new low

On Monday, Gallup released its latest Covid web-panel survey [LINK] which revealed that American's worry about catching Covid has dropped to a record low. Only 35% of Americans between Mar 15-21 responded that they were very/somewhat worried about catching Covid, which is down substantially from the record high 59% this past summer and 49% in Mid-Feb. The other indicators were also positive with 77% reporting the Covid situation in the US is improving, which is up from 33% in January; and 64% reporting that Covid is causing a great deal/a fair amount of disruption to their lives, down from 70% in February. Clearly, due to increasing vaccination rates, American's views towards Covid have shifted for the better.

Figure 43: Americans' Concerns on Covid



Source: Gallup

@Energy_Tidbits on Twitter

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

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

Look for energy items on LinkedIn

LinkedIn – Look for quick energy items from me on LinkedIn

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

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

Canada's Corey Connors sitting solo 6Th at the Masters

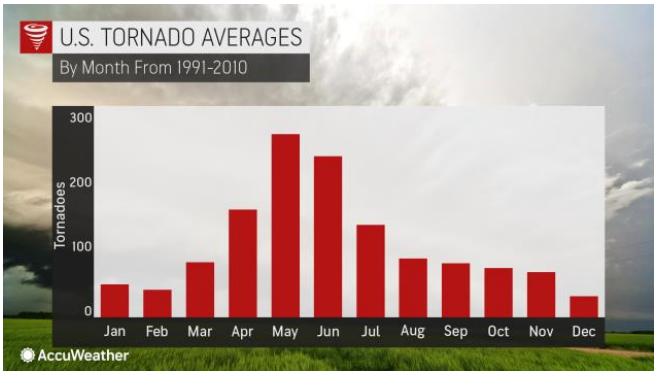
Canadian golf fans had a good day yesterday watching Corey Connors on moving day in the Masters moving from 13th at the end of round 2 to be solo 6th to start the

final round today. We couldn't help tweet [LINK] during his round, disappointed to have a rain delay when he was having a great round highlighted by his hole in one on the 6th. We think the rain delay hurt his momentum with a 3 putt on his first hole back after the delay. Even still he was -4 on the day, the second best round. One of the items in our tweet was the reminder how Corey keep doing better at the Masters. We tweeted "*the @TheMasters weather delay is ruining a great afternoon of watching Maple leaf @coreconn light it up. Corey has gotten better every time he is in the Masters. This is 4th start, T73 in 2015, T46 in 2019, but last year T10 in 2020. Currently T3 in the rain delay!"*

Highly active tornado season expected due to La Nina conditions

AccuWeather [LINK] is predicting an above average number of tornados this year, partly due to expected La Nina conditions through spring. The year has already been very acive with the tornado count to March 31 at 207, with 180 coming in March, well above the 3 year average from March of 82. Forecasters are predicting 1,350 to 1,500 tornados to touch down across the country this year, an increase from 2020, where a total of 1,245 tornadoes were observed. AccuWeather wrote "*A La Niña pattern occurs when the water near the equator in the Pacific Ocean is cooler than normal, which influences the jet stream and the overall track of storm systems." "That pattern not only stirs stronger winds high up in the atmosphere but also sets the stage for bigger clashes of cold and warm air, Pastelok explained. Both of those factors are ingredients for severe weather."* La Niña is forecast to continue through most of the season, which stirs stronger winds and contributes to bigger clashes of cold and warm air – both factors for severe weather. Additionally, AccuWeather meteorologists are seeing many similarities between this current tornado season and the deadly 2011 tornado season which holds the record for highest annual tornadoes at 2,240. Our Supplemental Documents package includes the AccuWeather report.

Figure 44: Monthly Tornado Averages



Source: AccuWeather

Humboldt Broncos hockey team bus crash was April 6, 2018

Watching the news on Tues reminded of an item i forgot to put in last week's memo – a tribute to the Humboldt Broncos hockey team on the anniversary of the tragic crash of their team bus that resulted in 16 people killed and 13 injured. One of the things you realize as you get older is that we have been fortunate to live a good life and that's what makes it so sad when young people have their lives taken away from something like a semi trailer truck failing to yield at a highway intersection and crashing into their team bus.