Energy Tidbits

March 21, 2021

Produced by: Dan Tsubouchi

India Oil Consumption to Double By 2030, Adding 4.3 mmb/d to 8.7 mmb/d Says India Ministry of Petroleum and Natural Gas

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. India's Ministry of Oil and Natural Gas forecasts India oil consumption double to 2030, adding 4.3 mmb/d to 8.7 mmb/d. (Click Here)

2. IEA's Oil 2021 report forecasts global oil demand +4.3 mmb/d to reach 104.1 mmb/d in 2026. (Click Here)

3. IEA's Oil Market Report says their data and analysis suggests no super-cycle for oil. (Click Here)

4. Saudi Aramco released Q4 this morning, reinforces why Saudi wants/needs solid oil prices ie. Brent >$60. (Click Here)

5. Senate confirmed Deb Haaland as Interior Secretary has to take away optimism for the Interior Dept "fossil fuels" federal lands review. (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].

Dan Tsubouchi
Principal, Chief Market Strategist
dtsubouchi@safgroup.ca

Ryan Dunfield
Principal, CEO
rdunfield@safgroup.ca

Aaron Bunting
Principal, COO, CFO
abunting@safgroup.ca

Ryan Haughn
Principal, Energy
rhaughn@safgroup.ca

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Natural Gas – Natural gas draw of 11 bcf, storage now -253 bcf YoY deficit

YoY storage at -253 bcf YoY deficit

The EIA reported an 11 bcf draw (vs -18 bcf expectations) for the March 12 week, which was well below the 5-yr average draw of 59 bcf and slightly larger than last year's draw of 9 bcf. Storage is 1.782 tcf as of Mar 12, decreasing the YoY deficit to 253 bcf from 257 bcf last week and storage is now 93 bcf below the 5 yr average. 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 (03/12/20)		5-year average (2016-20)	
Region	03/12/21	03/05/21	net change	implied flow	Bcf	% change	Bcf	% change
East	328	350	-22	-22	414	-20.8	353	-7.1
Midwest	426	440	-14	-14	514	-17.1	449	-5.1
Mountain	114	113	1	1	96	18.8	107	6.5
Pacific	199	205	-6	-6	199	0.0	186	7.0
South Central	715	685	30	30	811	-11.8	779	-8.2
Salt	197	176	21	21	245	-19.6	237	-16.9
Nonsalt	519	509	10	10	566	-8.3	543	-4.4
Total	1,782	1,793	-11	-11	2,035	-12.4	1,875	-5.0

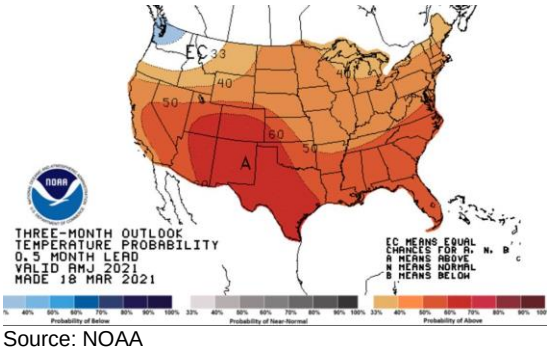
Source: EIA

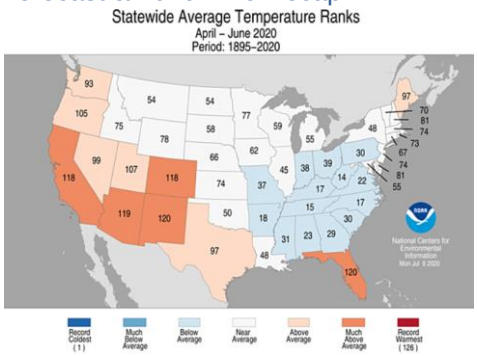
Natural Gas – NOAA forecasting a hot summer

NOAA forecasts a hot summer

The updated NOAA summer outlook is for a hot summer across the US, providing support for summer natural gas demand [LINK]. On Thurs, NOAA released its monthly update to its seasonal temperature forecasts. NOAA is calling for above normal for April/May/June for most of the US with only a small part of the Pacific Northwest expecting normal temps. It was very hot last year. Q2/20 AMJ was the 33rd hottest in the last 126 years, but a split picture. It was extremely hot in the west, southwest and Florida, cool in the Midwest and normal in the Plains/Northeast. For July/August/September, the NOAA expects temperatures to be above normal for the entire country. Last year, July/August/September were 7th hottest in the last 126 years and hot across most of the country. Below are the new NOAA temperature probability maps for April/May/June and for July/August/September.

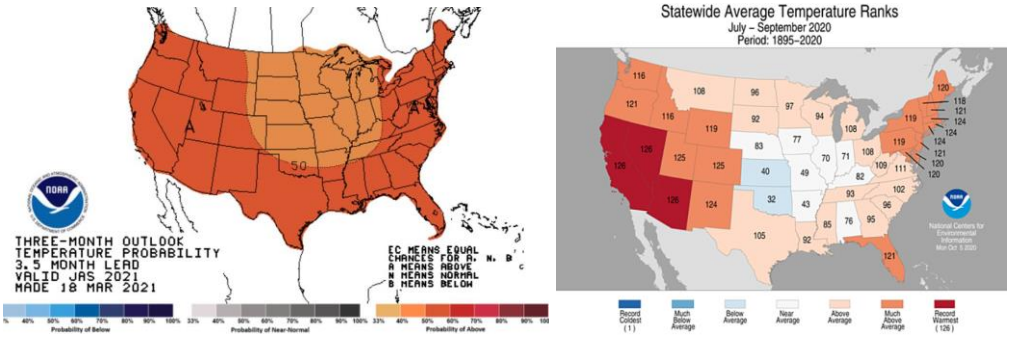
Figure 2: NOAA AMJ Temperature Probability Forecast & 2020 AMJ Recap





Source: NOAA

Figure 3: NOAA JAS Temperature Probability Forecast & 2020 JAS Recap



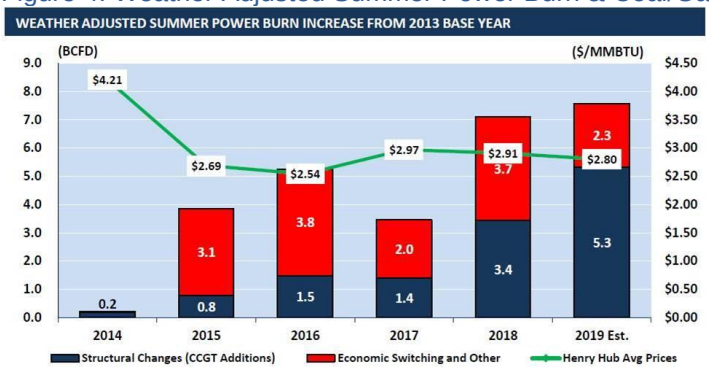
Source: NOAA

Natural Gas – Pull back in HH prices should reduce to coal switching this summer

Coal to gas switching this summer

Our Feb 21, 2021 Energy Tidbits noted how HH prices were ~$3 thru the summer and that was setting up the potential for up to ~4 bcf/d of economic switching from natural gas to coal. However, HH gas prices for the summer have dropped and its still in March so there is time to plan summer coal vs natural gas economic switching. As of the Friday close, HH forward prices are $2.63 for June, $2.69 for July, $2.71 for Aug, and $2.70 for Sept. There isn't one specific price that dictates natural gas to coal switching but a good indicator came from the Peabody Energy Q4 call. Our Feb 14, 2021 Energy Tidbits noted Peabody's rule of thumb they use for natural gas prices that drive natural gas to thermal coal switching and vice versa. They use HH $2.50. We also included a perspective of the potential impact in bcf/d this summer if HH prices were ~$3 for the summer. At that $3 price, we said we would expect most to economically switch from natural gas to coal. The Natural Gas Supply Association didn't post a summer natural gas outlook in 2020, but our June 9, 2019 highlighted their 2019 outlook which included the below graph that shows the NGSA estimated impact of economic coal to gas switching that reached as high as 3.8 bcf/d in 2016 and 3.7 bcf/d in 2018.

Figure 4: Weather Adjusted Summer Power Burn & Coal/Gas Economic Switching



Source: NGSA

Natural Gas – EIA, US shale/tight natural gas to continue decline into April

Shale/tight gas to decline into April

On Monday, the EIA issued its Drilling Productivity Report March 2021 [LINK], which is the EIA's forecast for oil and natural gas production from the major shale/tight oil and gas basins for the current month (in this case March) and the next month (in this case April). (i) The key takeaway is that the EIA forecasts both US shale/tight oil and gas are going lower, albeit modestly lower, in April vs March though both may be nearing a bottom. Feb was hit by the Texas freeze and the implied assumption is that March is back to the pre freeze trend, which

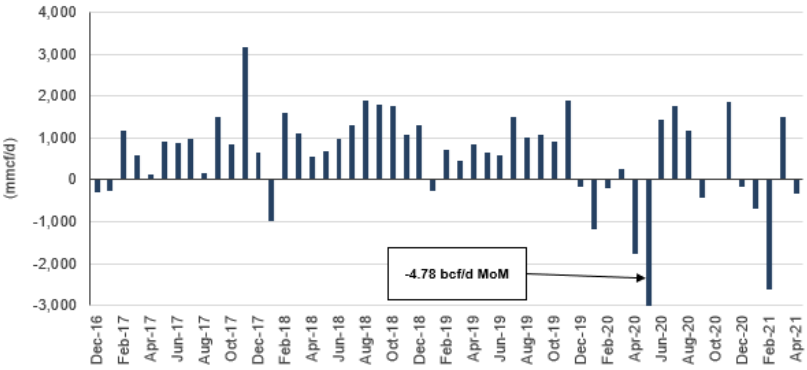
was modestly down. But as noted above, we expect the tight/shale plays to find a bottom in Q2 with increasing frac spreads, rigs and $60 oil. (ii) The EIA forecasts Apr at 82.588 bcf/d which is -0.316 bcf/d MoM (would have been +0.563 bcf/d MoM if not for the big revisions to Mar) and down 4.296 bcf/d from the Nov/19 peak of 86.884 bcf/d. (iii) The key reason why shale/tight oil and natural gas is expected lower in March and April seems to be the amssive drop off in frac spreads during Feb. Frac spreads are now back up to and higher than pre freeze up levels and this should be the key for why shale/tight should reach a bottom in Q2/21. (iv) Outside of a small MoM increase in Haynesville and Permian, every US shale/tight play shows a decline MoM in Apr, with the largest declines coming from Appalachia -0.149 bcf/d MoM and Andarko -0.126 bcf/d MoM. (v) Three basins are now up YoY with Appalachia +0.814 bcf/d YoY, Permian +0.628 bcf/d YoY and Haynesville +0.116 bcf/d YoY. Total US shale/tight natural gas production is -1.261 bcf/d YoY for April, which is a much lower deficit vs previous months. (vi) Remember US shale/tight gas is ~90% of total US natural gas production. So whatever the trends are for shale/tight gas are the trends for US natural gas in total. Below is our running table showing the EIA DPR data for the shale/tight gas plays, and the MoM changes in major shale/tight natural gas production. Our Supplemental Documents package includes the Drilling Productivity Report.

Figure 5: Major Shale/Tight Play's Natural Gas Production

										2021					
mmcf/d	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Apr YoY	Apr Less Mar
Anadarko	7,030	6,269	6,633	6,549	6,534	6,623	6,334	6,621	6,488	6,353	6,028	6,194	6,068	-962	-126
Appalachia	33,302	32,993	32,865	33,862	34,353	33,401	33,733	34,804	35,160	34,858	34,522	34,265	34,116	814	-149
Bakken	2,757	1,982	2,030	2,352	2,683	2,851	2,922	2,919	2,921	2,884	2,835	2,785	2,741	-16	-44
Eagle Ford	6,773	5,686	5,764	5,878	5,993	5,902	5,820	5,768	5,672	5,613	5,085	5,569	5,504	-1,269	-65
Haynesville	11,966	12,227	11,864	11,405	11,384	11,514	11,507	12,068	11,964	11,984	11,651	12,007	12,126	160	119
Niobrara	5,609	5,127	5,236	5,405	5,475	5,470	5,360	5,459	5,323	5,227	5,145	5,065	4,993	-617	-72
Permian	16,413	14,752	16,097	16,791	17,003	17,248	17,350	17,240	17,173	17,081	16,121	17,020	17,041	628	21
Total	83,850	79,036	80,488	82,243	83,425	83,009	83,027	84,879	84,701	84,000	81,385	82,905	82,588	-1,261	-316

Source: EIA, SAF

Figure 6: MoM Change In Major Shale/Tight Natural Gas Production



Source: EIA, SAF

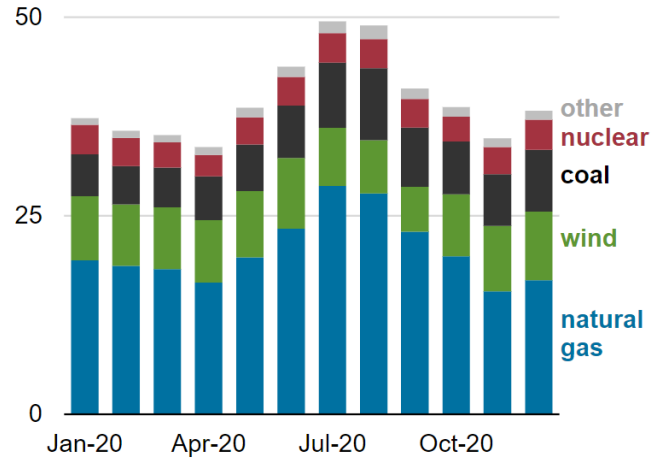
Texas uses natural gas for both electricity and power

Natural Gas – Texas uses natural gas for both electricity and power

There was a good reminder this week of the critical role natural gas plays in Texas. The EIA posted a blog "*Texas uses natural gas for electricity generation and home heating*" [LINK] that highlighted during the February freeze-off in Texas, natural gas generation stepped up significantly to fill the hole from a massive drop in wind and solar generation. 61% of homes in Texas use electricity as their primary heating source- a much large proportion than the rest of the country (39%). The EIA wrote *"Natural gas directly heats about 35% of Texas homes, but most modern natural gas furnaces require electricity to ignite and to fan heat throughout houses".* However when ERCOT began implementing rotating blackouts on Feb 15, natural

gas fired power generation fell sharply, along with coal, wind, and nuclear. Earlier we noted the new NOAA seasonal temperature forecast. And if its hot in Texas, this EIA blog shows how it will be good for natural gas consumption ie. turn up the A/C, use electricity, 61% of which is generated by natural gas. Our Supplemental Documents package includes the EIA blog.

Figure 7: Texas monthly electricity generation by source (million megawatthours)



Source: EIA

Natural Gas – Chevron ending all Kitimat LNG funding

Chevron cuts all funding for Kitimat LNG

No one was surprised to see the Friday reports that Chevron will no longer be funding further feasibility work for the Kitimat LNG project [LINK]. Chevron wrote *"At this time, it is Chevron's intent to cease Chevron-funded further feasibility work for the proposed Kitimat LNG Project".* In December 2019, Chevron surprised investors when they first announced that they were pursuing divestment of their 50% stake in the project [LINK], writing *"As a result of Chevron's disciplined approach to capital allocation and a downward revision in its longer-term commodity price outlook, the company will reduce funding to various gas-related opportunities including Appalachia shale, Kitimat LNG, and other international projects. Chevron is evaluating its strategic alternatives for these assets, including divestment".* When Chevron put the asset up for sale, they still committed to continue working with Woodside on project activities that brought value or were required for regulatory and operational compliance, however that looks to be over now. Post that announcement, we posted a Dec 13, 2019 blog *"Chevron Lowers Long Term Gas Prices, Hits Both Short Cycle Dry Marcellus Shale And Long Cycle Greenfield Kitimat LNG"* [LINK]. There was likely other considerations specific to Kitimat but the primary decision factor in Dec 2019 was Chevron's changing view for lower long term LNG prices and the ability for Kitimat to be cost competitive in such an outlook. Our Supplemental Documents package includes the Yahoo Finance reporting.

Natural Gas – India Jan natural gas production down 2.2% YoY to 2.96 bcf/d

India natural gas production -2.2% YoY and +5.4% MoM

One of the key LNG watch themes for the 2020s will be India's domestic natural gas production and if they can ever turn it around and stop the modest declines. Because if not, then any increasing India natural gas consumption must be met by increased LNG imports. India's Petroleum Planning and Analysis Cell released their monthly report for Feb natural gas and oil statistics this week [LINK]. India's domestic natural gas production was down 1.4% YoY to 2.91 bcf/d, up 3.1% MoM from 2.82 bcf/d in January. India has consistently struggled to grow domestic natural gas production and overall current financial year (Apr-

Feb) production is 9.7% lower YoY. This means that until they can grow production, any incremental natural gas demand is likely to be met by increasing LNG imports. Our Supplemental Documents package includes excerpts from the PPAC monthly package.

Natural Gas – India Feb LNG imports down 19.7% YoY to 3.64 bcf/d

India LNG imports -19.7% YoY and +29.2% MoM

The obvious question with this next point is why were India LNG imports down big YoY in Feb if it needs to meet any increased natural gas consumption with LNG imports. The answer is that India is also extremely price sensitive, and this is evident the Feb LNG imports. Recall that global LNG prices were increasing in late Dec and hit record levels in early Jan. We suspect that this would have stopped any spot LNG cargoes from being redirected to India in Jan. And when LNG prices started to decline thru Feb, it meant that there were likely spot LNG cargoes redirected to India to replenish LNG ie. Feb up MoM vs Jan. The Petroleum Planning and Analysis Cell release also included February import/export data this week, which showed February LNG imports of 3.64 bcf/d. This is down 19.7% YoY but is up 29.2% from 2.81 bcf/d in January. Since April, India's LNG import demand has held in YoY with imported LNG volumes to the end of February 3.3% below YoY levels, helped by the low spot prices for much of 2020.

Natural Gas – Japan LNG Imports in Feb 13.83 bcf/d, highest daily avg since Feb 2018

Japan Feb LNG imports +25.8% YoY

Japan Ministry of Finance released its February LNG import data on Wednesday [LINK]. Japan's February LNG imports were 13.83 bcf/d, up 25.8% YoY and up 10.8% MoM from 12.48 bcf/d in January. Slightly surprising given the warm weather Japan has been experiencing, but normally the reason is that it's a restocking process following big draws in Dec/Early Jan. February thermal coal imports underperformed LNG imports, and were up only 7.3% YoY. Below is our table that tracks Japan LNG import data.

Figure 8: Japan Monthly LNG Imports

bcf/d	2015	2016	2017	2018	2019	19/18	2020	20/19	2021	21/20
Jan	13.06	11.22	12.85	12.79	11.69	-8.7%	11.63	-0.5%	12.48	7.3%
Feb	13.25	12.30	13.35	14.22	12.60	-11.4%	10.99	-12.7%	13.83	25.8%
Mar	12.60	12.62	12.61	12.28	11.30	-8.1%	11.16	-1.2%		
Apr	10.56	10.21	10.52	8.97	9.00	0.3%	8.21	-8.8%		
May	8.91	8.55	9.66	9.92	8.62	-13.1%	6.99	-18.9%		
June	10.61	10.02	9.90	8.88	8.32	-6.3%	8.42	1.2%		
July	10.77	10.19	10.19	10.55	10.56	0.1%	9.35	-11.5%		
Aug	10.93	11.96	11.24	11.73	9.45	-19.5%	8.99	-4.9%		
Sept	11.06	10.67	9.31	10.04	10.30	2.6%	10.41	1.0%		
Oct	9.38	9.73	9.50	10.12	9.75	-3.6%	9.20	-5.7%		
Nov	10.71	12.07	10.26	10.15	10.03	-1.2%	9.63	-4.0%		
Dec	12.51	11.69	12.31	11.23	10.54	-6.2%	11.96	13.4%		

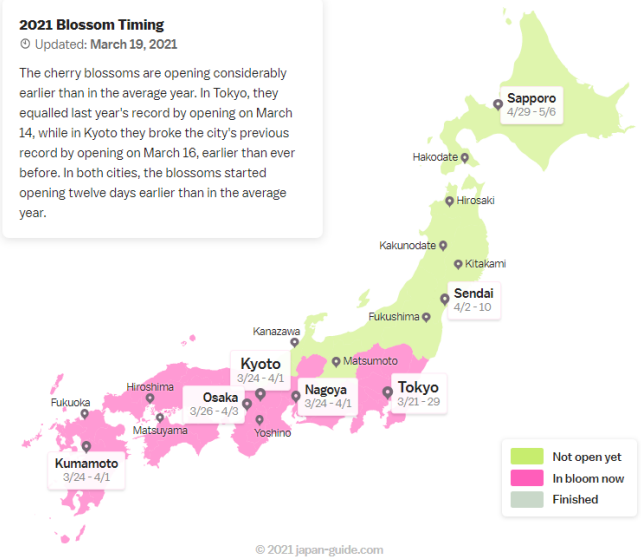
Source: Japan Ministry of Finance

Natural Gas – Any significant Japan LNG demand was over in Feb

Early than average cherry blossoms in Japan

While Japan's LNG imports for the month of February were significant, being +25.8% YoY, we believe March import data will likely show a MoM decline as winter LNG demand is over. One indication of the warm end to Feb and start to March is the early cherry blossoms across Japan. On Thursday, we tweeted [LINK] *"Won't see Japan #LNG import data for March until late April. But there is a pretty good indicator that tells markets any significant winter Japan #NatGas #LNG demand was over in Feb - there were record early cherry blossoms in Tokyo and Kyoto".* In both Tokyo and Kyoto, the blossoms started to open this year twelve days earlier than the average year, indicating warm temps, which means that any significant natural gas demand was over in late Feb.

Figure 9: Japan Cherry Blossom Forecast 2021



Source: Japan-guide.com

Natural Gas – China domestic gas production +13.5% YoY to 21.19 bcf/d

China domestic natural gas production trends higher

Bloomberg had also reported on domestic natural gas production in China for the January to February period. Domestic natural gas production had increased 13.5% YoY to 21.19 bcf/d. We have been highlighting the theme of increasing domestic natural gas production and the negatives that brings for global LNG import volumes as China will no longer be the growth engine for YoY LNG increases. Its domestic natural gas production moved to bigger YoY increases in 2019 and 2020, and there was the start up of the Power of Siberia natural gas pipeline from Russia to China. There were lots of LNG supply interruptions around the world in H2/20 and then a cold Asia winter sent LNG to record highs, but this China trend remains with domestic gas production being +2.52 bcf/d YoY.

Natural Gas – China natural gas imports +17% YoY to 17.46 bcf/d

China natural gas imports

Bloomberg reported on the preliminary release of China natural gas import data for the first two months of 2021. Total imports were very strong for Jan and Feb, with the preliminary data showing a 17.4% YoY increase to 17.46 bcf/d, but is down slightly from December of 17.63 bcf/d. The strong imports had mainly been driven by severe cold snaps in the Northern regions and overall higher than expected domestic consumption. Later the detailed release showed Jan LNG imports were 13.153 bcf/d, +27.5% YoY while Jan pipeline imports were 4.9 bcf/d. Feb showed a strong MoM increase with LNG imports being +31.1% YoY to 9.52 bcf/d, but was down 27.6% MoM. Feb pipeline imports were +7.2% YoY to 6.1 bcf/d and was up 23.9% MoM.

Figure 10: China LNG Imports by Month

bcf/d	2016	2017	17/16	2018	18/17	2019	19/18	2020	20/19	2021	21/20
Jan	3.84	5.35	39.3%	8.03	50.0%	10.20	27.1%	10.31	1.1%	13.15	27.6%
Feb	3.10	4.10	32.3%	6.84	66.9%	7.46	9.1%	7.26	-2.7%	9.52	31.1%
Mar	2.60	3.06	17.7%	5.04	64.5%	6.28	24.8%	6.49	3.3%		
Apr	3.00	3.44	14.7%	5.43	57.8%	7.27	34.0%	8.16	12.3%		
May	2.20	4.50	104.5%	6.39	41.9%	6.87	7.6%	8.10	18.0%		
June	3.51	4.85	38.2%	6.31	30.1%	7.25	14.9%	9.27	27.8%		
July	2.46	4.80	95.1%	6.40	33.4%	7.56	18.1%	7.79	3.1%		
Aug	3.54	4.86	37.4%	7.26	49.2%	8.04	10.8%	9.23	14.8%		
Sept	4.05	5.54	36.8%	7.00	26.3%	8.16	16.7%	9.17	12.4%		
Oct	2.85	5.50	93.0%	7.13	29.6%	6.26	-12.2%	7.78	24.3%		
Nov	4.26	6.50	52.6%	9.59	47.5%	10.42	8.7%	10.58	1.6%		
Dec	5.80	7.80	34.5%	9.75	25.0%	10.01	2.7%	11.76	17.5%		
Full Year Avg.	3.43	5.03	46.3%	7.10	41.2%	7.98	12.5%	8.83	10.6%	11.34	28.4%

Source: Bloomberg China Customs

Figure 11: China Pipeline Gas Imports by Month

bcf/d	2016	2017	17/16	2018	18/17	2019	19/18	2020	20/19	2021	21/20
Jan	4.3	3.7	-13.5%	4.0	8.2%	5.0	24.9%	5.2	3.5%	4.9	-4.5%
Feb	5.0	4.4	-12.9%	5.0	15.6%	5.5	9.0%	5.7	3.8%	6.1	7.2%
Mar	4.2	3.6	-15.6%	4.2	17.7%	4.5	6.4%	4.2	-5.2%		
Apr	4.5	4.7	4.1%	5.5	17.7%	5.0	-9.3%	4.2	-15.5%		
May	3.2	3.9	23.2%	5.1	30.4%	4.8	-4.3%	4.0	-16.6%		
Jun	3.3	4.1	22.1%	5.3	31.2%	4.8	-10.3%	4.1	-15.0%		
Jul	3.2	4.1	25.5%	4.7	14.5%	4.7	0.0%	3.6	-23.3%		
Aug	1.7	3.9	133.5%	4.7	21.3%	4.9	3.1%	5.3	7.9%		
Sep	5.1	4.0	-22.3%	5.2	30.7%	5.0	-4.2%	4.7	-6.0%		
Oct	3.1	3.5	13.2%	4.2	20.6%	3.8	-8.1%	3.9	1.0%		
Nov	3.1	4.0	27.4%	5.1	26.8%	4.7	-6.9%	4.1	-13.0%		
Dec	3.6	4.4	22.7%	4.6	2.8%	4.7	3.9%	5.6	18.9%		

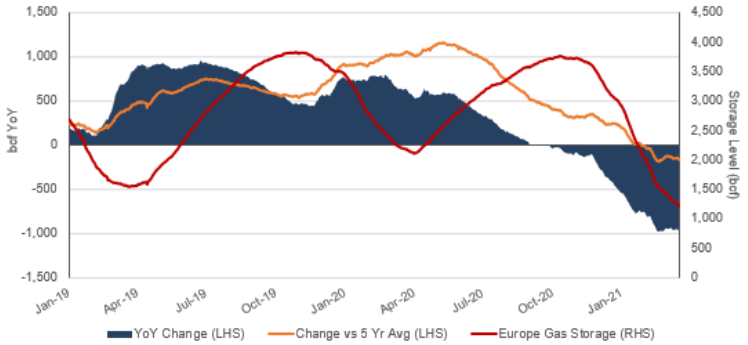
Source: Bloomberg China Customs

Natural Gas – Europe storage 31.13% full vs 5 year average of 36.28%

Europe gas storage 31.13% full

Winter is coming to an end in Europe and our focus for Europe gas storage will be turning to how quickly it fills off the low point this winter. Its been cold to start March and this has 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. Europe gas storage started the winter (Nov 1) at basically full levels at 94.66% and has dropped by 63.53% to be 31.13% at Mar 18. This 63.53% decline since Nov 1 compares to the 5 yr average that would be down 53.10% in the same period or to last winter that was only down 41.35% in the same period. Storage at Mar 18 of 31.13% is 24.84% less than last year and 5.15% less than the 5 yr average. 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 Europe gas storage utilization and our graph of YoY change in net LNG flows to NW Europe.

Figure 12: Europe Gas Storage Level



Source: Bloomberg

Figure 13: Europe Gas Storage Utilization Comparison to Mar 18

	Nov 1	Mar 18	Mar 18 Less Nov 1
Winter 2020/21	94.7%	31.1%	-63.5%
Winter 2019/20	97.3%	56.0%	-41.4%
5 yr Average	89.4%	36.3%	-53.1%

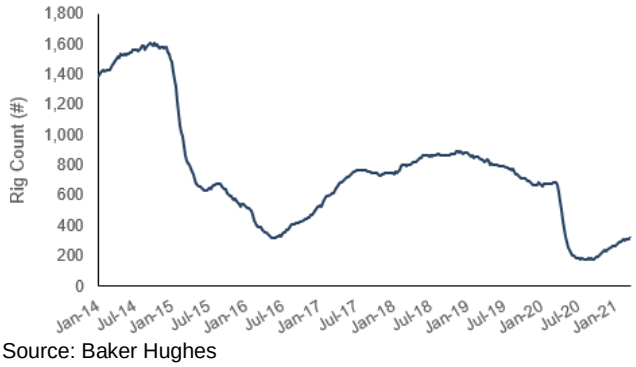
Source: Bloomberg

Oil – US oil rigs up 9 to 318 oil rigs

US oil rigs up 9 this week

Baker Hughes reported its weekly rig data on Friday. US oil rigs were up 9 to 318 oil rigs as of Mar 19. The increases were in the Permian +5, Eagle Ford +2, Williston +1, Others +1 and there were no decreases this week. Oil rigs are +146 off the bottom of 172 in the Aug 14 week. It is interesting to note that this week New Mexico rigs were +7, which we this is likely due to the DOI "fossil fuels" review process kickoff. We believe that operators are likely trying to drill ahead of any results from this process. US oil rigs have been modestly increasing, but the key will be the next several weeks to see if there is stronger increases in rigs now that WTI has been at or over $60 for almost a month. The rise has been quick with WTI below $50 to end Dec, hitting $55 in early Feb, and then over $60 in mid Feb. We doubt that any companies went into their Feb board meetings to discuss year end results assuming WTI would be over $60 before the end of Feb. Its why we think companies are now figuring out what they do with higher oil prices. And we expect to see privates and some publics move to higher drilling 2021 budgets. Its why we expect to see US oil rigs increase at modestly higher rates. US oil rigs hit their 2020 peak at 683 on March 13 and have since fallen by 365 to 318 oil rigs (-53.4%). Below is our graph of Baker Hughes US oil rigs.

Figure 14: Baker Hughes Total US Oil Rigs



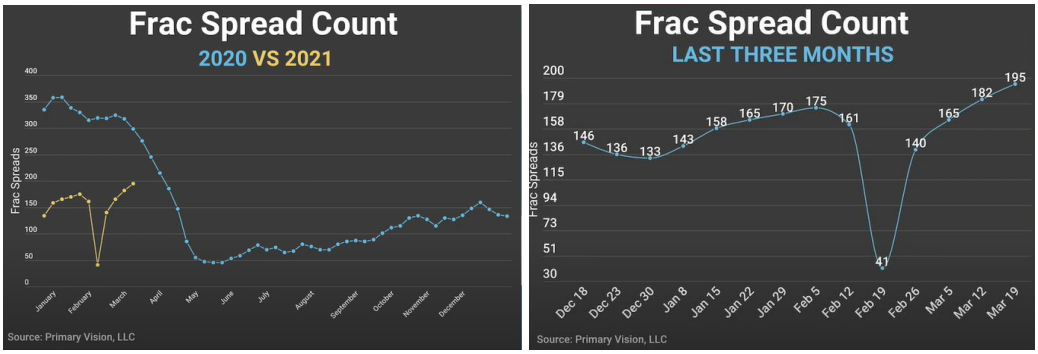
Source: Baker Hughes

Oil – Frac spreads +13 to 195 for week ending March 19

Frac spreads +13 to 195

Every week, Mark Rossano posts a YouTube recap of frac spreads for the week on the Primary Vision Network [LINK]. This week, Primary Vision's Mark Johnston filled in for Rossano. For the week ending March 19, US frac spreads were +13 to 195. Frac spreads have recovered from the Texas freeze and now well above pre freeze levels. Johnston didn't speak specifically about the WoW changes, but said over the past few weeks, much of the growth has been in Texas, and they are also seeing some Powder River Basin increases, whereas most of the north has been static. He also said he expects to see an increase in pricing in Q2. And that there will be new equipment decision soon to be made, otherwise he expects capacity/utilization to be maxed out over the next 3 to 6 months. Below are his two key frac spread graphs.

Figure 15: Active Frac Spreads for Week Ending March 19, 2021



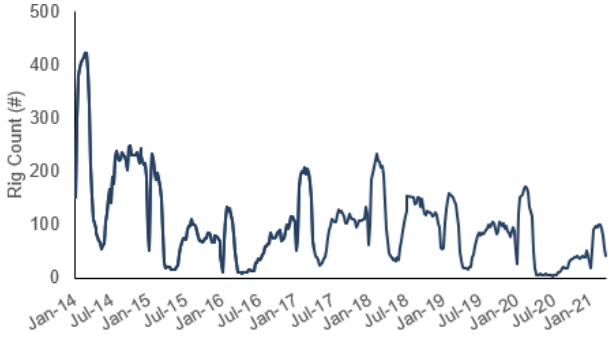
Source: Primary Vision

Oil – Total Cdn rigs down 24 to 92 total rigs and down 6% YoY

Cdn rigs -24 this week

Baker Hughes reported total Cdn rigs were down 24 this week to 92 total rigs. The big decline this week was expected and will likely continue next week with breakup and the end of winter drilling. Cdn oil rigs were down 17 to 41 rigs. Cdn gas rigs were down 7 to 51 gas rigs. Total rigs are now +79 since the June 26 all-time low. Cdn drilling is still down big vs prior years - Cdn rigs are down 6% YoY and down 12% vs two years ago. While Cdn drilling has recovered, a year ago Cdn oil rigs were 52 and Cdn gas rigs were 46 for a total Cdn rigs of 98, meaning total Cdn rigs are -6 YoY. Below is our graph of Baker Hughes Cdn oil rigs.

Figure 16: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production flat at 10.9 mmb/d

US oil production flat at 10.9 mmb/d

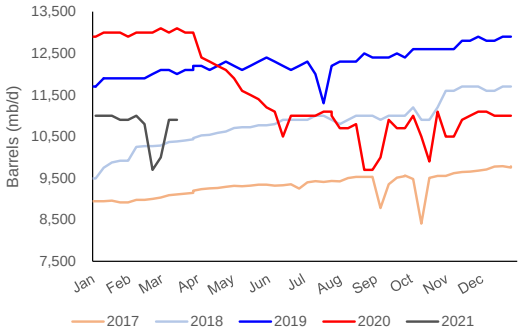
Production was flat for the week, and Lower 48 was flat at 10.4 mmb/d following the 0.9 mmb/d increase in last week's data. This puts US oil production down 2.2 mmb/d YoY, and is down 2.2 mmb/d since the 2020 peak of 13.1 mmb/d on March 13. The EIA DPR released on Monday has the expectation of continued 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 March STEO slightly lowered Q1/21 production mainly due to the freeze with Feb production averaging 10.4 mb/d, 0.5 mmb/d lower than Jan production. However, the EIA revised up the remainder of 2021 and is continuing to show modest growth thru 2021 with the 2021 exit at 11.46 mmb/d, down 1.32 from Q4/19 peak of 12.78 mmb/d. YoY growth returns in 2022 with average production of 12.02 mmb/d, +0.90 mmb/d YoY with Q4/22 production of 12.41, down 0.34 mmb/d vs Q4/19. 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 overestimate in the actuals for November which had been due to hurricane activity in early Nov.

Figure 17: EIA's Estimated Weekly US Oil Production

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

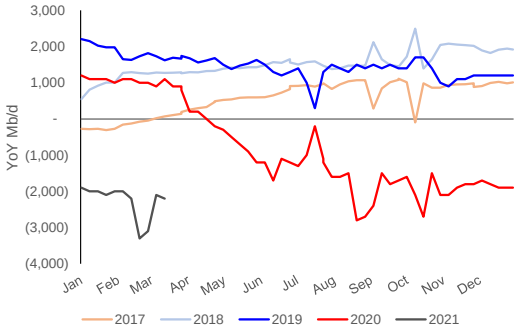
Source: EIA

Figure 18: US Weekly Oil Production



Source: EIA, SAF

Figure 19: YoY Change in US Weekly Oil Production



Source: EIA, SAF

US shale/tight oil production

Oil – US Dec. shale/tight oil down 1.73 mmb/d since Nov/19, hasn't found a bottom yet

The EIA issued its Drilling Productivity Report March 2021 on Monday [LINK], which is the EIA's forecast for oil and natural gas production from the major shale/tight oil and gas basins for the current month (in this case March) and the next month (in this case April). Similar to our comment on natural gas, the key headline is the expected continued decline in US shale/tigh oil in March and April, which we believe mainly due to completions being hammered due to the Feb freeze, which pushes back when tight/shale production will bottom. If not for the freeze, we would have expected April to likely have been a bottom. But as previously noted, we expect the tight/shale plays to find a bottom in Q2 with increasing frac spreads, rigs and $60 oil. (i) The EIA forecasts April at 7.458 mmb/d which is -47,000 b/d MoM (would have been +45,000 b/d MoM if not for revisions to Mar) and down 1.727 mmb/d from the Nov/19 peak of 9.158 mmb/d. (ii) Similar to the last several months, all basins are down YoY except for Appalachia (+5,000 b/d), with the largest declines coming from Permian at -281,000 b/d YoY, and Eagle Ford at -254,000 b/d YoY in April. Total US shale/tight oil production is now -0.946 mmb/d YoY, however this comparison is becoming less useful as production had begun to decline last April due to Covid. (iii) Even before the massive capex cuts and shut-ins, the oil shale/tight production had built a narrative for 2020 that US oil production had peaked in Nov/19 at 9.158 mmb/d, expected to plateau H1/20 and then starting to decline later in 2020. (iv) Note that shale/tight oil is approx. ~70% of total US production, so whatever the trends are for shale/tight oil are the trends for US oil in total. Below is our table of running DPR estimates of shale/tight oil production and our graph of MoM changes in major shale/tight oil production.

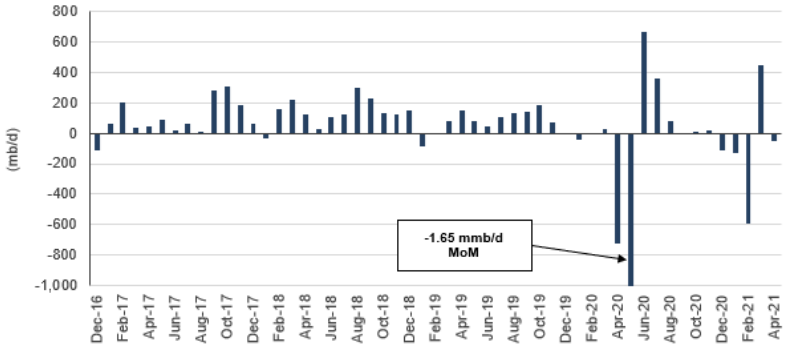
Figure 20: EIA - Major Shale/Tight Plays Oil Production

EIA Drilling Productivity Report - US Shale/Tight Oil Production Estimates

										2021					
Thousand b/d	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Apr YoY	Apr Less Mar
Anadarko	468	312	455	466	454	433	414	439	419	399	350	376	362	-106	-14
Appalachia	116	116	134	133	133	137	130	122	126	125	123	122	121	5	-1
Bakken	1,227	890	927	1,066	1,184	1,236	1,244	1,237	1,203	1,161	1,144	1,128	1,116	-111	-12
Eagle Ford	1,287	926	999	1,095	1,121	1,122	1,120	1,119	1,101	1,073	962	1,048	1,033	-254	-15
Haynesville	36	29	34	33	33	34	34	34	34	33	32	32	32	-4	0
Niobrara	697	584	629	648	648	622	591	585	579	555	536	517	502	-195	-15
Permian	4,573	3,912	4,256	4,349	4,301	4,280	4,339	4,357	4,315	4,301	3,905	4,281	4,292	-281	11
Total	8,404	6,769	7,434	7,791	7,874	7,864	7,871	7,892	7,776	7,647	7,052	7,504	7,458	-946	-47

Source: EIA, SAF

Figure 21: MoM Change – Major Shale/Tight Oil production



Source: EIA, SAF

Oil – EIA DUC's worked down by 102 in February

DUCs continue to be reduced

Our biggest concern in the past on EIA's Drilling Productivity Report [LINK] estimate of Drilled UnCompleted wells was that the data had been constantly revised and sometimes significantly. However, the EIA DUC data shows a clear trend since August of a continued work down of DUCs and we expect that trend is correct. The EIA estimates DUCs are down another 102 MoM in February, meaning a total of 1,495 DUCs have been worked down since the June peak of 8,544. No question, activity levels in US shale/tight basins are below the necessary threshold to maintain or grow production, but the DUC work down is partially offsetting the impact of low rig counts. Below is our running table of the EIA Drilling Productivity Report DUCs

Figure 22: EIA - Estimated Drilled UnCompleted Wells

	2020												2021		
Drilled UnCompleted \	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Feb YoY
Anadarko	1,014	971	937	919	906	899	893	867	847	827	806	784	764	751	-220
Appalachia	720	696	688	679	664	652	645	635	618	605	593	581	564	550	-146
Bakken	854	843	825	853	863	864	854	840	807	778	756	726	702	680	-163
Eagle Ford	1,251	1,256	1,288	1,303	1,291	1,272	1,255	1,218	1,165	1,126	1,093	1,062	1,033	1,011	-245
Haynesville	356	339	337	341	349	351	353	349	351	336	324	318	313	314	-25
Niobrara	754	756	758	753	750	756	744	744	722	664	614	573	537	507	-249
Permian	3,562	3,565	3,571	3,617	3,697	3,750	3,768	3,722	3,631	3,521	3,413	3,333	3,275	3,273	-292
Total	8,511	8,426	8,404	8,465	8,520	8,544	8,512	8,375	8,141	7,857	7,599	7,377	7,188	7,086	-1,340

Source: EIA, SAF

Oil – Haaland confirmed as Interior Secretary, can't be good for "fossil fuels" review

New Interior Secretary Haaland

We are hopeful that Biden doesn't hammer oil and gas in their federal lands review, but unfortunately believe the more likely scenario is the worst case scenario than a hopeful case. On March 9, we tweeted [LINK] on the Interior Dept's release for its next steps on reviewing oil and natural gas operations on US federal lands. This is the big risk that everyone is watching is what restrictions will Biden put on federal lands as it will have a big impact on the Permian and all the other major US oil and gas basins including the Gulf of Mexico. The reason we tweeted was because there seemed like a clear indicator of how the Biden administration wants this review to end up – the release was titled "*Interior Department Outlines Next Steps in Fossil Fuels Program Review*". The DOI made a point of using fossil fuels instead of oil and natural gas. Its why our tweet said "*Should assume @DallasFed worst case est #Permian impact @POTUS federal lands risk ie. 0.5 mmb/d less growth. How can #Oil #NatGas be optimistic, @Interior outlines next steps in "fossil fuels" review. Emphasizing fossil fuels can't be good. #OOTT".* We recognize that this is only the outline of the review process, but, clearly the Biden administration is setting the stage for a tough review process. On Tues, the Senate confirmed Deb Haaland as US Dept of Interior

Secretary. Haaland is well known for her prior statements against fracing and fossil fuels. The Republican senators on the committee made sure her prior comments were on the record saying "*In May of 2019, Representative Haaland said unequivocally in an interview with The Guardian newspaper is quote, "I am wholeheartedly against fracking and drilling on public lands." On her campaign Web site, Representative Haaland said we need to quote, "keep fossil fuels in the ground." And then went on to say, "I pledge to vote against all new fossil fuel infrastructure," close quote".* Haaland tried to reassure senators that it wouldn't be her agenda saying "*And if I'm confirmed the secretary, it is President Biden's agenda, not my own agenda that I would be moving forward."* We don't doubt that Haaland will be implementing the agenda items Biden selects. However, as Secretary of the Interior, her job isn't just to implement what she is told to do but make recommendations. And we find it impossible to believe any recommendations she makes, including on the Interior Dept review of fossil fuels on federal lands, will not be shaped by Haaland. This is why we think the more likely scenario is a worst case scenario and not the hopeful case. Our Supplemental Documents review includes excerpts from the Haaland confirmation hearing transcript.

Oil – CP and Kansas City Southern combine to form rail network in Can/US/Mex

CP and Kansas City Southern to merge

Big announcement in the rail sector this morning with "*Canadian Pacific and Kansas City Southern Agree to Combine to Create the First U.S.-Mexico-Canada Rail Network*". The combined company will be at the small end of the big rail companies, but they do provide a full Canada – US – Mexico network. The release talks about providing significant positive impacts for their customers and expanding options and efficiencies for customers. We aren't expecting any big rail rate decreases from the combination. The item we will want to watch from a crude by rail perspective continues to be the risk for further restrictions on crude by rail for safety ie. risk of puncture/fire. Below is the map from the CP release. Our Supplemental Documents package includes the CP release. [LINK]

Figure 23: US Refinery Crude Oil Inputs (thousands b/d)

Source: EIA, SAF

Link to bookmark for excellent interactive US/Can rail network mapping

Earlier this morning, when we saw the breaking news of the CP and Kansas City Southern combination, we pulled out one of our prior tweets and tweeted [LINK] a

reminder of a good interactive rail US/Canada rail network mapping system to bookmark. The North American Crude by Rail interactive mapping [LINK] allows the user to pick the railways and show the North American fit. This was our immediate go to on hearing breaking CP news. And it was very easy to just click the boxes for CP and Kansas City Southern to show this below map. The negative in this case is that it only shows US and Canada and did not include the Kansas City Southern rail network in Mexico.

Figure 24: CP and Kansas City Southern Rail Networks in US/Can

Source: priceofoil.org

Oil – Oil sands the biggest factor for non-OPEC+ oil production drop in April

Non-OPEC+ production to drop April/May on maintenance

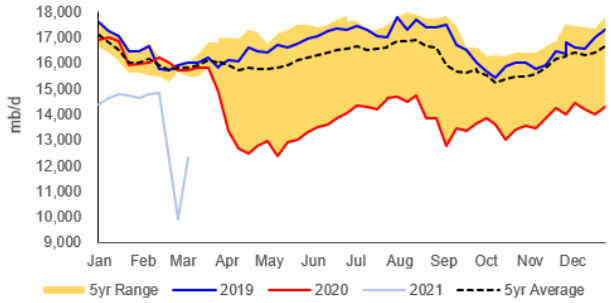
One of the oil stories this week was that there would be significant non-OPEC oil production off line in April and May due to maintenance. The reminder is that the biggest factor is Cdn oil sands. In our March 7, 2021 Energy Tidbits we noted that there will be ~450,000 b/d of Cdn oil sands offline at various times in Q2, which includes turnarounds at Suncor's 130,000 b/d U2 upgrader beginning in April, Syncrude's 70,000 b/d 8-3 coker, and 250,000 b/d from CNRL's Horizon upgrader in April. This week, Bloomberg reported on data from Rystad indicating that non-OPEC+ crude production is expected to drop 883,000 b/d in April and 800,000 b/d in May due to seasonal maintenance work driven mainly by the above normal Cdn oil sands maintenance along with work at offshore Norway and UK fields.

Oil – Refineries continue to recover, up +1.123 mmb/d YoY to 13.433 mmb/d

Refineries recover post freeze

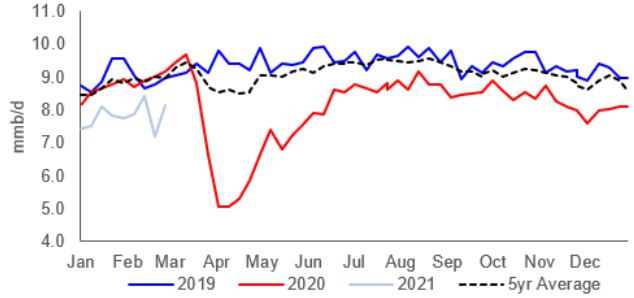
Crude inputs to refineries continued to ramp up this week and were +1.123 mmb/d to 13.433 mmb/d, and are -2.387 mmb/d YoY. Refinery utilization increased this week, being +13.0% to 69.0%, which is -17.40% YoY. being +7.1% to 76.1%, which is -13.3% YoY. Total products supplied (ie demand) increased this week and was +0.261 mmb/d to 18.933 mmb/d for the Mar 12 week, and motor gasoline demand decreased, being -0.284 mmb/d to 8.442 mmb/d. Below is our graph of crude inputs to US refineries and our graph of US motor gasoline supplied.

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



Source: EIA, SAF

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



Source: EIA, SAF

Oil – Valero, Navigator & BlackRock partner for large scale CCS system

CCS system would span 5 states

Its not just supermajors who are working towards lowering net emissions, its also refineries such as ValeroThis week, Navigator Energy Services announced a partnership with Valero and BlackRock to develop a large scaleCCS system. [LINK] The initial phase of the system would include ~1,200 miles of carbon dioxide gathering and transport lines across 5 states, with the capacity to store ~5 million metric tons of carbon dioxide per year with potential to be expanded to 8 million metric tonnes per year. The completion date for this project is set for late 2024. The system will consist of 6" to 16" lines across Nebraska, Iowa, South Dakota, Minnesota, and Illinois with the central sequestration facility expected to be in south-central Iowa.

Figure 27: US Refinery Crude Oil Inputs (thousands b/d)

Source: Navigator CO2 Ventures

Oil – US "net" oil imports down 0.219 mmb/d to 2.803 mmb/d

US "net" oil imports -0.219 mmb/d WoW

US "NET" imports were down 0.219 mmb/d to 2.803 mmb/d for the Mar 12 week. US imports were down 0.332 mmb/d to 5.323 mmb/d and US exports were down slightly, being -0.113 mmb/d to 2.520 mmb/d. The WoW decrease in US oil imports was driven by decreases from Colombia and Canada. Some items to note on the by country data. (i) Canada was down this week, and was -0.187 mmb/d to 3.448 mmb/d for the Mar 12 week, which is now ~252,000 b/d below the average levels in Jan/Feb of 2020. Also note that PADD 2 imports were also down, being -31,000 b/d and Canada is almost all of this market. (ii) Saudi Arabia was up 0.157 mmb/d to 0.308 mmb/d this week. (iii) Colombia down 286,000 b/d to zero this week. (iv) Ecuador increased and was +68,000 b/d to 127,000 b/d. (v) Iraq was up 24,000 b/d to 165,000 b/d. (v) Venezuela remained at 0 due to US sanctions. (vi) Mexico decreased 84,000 b/d to 0.278 mmb/d.

Figure 28: US Weekly Preliminary Oil Imports By Major Countries

	Jan 15/21	Jan 22/21	Jan 29/21	Feb 5/21	Feb 12/21	Feb 19/21	Feb 26/21	Mar 5/21	Mar 12/21	WoW
Canada	3,890	3,115	4,238	3,730	3,681	2,831	3,648	3,635	3,448	-187
Saudi Arabia	135	206	180	282	237	143	368	251	308	57
Venezuela	0	0	0	0	0	0	0	0	0	0
Mexico	710	463	723	446	471	355	602	362	278	-84
Colombia	358	73	305	336	346	200	285	286	0	-286
Iraq	97	115	90	114	227	0	68	141	165	24
Ecuador	144	258	100	105	186	55	114	59	127	68
Nigeria	49	116	175	0	70	50	89	0	44	44
Kuwait	0	0	0	0	0	0	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0
Top 10	5,383	4,346	5,811	5,013	5,218	3,634	5,174	4,734	4,370	-364
Others	662	718	696	844	680	965	1,118	921	953	32
Total US	6,045	5,064	6,507	5,857	5,898	4,599	6,292	5,655	5,323	-332

Source: EIA, SAF

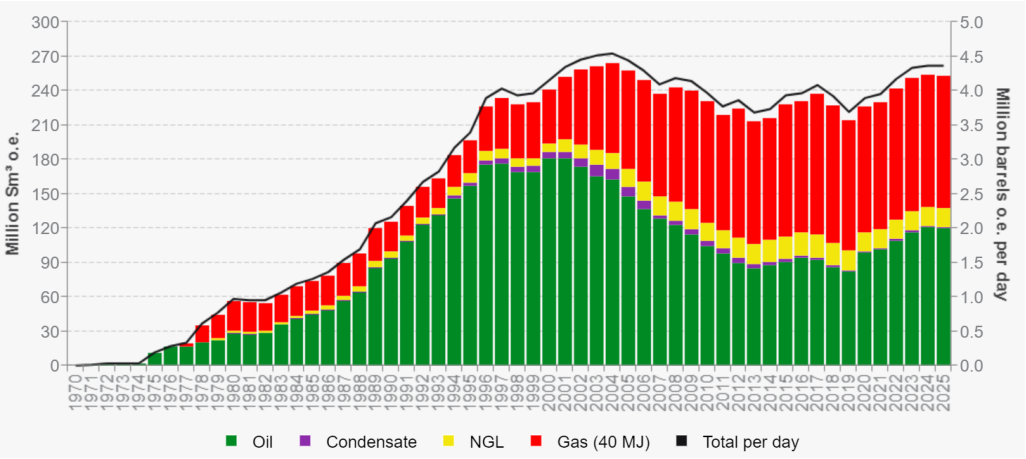
Oil – Norway oil production of 1.792 mmb/d, 0.4% higher than forecast

Norway oil production -0.6% MoM

The Norwegian Petroleum Directorate released its February production figures [LINK] of 1.792 mmb/d of oil, which is +1.8% YoY, but -0.6% MoM from January of 1.802 mmb/d. This was only a slight deviation from the forecasted amount of 1.785 mmb/d, and 0.1% higher than the forecast so far this year. The story for Norway was that its oil production returned to growth in the last 3 years because of the Johan Sverdrup oil field. Below is the NPD's

historical and forecast production graph as of Feb 17. [LINKI] Our Supplemental Documents package includes the NPD update.

Figure 29: Historical and expected production in Norway, 1970-2025



Source: Norway Petroleum Directorate

IEA: no supercycle for oil

Oil – IEA OMR, there is no supercycle for oil

The IEA released its monthly Oil Market Report for March on Wed. They only release very limited public info, but fortunately Bloomberg did their normal IEA market wrap and stories. (i) The big headline from the IEA OMR is that it doesn't see a supercycle for oil. The IEA press release states "*Plenty to spare*. *Oil's sharp rally to near $70/bbl has spurred talk of a new super-cycle and a looming supply shortfall. Our data and analysis suggest otherwise. For a start, oil inventories still look ample compared with historical levels despite a steady decline from a massive overhang that piled up during 2Q20. By the end of January, OECD industry stocks, at 3 023 mb, were still 110 mb higher than a year ago – at the onset of the Covid crisis. On top of the stock cushion, a hefty amount of spare production capacity has built up as a result of OPEC+ supply curbs".* (ii) Minor increase to 2021 oil demand. driven by Q1/21 cold weather, whereas Q4/21 was unchanged. No change to 2020 demand of 91.0 mmb/d. 2021 demand revised +0.1 mmb/d to 96.5 mmb/d vs 96.4 mmb/d in Feb MOMR. The increase was driven by cold weather in Q1/21 such that Q1/21 revised +0.2 mmbd, whereas Q4/21 demand is unchanged at 99.2 mmb/d. IEA OMR does not forecast oil demand back to pre-Covid levels in 2021. (iii) OPEC February production was down 0.77 mmb/d to 24.75 mmb/d. (iv) Minor revision down to Non-OPEC oil supply due to US in Q1/21 from the Texas freeze. IEA lowered its non-OPEC oil supply forecast for 2021 from 64.0 mmb/d to 63.9 mmb/d. This is due to their lowering of America's Q1/21 supply due to the Texas freeze. The IEA lowered its Americas Q1/21 forecast to 23.6 mm/b, down from 24.2 mmb/d in the Feb OMR. (v) In the OMR, the IEA highlighted the new refinery capacity being added in Asia and the need for more refinery capacity to be reduced. Bloomberg wrote *"More oil refineries will need to close through 2026, partly due to the drop in demand for transport fuels, the International Energy Agency said in its Oil 2021 report. * Closures will also be needed to offset the growth in capacity starting up in the next few years in East of Suez nations * A total of 6m b/d of capacity needs to close through 2026 to push run rates above 80% ** That means announcements are needed on a further 2.4m b/d of capacity"*. (vi) Note the earlier comment on why the IEA does not see a supercycle. The IEA also wrote "*OECD industry stocks fell for the sixth consecutive month in January. A monthly decline of 14.2 mb left inventories at 3 023 mb, 63.2 mb above their 2016-2020 average.*

Crude oil stocks led the fall with a counter-seasonal 23.7 mb draw. February data for the US, Europe and Japan show that total industry stocks fell by 52.6 mb (1.88 mb/d) in total, led by lower gasoline and middle distillate stocks in the US". (vii) Special thanks to the Bloomberg team for their IEA OMR wrap stories. Our Supplemental Documents package includes the IEA release and Bloomberg terminal IEA wrap.

Figure 30: IEA OMR Global Demand Forecast

mmb/d	2019	Q1/20	Q2/20	Q3/20	Q4/20	2020	20-19	Q1/21	Q2/21	Q3/21	Q4/21	2021	21-20
Mar 21	99.7	93.8	82.9	92.7	94.7	91.0	-8.7	93.9	95.0	97.8	99.2	96.5	5.5
Feb 21	99.6	93.8	82.9	92.7	94.7	91.0	-8.6	93.7	94.9	97.9	99.2	96.4	5.4
Jan 21	99.9	94.1	83.1	93.0	94.5	91.2	-8.7	94.1	95.2	98.1	99.0	96.6	5.4
Dec 20	99.9	94.1	83.1	93.0	94.7	91.2	-8.7	94.7	95.4	98.0	99.2	96.9	5.7
Nov 20	99.9	94.0	83.0	93.2	94.9	91.3	-8.6	94.9	95.8	98.4	99.1	97.1	5.8
Oct 20	99.9	94.1	83.0	93.6	96.1	91.7	-8.2	95.6	96.1	98.2	98.8	97.2	5.5
Sept 20	99.9	93.9	83.0	93.7	96.0	91.7	-8.2	95.6	95.8	98.2	98.9	97.1	5.4
Aug 20	99.9	94.1	83.2	93.8	96.7	91.9	-8.0	95.4	95.8	98.6	98.7	97.1	5.2
July 20	99.9	94.0	82.9	94.3	97.1	92.1	-7.8	95.5	96.2	99.0	98.9	97.4	5.3
June 20	99.9	93.9	81.4	94.6	96.9	91.7	-8.2	95.6	96.6	98.7	98.7	97.4	5.7
May 20	99.9	93.5	79.3	95.1	96.9	91.2	-8.7	-	-	-	-	-	-
Apr 20	99.8	93.3	76.1	95.0	97.6	90.5	-9.3	-	-	-	-	-	-
Mar 20	100.0	96.7	99.2	102.0	101.7	99.9	-0.1	-	-	-	-	-	-

Source: IEA, SAF

Oil – No word yet if any damage to Saudi Aramco Riyadh refinery from drone attack

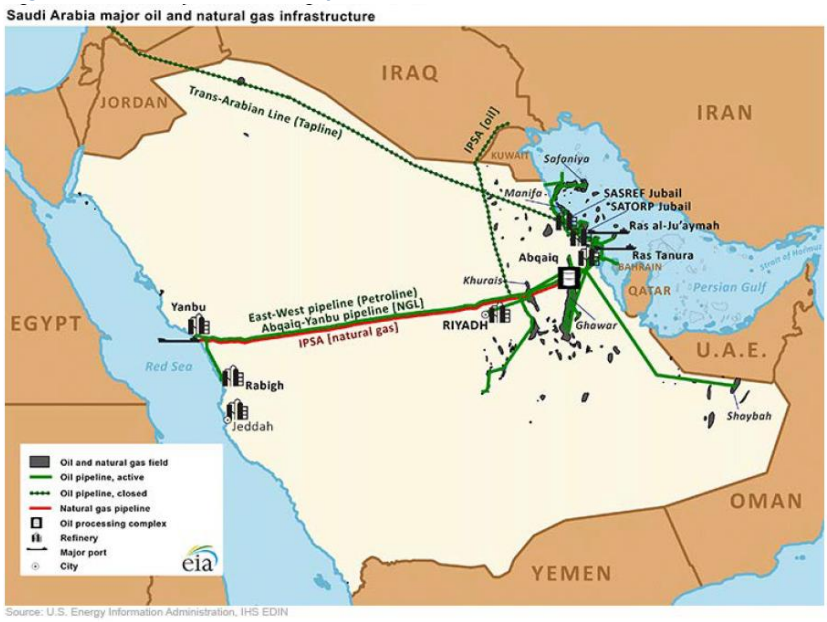
Drone attack on Riyadh refinery

As of our 7am MT news cut off, we still haven't seen any Saudi confirmation of any damage to the Saudi Aramco Riyadh 124,000 b/d refinery. We weren't going to tweet yesterday but most of the reports on the Houthi drone attack said no damage to the refinery. We read the same official Saudi Press Agency report and the SPA report confirmed there was a fire, but did not say no damage. Its why we tweeted yesterday morning [LINK] "*No word yet what was damaged in #SaudiAramco Riyadh refinery drone attack. KSA has confirmed: a fire was brought under control, supply of oil or its derivatives was not affected by the attack. Doesn't mean there wasn't damage. Glad no one injured*". Saudi did not say no damage, rather they said "*An official spokesman at the Ministry of Energy stated that today at 06:05 AM the Riyadh oil refinery was attacked by drones, resulting in a fire that has been brought under control. The attack did not result in any injury or death nor was the supply of oil or its derivatives affected."* Saying the supply of oil or its derivatives wasn't affected doesn't mean no damage. Our Supplemental Documents package includes the Saudi Press Agency reporting. [LINK]

Saudi Arabia major oil and gas infrastructure

The drone attack on Aramco in Riyadh is probably more of a statement to the royal family that if the Houthis can hit the refinery, they can hit the palace. Because Riyadh isn't as significant an oil and gas Aramco asset area as opposed to last week's Ras Tanura's ballistic missile attack, Abqaiq from 2019, or from prior attacks on Yanbu on the Red Sea. When the news broke of a Houthi drone attack on Aramco at Riyadh, we tweeted out some comments on Riyadh. We included the below EIA Saudi Arabia major oil and natural gas infrastructure map. There aren't any oil and gas fields around Riyadh. The EIA has the Aramco Riyadh refinery at 124,000 b/d. Plus the EIA map reminds that major oil, NGLs and natural gas pipelines run right beside Riyadh.

Figure 31: Saudi Arabia Major Oil and Natural Gas Infrastructure



Source: EIA

Oil – Houthi's warned of attacks on Aramco if Saudi kept attacking Marib

Houthis warmed they would attack Aramco

The Houthis have been warning they will be attacking Saudi Aramco. So the attacks on Saudi Aramco's Riyadh refinery this week and the Saudi Aramco major loading terminal and refinery at Ras Tanura should not be a surprise. We have been highlighting the battle for Marib in Yemen with our view that this is likely the major battle that signals the end may be nearing for the Saudi/Houthi war. Tied to the Marib battle, our March 7, 2021 Energy Tidbits highlighted that week's warning by the Houthis to Saudi that if Saudi continued its air strikes in the battle for Marib, the Houthis would turn their attacks to Saudi Aramco facilities. That has happened. In the March 7 memo, we wrote "Earlier this week, on Tuesday the Jerusalem Post reported [LINK] on the Houthis *"will strike at Saudi Arabia's Aramco if Saudi Arabia or UAE "fighters or supporters" commit "aggression" in certain areas. The Houthis pointed to the "Safer oil fields", as an example. It was not clear where this red line was or what specific infrastructure they don't want targeted." "The most important message is to warn the Saudi regime not to think of attacking Ma'rib oil structures .Therefore, if the Safar oil sectors are targeted by Saudi or Riyadh-based fighter jets, the Sanaa forces will also use 'UAVs and missiles will bomb Saudi oil structures in a large-scale operation.'" He warned of another Abqaiq-style attack".*

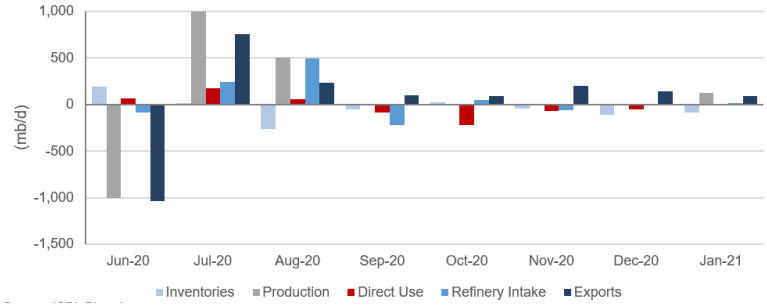
Oil – 110,000 b/d MoM of unaccounted for Saudi Jan net oil supply in JODI data

JODI data for Jan

This month's JODI data update for Jan did not necessarily contain anything significant but, based on the on the reported data, we can't account for +110,000 b/d MoM of net supply. (i) Production in Jan was up, being +123,000 b/d to 9.103 mmb/d, along with an increase in exports of +87,000 b/d to 6.582 mmb/d. Direct use for electricity was basically flat, being +2,000 b/d to 269,000 b/d. Inventories declined 2.809 mmb or 91,000 b/d to 137.207 mmb. (ii) Production in Jan was up +123,000 b/d to 9.103 mmb/d. With production being +123,000 b/d, we would assume exports would be up and they were at +87,000 b/d. However, there is 110,000 b/d of net supply (production + inventory changes) that is unaccounted for in the reported data. MoM increase of net supply consists of production +123,000 b/d and

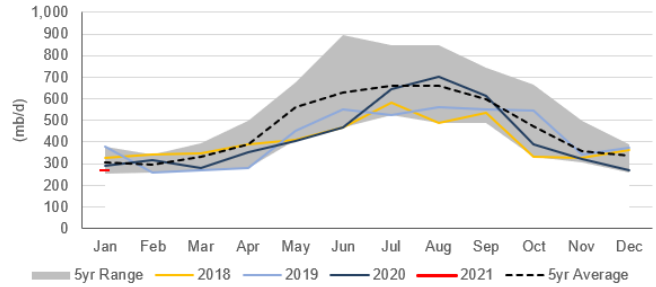
inventories down 91,000 b/d MoM. Net uses were direct use for electricity +2,000 b/d MoM and refinery intake +15,000 b/d MoM. Net supply is +197,000 b/d MoM, yet exports are only +87,000 b/d MoM which means 110,000 b/d of net supply is unaccounted for. Below are our updated graphs for the Saudi JODI data for Jan.

Figure 32: MoM Saudi Inventories, Production, Direct Use, Refinery Intake & Exports



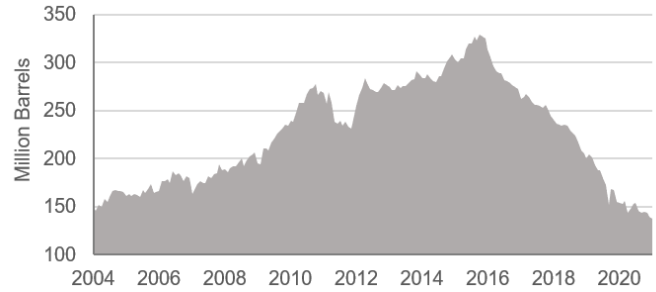
Source: JODI, Bloomberg

Figure 33: Saudi Arabia Direct Use of Crude Oil For Electric Generation



Source: JODI

Figure 34: Saudi Arabia Crude Oil Inventories (million barrels)



Source: JODI

Oil – Saudi Aramco cuts 2021 capex to $35b, should provide comfort to $75b dividend

Aramco cuts 2021 capex to $35b

Saudi Aramco had a very short press release for its Q4/20 results this morning. We really have to wonder why they don't provide the full financial information until tomorrow, its even worse than what we did in Canada in the early 80s. Regardless, the item we highlighted in our tweet earlier today [LINK] "*See why #SaudiAramco is cutting 2021 capex to $35b vs previous guidance $40-45b. if maintain Q4/20 $28.9b operating cash flow, could fund $75b dividend + $35b capex with $5b cushion. Saudi wants/needs >$60 Brent #OOTT*". Aramco said "*The Company continues to assess its capital expenditure and efficiency programs, and*

expects capital expenditure for 2021 to be around $35 billion, significantly lower than the previous guidance of $40-$45 billion." In theory, with stronger oil prices and the increased economic outlook for the world with vaccinations, most would expect oil companies to either keep flat or increase capex. But that isn't the case here and we believe it comes back to funding the $75b annual dividend. Our tweet included the below table that shows Aramco in Q4/20 went back to free cash flow "after" paying its dividend. And the math is fairly simple, if Aramco can maintain the running rate net cash provided by operating activities at Q4/20 levels, and it will have a $5b cushion after funding a $35b capex and $75b dividend. Our Supplemental Documents package includes the very brief release [LINK] and the Non-IFRS measures reconciliations and definitions for the year ended December 31, 2020 [LINK].

Figure 35: Saudi Aramco Free Cash Flow After Dividends

US$ in million	Q1/20	Q2/20	Q3/20	Q4/20	2020	2019
Net cash provided by operating activities	22,418	12,349	12,411	28,901	76,079	111,074
Capital expenditures	7,397	6,248	6,383	6,914	26,942	32,769
Free cash flow	15,021	6,101	6,028	21,987	49,137	78,305
Dividends	13,394	18,751	18,752	18,752	69,649	73,200
Free cash flow after dividends	1,627	-12,650	-12,724	3,235	-20,512	5,105

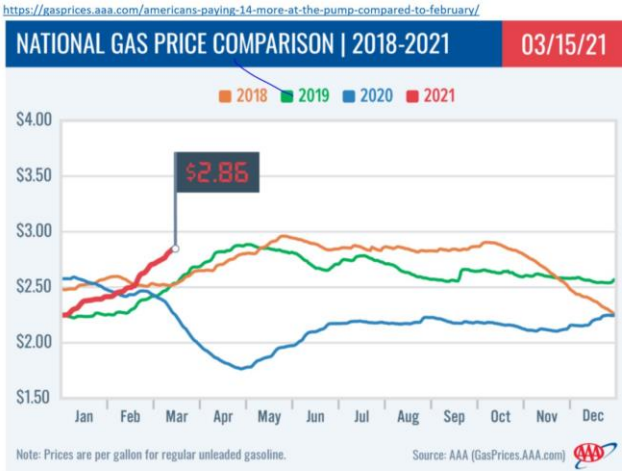
Source: Saudi Aramco

Oil – Key for MBS on oil prices, make sure US oil production isn't about to take off

US gasoline prices are nearing $3

One of the questions we get isn't Saudi Arabia afraid of US ramping up activity? We said for sure. And then we said but the beauty for Saudi Arabia and Russia is that they have a very clear view of US drilling and fracking activity so can monitor that. And they also can see what companies are saying and doing. And that if all they are seeing is the US maybe holding production flat, then we said they don't have to change their strategy in a recovering global oil demand in Q2 and Q3. And we added, Putin knows Biden is against him (especially after Biden's killer comment this week), and MBS now knows Biden wants to put on the B team in the US's recalibrated relationship with Saudi, so both are going to be pretty happy if US oil production stays flat, oil prices stay high and gasoline prices are high just as the US moves into peak driving season starting Memorial Day in a summer where there will be pent up demand. Its why we tweeted [LINK] "*Key for KSA, make sure US #Oil production isn't about to take off. Can add back some bpd and keep oil >$60. #MBS (#Putin also) won't mind US gasoline prices about to break thru $3 before the traditional price rise going into start of US driving season Memorial Day weekend. #OOTT*". Below is the AAA's US National Average gasoline price graph as of March 15, and note how (surprise, surprise), gasoline prices tend to rise just before Memorial Day. Just like we see before every long weekend in Alberta.

Figure 36: US National Gas Price Comparison



Source: AAA

Oil – US reportedly tells China "no tacit green light" to import Iran oil

US on China importing Iran oil

We wonder if the publicity that Iran oil exports to China could reach 0.9 mmb/d in March compelled the US to get out the story that they aren't going to stand for this. On Wed, the FT reported [LINK] "*Some observers had questioned whether the rise indicated that the Biden administration was turning a blind eye to the trade in an effort to encourage Tehran to join negotiations over a 2015 nuclear accord that the US abandoned in 2018. The Biden administration has made returning to the deal a priority. "We've told the Chinese that we will continue to enforce our sanctions," the senior administration official said. "There will be no tacit green light." The official indicated that sanctions could be waived during hoped-for talks between Washington and Tehran to revive the multi-party nuclear deal."* Last week's (March 14, 2021) Energy Tidbits noted March 11 Bloomberg report "*A Surge in Iranian Oil Exports Is Clogging Up Chinese Ports*" that highlighted "*Chinese imports of Iranian crude will rise to 856,000 barrels a day in March, the most in almost two years and up 129% from last month, according to Kevin Wright, a Singapore-based analyst with Kpler. His estimates include oil that's undergone ship-to-ship transfers in the Middle East or in waters off Singapore, Malaysia and Indonesia to obscure their origin*. We will have to wait and see if the US is actually going to crack down on this or if they just wanted to message that they are dealing with it.

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

Monthly long Ramadan starts April 13

Reminder that Ramadan is 10 days earlier this year, and starts the evening of Tues April 13, and ends the evening of Wed May 12. So we are still over 3 weeks away. Normally every year in the run up to Ramadan, we will see security threat warnings. 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 – IEA forecasts oil demand +4.3 mmb/d to 2026

IEA oil demand +4.3 mmb/d to 2026

One of the oil stories to the negative this week was the IEA releasing its "Oil 2021: Analysis and forecast to 2026" [LINK], which is the IEA's updated long term forecast of oil supply and demand to 2026. (i) The headlines from the report were to the negative focusing on items such as the IEA writing "g*asoline demand may have peaked, though, as efficiency gains and the shift to electric vehicles offset mobility growth in emerging and developing economies*", and ""*For the world's oil demand to peak anytime soon, significant action is needed immediately to improve fuel efficiency standards, boost electric vehicle sales and curb oil use in the power sector." Those actions – combined with increased teleworking, greater recycling and reduced business travel – could reduce oil use by as much as 5.6 mb/d by 2026, which would mean that global oil demand never gets back to where it was before the pandemic*." (ii) On the latter point, the IEA does warn that if governments take "significant actions" "immediately" on this list of items, then there could be a big hit to demand by 2026. Is this possible? Maybe but really not likely, although there could be some impact assuming there is an big acceleration in action, not just in aspiration. (iii) Overlooked is the IEA base case, it does not forecast peak oil demand thru 2026. And the rate of demand growth in 2026 vs 2025 is still +0.9 mmb/d YoY. Rather the IEA forecasts oil demand increases to 104.1 mmb/d in 2026, vs 99.7 mmb/d in 2019. Oil demand returns to pre Covid in 2023 at 101.2, not quite there in 2022 at 99.4. And then the IEA forecasts demand to reach 104.1 mmb/d in 2026. On the long term demand forecast, the negative comment was that this was revised down by 2.5 mmb/d vs last year. But the base case is for growth of 4.3 mmb/d vs pre Covid levels. (iv) The IEA also highlights the supply challenge. "*To meet the growth in oil demand to 2026 in the IEA report's base case, supply needs to rise by 10 mb/d by 2026. The Middle East, led by Saudi Arabia, is expected to provide half that increase, largely from existing shut-in capacity*." The IEA says need to add 10 mmb/d of supply to meet the 2026 demand, which infers a decline of 5.7 mmb/d from 2019 of 99.7 mmb/d. We don't have the assumptions, but that is the simple math to having to add 10 mmb/d of supply to meet demand. We just don't think that is a high enough decline assumption of 6 years and is a big upside risk to their forecast. Our Supplemental Documents includes the IEA Oil 2021 release and some of the publicly available tables.

Oil – India forecasts oil consumption to double, add 4.3 mmb/d to 8.7 mmb/d in 2030

India oil consumption to double

India is forecasting its oil consumption will double by 2030. Even with the increasing # of calls for peak oil demand to happen soon, if not already, we still believe the demise of oil, will be like coal, and won't go away as quickly as the aspirations of energy transition. Its not because of the goals and aspirations to do so, its just the reality. The energy transition is going to happen – it will just take longer, be a bumpy road, and cost more than expected. Peak oil demand happening sooner was topical this week with the IEA's Oil 2021 forecast thru 2026. Its why we tweeted a couple times on an overlooked long term oil story that is contrary to the call of early peak oil demand. India is forecasting its growth in oil consumption is way higher than included in forecasts. Our 2nd tweet [LINK] was *"India oil consumption to double by 2030, an additional 4.3 mmb/d to 8.7 mmmb/d says India Ministry of Petroleum and Natural Gas. What does India know that others don't? Demise of #Oil won't be as quick as aspirations of #EnergyTransition*". The story was a Bloomberg report early Thurs morning that noted "*India's oil demand is expected to rise to 8.7 million barrels/day or about 435 million tons/year by 2030 from 4.4 million barrels now, according to Kumar, who's the joint secretary of refinery at the Ministry of Petroleum and Natural Gas".* This is a forecast from India's Ministry of Petroleum and Natural Gas, not from an analyst or non-India forecast group. And, as noted below, a growth in oil consumption from 4.4 to 8.7 mmb/d in 2030 is not in anyone's forecast, which is what we put in our 1st tweet [LINK] *"#PeakOil demand. Hard to see the case it is already here. India reminds it is THE growth market for #Oil, forecasts its*

#Oil demand doubles from 4.4 mmb/d to 8.7 mmb/d in 2030. Double the growth in @IEA Oil 2021 & $BP Sept outlook. Great report by Bloomberg @JournoDebjit". Our Supplemental Documents package includes the Bloomberg report.

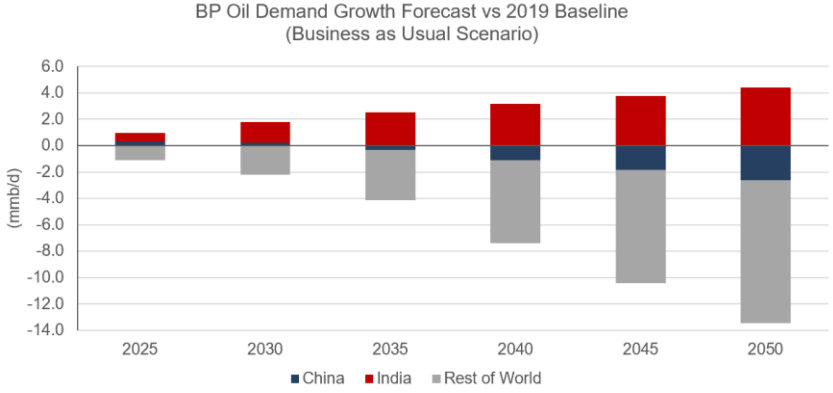
IEA sees India oil demand +1.2 mmb/d to 2026 vs India +4.3 mmb/d to 2030

As noted earlier in the memo, this week, the IEA released its "Oil 2021: Analysis and forecast to 2026" [LINK], which is the IEA's updated long term forecast of oil supply and demand to 2026. The IEA forecasts global oil demand increases to 104.1 mmb/d in 2026, vs 99.7 mmb/d in 2019. Oil demand returns to pre Covid in 2023 at 101.2, not quite there in 2022 at 99.4. Embedded in the IEA forecast is that India oil demand increases from 4.50 mmb/d in 2020 (down from 4.99 mmb/d in 2019), and then increasing gradually and consistently to reach 5.70 mmb/d in 2026 This is an increase of 1.20 mmb/d in the 6 years from 2020 to 2026. This compares to the India Ministry of Petroleum and Natural Gas forecast growth from 4.3 mmb/d in 2020 (pretty similar to IEA starting point) to 8.7 mmb/d in 2030.

BP sees India oil demand +2 mmb/d to 2030 vs India +4.3 mmb/d to 2030

Our Oct 4, 2020 Energy Tidbits noted the then recent long term oil demand forecasts that reminded India was the growth engine for oil demand and not China. This included BP's Energy Outlook 2020. We then wrote "*We want to follow up on two items from last week's (Sept 27, 2020) Energy Tidbits – the BP Outlook and the CNPC research group forecast that China's consumption of petroleum products will peak in 2025. On Thurs, we tweeted [LINK] "CNPC's view for China peak #Oil demand around 2025. See below SAF Group graph showing BP's Sept Energy Outlook 2020 forecast also calls for 2025 China peak demand and reminds that the key oil demand growth region for 2020s/30s/40s is India." Historically, China has been the biggest growth area for oil demand. But, we pulled the backup forecast data from the BP Energy Outlook to create the below graph, which clearly shows that, going forward, India is the now the biggest growth area for oil demand thru 2050."* BP used a reference year of 2018 and only included oil demand in mmb/d rounded to whole numbers BP forecast India's oil demand from 5 mmb/d in 2018 to 6 mmb/d in 2025 to 7 mmb/d in 2030. This compares to India Petroleum and Natural Gas ministry forecast to reach 8.7 mmb/d in 2030. Below is the graph we created from the BP Energy Outlook data.

Figure 74: BP Business As Usual Case: Oil Demand Growth By Region



Source: BP, SAF

Oil – India oil imports down 18.7% YoY to 3.98 mmb/d in February

India February crude imports down 18.7% YoY

This week, India's Petroleum Planning and Analysis Cell released crude oil import data for February [LINK]. Total crude oil imports decreased 18.7% YoY in February to 3.98 mmb/d and down from 4.63 mmb/d January. Crude imports since April are down 14.2% YoY. Petroleum products demand in Feb was at 95% of Feb 2020 demand, slightly below the Jan demand level which was at 96.1% of Jan 2020 demand. Refiner throughput in Feb was -11.8% YoY to 4.87 mmb/d, down from a ten month high in January at 5.15 mmb/d which was up 0.6% YoY. Processing volumes are 13.9% below YoY level for April to Feb 2021.

Oil – China's oil imports +17% YoY in Jan/Feb to 11.13 mmb/d

China oil imports

Bloomberg reported on China's oil imports for January and February 2021 which increased to 11.13 mmb/d, +22% vs December of 9.09 mmb/d. This follows an increase in apparent oil demand which was +16.81% YoY for the January to February period, reaching 13.33 mmb/d. The jump in import levels and demand was driven by strong fuel demand, along with increase import quotas for independent refineries put in place for 2021.

Oil – Vortexa floating storage -3.3% WoW, Braemar shows an increase in tankers

Vortexa and Braemar floating storage

Floating storage data from Vortexa and Braemar have been volatile as of late, however the overwhelming trend has been a decline which continued this week. (i) Bloomberg reported on Vortexa floating oil data that showed a WoW decrease of 3.46 mmb or -3.3% WoW to 102.52 on March 12 from 105.98 mmb on March 5. Note, Vortexa had originally reported last week's data at 99.32 mmb, and subsequently revised it up +6.66 mmb to 105.98 mmb. Floating storage is still down 53.7% since the June 28 peak of 221.3 mmb. West Africa is up 118% WoW, and the Middle East is up 77% WoW, which is its highest level since August. (*ii)* Bloomberg later reported on the Braemar data. Braemar doesn't estimate the barrels of oil in floating storage but notes there was an decrease of 4 VLCCs in floating storage to 36 as of March 15. Total tankers of 205 as of March 15 is -13 WoW. Our Supplemental Documents package include the Bloomberg Vortexa and Braemar stories.

Figure 38: Vortexa Global Floating Storage Level

Source: Bloomberg, Vortexa

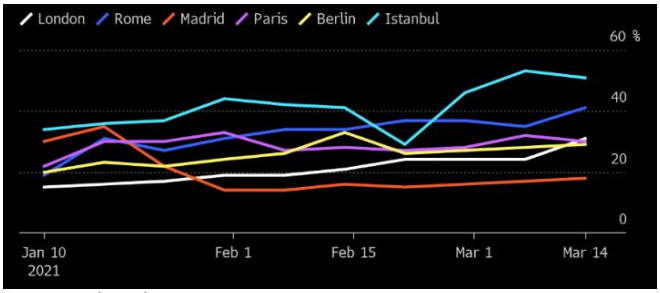
Oil – Bloomberg Oil Demand Monitor, London Traffic Exceeds 2019

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. Demand in the UK is benefitting from the fastest coronavirus vaccination rollouts in Europe and the easing of quarantine rules. London's Monday-morning traffic congestion exceeded 2019 levels for the first time since early December, being +5% vs 2019. Traffic congestion has been trending higher since the

start of the year in six of Europe's nine largest cities. However, Moscow, St. Petersburg, and Kiev have seen declining congesting levels since mid Feb due to increasing Covid cases. Traffic congestion in Beijing and Shanghai, the first two major cities to have congestion above 2019 levels, looks to once again be steadily above 2019 levels following a dip in late Jan/early Feb due to localized lockdowns. Beijing congestion was +16% and Shanghai was +15% vs 2019 levels for the week ending March 15. Our Supplemental Documents package includes the Bloomberg Oil Demand Monitor.

Figure 39: Average weekly congestion



Source: Bloomberg, TomTom

Set up for record US driving

Oil – Pent up demand/cabin fever setting up for record US summer driving season

We are sure everyone is hearing comments for their friends or making their own comments about the pent up demand for travel and driving in this driving season. Assuming no steps backward, the anecdotal evidence is that it should be more driving this summer than ever before. International travel is still going to be down so driving is going to be the first choice for most. One of the anecdotal items is multiple friends doing the motorized RV trips this summer to see the US. After hearing this, we checked out Thor Industries recent Q2/F21 slide deck from March 9. In the Q2 outlook, Thor said "*In the near-term, which we define as the remainder of calendar 2021, we see demand for our products outpacing supply. Our backlog is at record levels and is continuing to grow*." But this week, we saw a great indicator for why this summer US driving season should be at record levels, absent a Covid step back. On Thurs, we tweeted [LINK] on the visitor statistics for the Great Smoky Mountains National Park (Tennessee/North Carolina) in Jan. Our tweet was "*Positive for #Gasoline #Oil demand. Best indicator pent up demand/cabin fever should see record levels for US summer driving season unless a Covid backtrack. @GreatSmokyNPS saw 525,000 visitors in Jan, another monthly record, levels not normally seen until March. #OOTT".* It not so much that Jan was another record month for visitors, but it was that the Jan visitor numbers are at levels not normally seen until March. We saw this as a great indicator that there is a massive pent up demand for travel this summer and US driving should be the big winner. Especially since international travel will be off the radar for most Americans. Our Supplemental Documents package includes the Jan visitors reporting. [LINK].

G&A costs going up in 2021

Oil & Natural Gas – Oil & gas company G&A people costs to increase in 2021

It won't be material but one of the trends for 2021 will increasing G&A costs for oil and gas companies. Our Feb 28, 2021 Energy Tidbits noted the Weatherford Q4/20 call and mgmt's comment "*On the cost side, we are expecting headwinds next -- this year that our plans must address, including additional costs as we bring back salaries and benefits after the temporary reductions in 2020. Our employees have demonstrated leadership, responsibility and commitment while making personal sacrifices during a challenging period to ensure the financial performance of the company, and it is the right thing to do to normalize base*

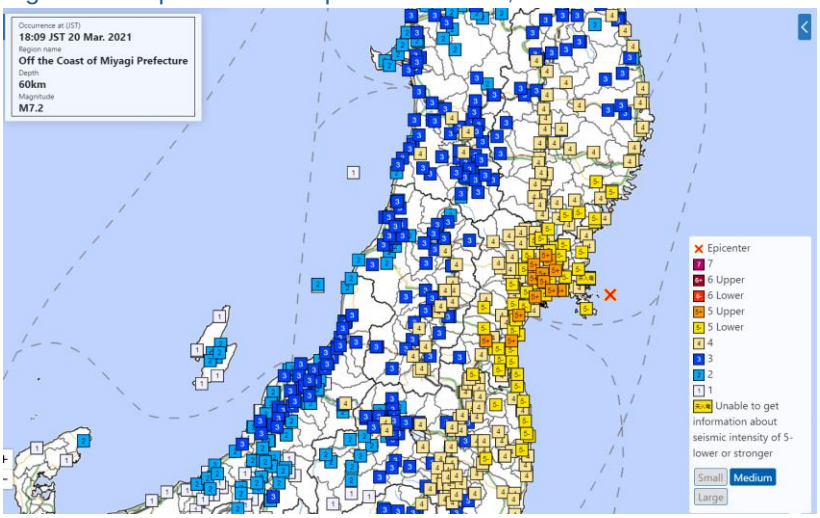
salaries back in line with industry benchmarks". Since then, we have made sure to ask the question to Cdn oil and gas companies if they plan to take a similar approach as Weatherford. We should have ran a survey, but the common view we hear back is that it's been a big relief to oil and gas companies in 2021 to not be worried about survival with solid natural gas and oil prices and, most of all, stock prices are up. And with oil and gas companies feeling better, it sounds like the Weatherford people costs view will be playing out, to the most part, in Canada. Most of all, the strong share price performance in the sector means there shouldn't be big pushback from investors.

Japan 7.2 earthquake

Electricity – Looks like no impact on Onagawa nuclear plant from Japan 7.2 earthquake

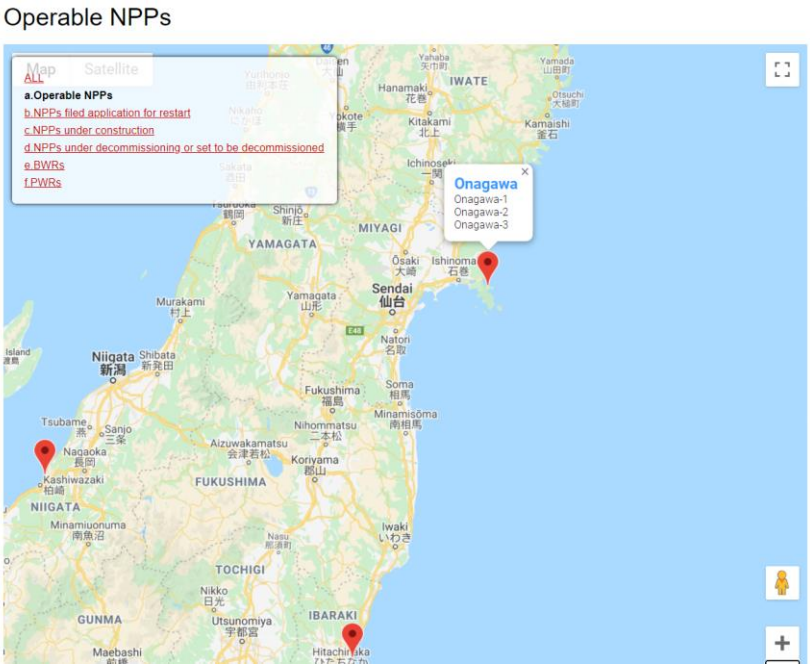
As of our 7am MT news cut off, its been about a day since the big 7.2 earthquake off the coast of Japan and the reports have been that were no irregularities to the very close by Tohoku Electric Power Co's Onagawa nuclear power plant. The plant was shut down as per protocol. Yesterday morning, we tweeted [LINK] on the reports of no problems at Onagawa, but also because we wanted to pass on two excellent Japan links. The first was to the Japan Meteorological Agency interactive earthquake mapping [LINK]. It is much more detailed than the USGS earthquake maps as it shows the strength of the earthquake impact by area. The second is the Japan Atomic Industrial Forum interactive nuclear power plant mapping. [LINK]. The JAIF mapping can layer the plants based on different status ie. only Operable NPPs.

Figure 40: Japan 7.2 earthquake March 20, 2021



Source: Japan Meteorological Agency

Figure 41: Japan Operable NPPs Nearby 7.2 earthquake



Source: JAIF

Energy Transition – Rystad's shows challenge for solar to meet Net Zero

Challenge for solar

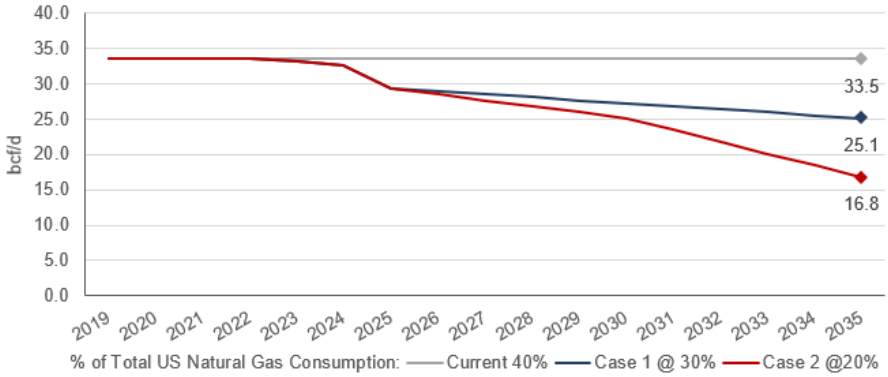
We were a little surprised that Rystad's March 16 blog on solar PV didn't get more attention. Its blog "*To meet its 2050 net-zero target, the US needs to cover land 50 times the size of Austin with solar PV*" [LINK]. The blog is a reality check on the math if the US to be on track for Net Zero. Rystad writes "*As such, to achieve Biden's decarbonization goal and displace all coal-fired plants and large amounts of gas demand, the US would need around 600 gigawatts (GW) of new wind capacity and 1,000 GW of new solar capacity. This could put at risk more than 56 billion cubic feet per day (Bcfd) of future gas demand. The operational utility solar PV capacity in the US as of February 2021, according to Rystad Energy's RenewableCube, is only about 48.8 GW, which covers merely 654 square miles of land."* The other that is normally overlooked in the full cycle costs of wind or solar is that they need to have storage or some sort of backup power to ensure reliability. Rystad wrote "*The intermittent nature of solar and wind will also require an unprecedented roll-out of storage infrastructure. Energy storage plays a key role in balancing the grid, shifting the peak load to ensure a lower cost of electricity for consumers, as well as providing ancillary services when demand rises to unexpected levels, and generally serving as power backup."* The energy transition is going to happen, but the Rystad blog is just another reminder that it will take longer, be bumpy and cost more than expected. Our Supplemental Documents package includes the Rystad blog.

Challenge is even tougher if electricity is to be "carbon pollution-free" by 2035

One of our takeaways from this good Rystad blog was that they are outlining a tough challenge but we think the actual challenge is even tougher. Its why tweeted [LINK] ""*Good @RystadEnergy perspective #RenewableEnergy reality check, need to add 20x existing solar & 5x existing wind capacity to hit #NetZero. Challenge is actually worse, @POTUS target is carbon pollution free electricity by 2035. See SAF July*

28/20 blog ". Biden's plan for electricity generation is actually a 2035 target and not a 2050 target. And its isn't to get rid of most of natural gas generation, its to have all US electricity be carbon pollution free by 2035. We continue to believe this is a game changer for electricity and for natural gas. Its why we posted our SAF Group 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*" [LINK]. In that blog, we noted one of our key concerns Biden's climate change plan is that he still plans to have all US electricity be "carbon pollution-free" by 2035 ie. no natural gas power generation after 2035. We said that we viewed this as an impossible target. The reality check is that fossil fuels currently provide ~60% of total US electricity, which is why we said we think this is impossible. However, we did state our warning that even if he is only 25% or 50% successful, it would be a massive hit to future US natural gas consumption. We didn't' get a chance to go into details on BNN, but our blog noted that electricity currently represents ~40% or ~33.5 bcf/d of total US natural gas consumption. If Biden is 50% successful, it will knock of 16.8 bcf/d or 20% of total US natural gas consumption. If he is 25% successful, it will knock of 8.4 bcf/d or 10% of total US natural gas consumption. If markets see Biden is serious about making this happen, it will very quickly impact the long term value of US natural gas and that some investors will soon look to avoid US natural gas ie. not consider it investible for the mid/long term. Its why we believe Biden's carbon-pollution free electricity plan will be a major negative to US natural gas in the 2020s. There is much more in the 5-page blog. Our Supplemental Documents package includes our July 28, 2020 blog.

Figure 42: Natural Gas Lost Consumption If Biden is 25% or 50% Successful



Source: SAF Group

Energy Transition – Air Canada commits to Net Zero, SAF has to be key to 2030 target

Air Canada's 2030 emissions target

The snowball is rolling down the hill on companies joining the Net Zero commitment. We continue to highlight the big surprise for 2021 will not be the number of companies committing to Net Zero. We have been saying it will accelerating in the coming months well ahead of COP-26 Glasgow in Nov. Rather the big surprise (and we believe shock) will be once people understand committing to Net Zero means setting specific interim targets to 2030 to make sure the company is on track for Net Zero by 2050. This will no longer be a general commit to Paris by 2050. And if there are interim targets to 2030, it means that these companies have to start now because they are also committing to annual or regular reporting on their progress to 2030. A great example was Monday morning, when "*Air Canada Commits to Ambitious Net Zero Emissions Goal by 2050*" [LINK] that had the very first point

"*2030 absolute targets of 20 per cent GHG net reductions from flights plus 30 per cent GHG net reductions from ground operations compared to 2019 baseline".* This is the point, Air Canada is committing to this reduction by 2030 to be on track for 2050. And this is 20% net reduction from flights, not on an overall corporate basis. So how do they reduce emissions from the flights? Process of elimination tells us this is bullish for sustainable aviation fuels (SAF). A substantial part of the fleet being hydrogen or being electric plans by 2030 doesn't seem likely. There will be getting rid of older planes for more fuel efficient planes. But doesn't this really leave them with one key option – blending SAF with conventional jet fuel? Air Canada noted an "*Investment of $50 Million in SAF and carbon reductions and removal*". Our Supplemental Documents package includes the Air Canada announcement.

Sustainable aviation fuel

Energy Transition – NREL: Progress on sustainable aviation fuel from wet waste

It must have been a sustainable aviation fuel day on Monday because later, the National Renewable Energy Laboratory issued a release "*From Wet Waste to Flight: Scientists Announce Fast-Track Solution for Net-Zero-Carbon Sustainable Aviation Fuel. A Novel Pathway for "Drop-In" Sustainable Aviation Fuel May Lift Net-Zero Flights Off the Runway Sooner Than You Think".* [LINK] We had just sent out our internal comment on the Air Canada announcement and thought this tied in to those views. So we tweeted [LINK] "*1/2. A must have #NetZero breakthrough to have any real impact to reduce plane emissions by 2030 will be Sustainable Aviation Fuel to blend w/ conventional jet fuel. @NREL notes advancements are being made."* As noted above, its hard to see what else can make a significant impact on lowering the emissions from commercial air flights by 2030 but blending SAF with conventional jet fuel. NREL release is about "*Fueling aircraft with sustainable aviation fuel made from wet waste—such as food waste, wastewater sludge, and animal manure"*. And that ""*If our refining pathway is scaled up, it could take as little as a year or two for airlines like Southwest to get the fuel regulatory approvals they need to start using wet waste SAF in commercial flights," said NREL scientist Derek Vardon, the corresponding author of the paper. "That means net-zero-carbon flights are on the horizon earlier than some might have thought." Identical to Fossil Jet Fuel, But With a Negative-Carbon Twist".* The NREL notes that this is not the silver bullet, which infers to us they know its isn't cost effective. But the point is that the Air Canada's of the world will use this higher cost SAF to blend with regular jet fuel. They just will pass the cost on as some sort fuel surcharge. Just like they do when ol prices spike up. Our Supplemental Documents package includes the NREL release.

Sustainable aviation fuel is another item predicted in Back to the Future II

Last week's (March 14, 2021) Energy Tidbits included the below picture under a misc items "waiting for a supermajor oil co's next renewable investment to be Mr. Fusion" saying it is what we think about whenever we hear a supermajor investing in renewable natural gas. It just so happens the picture was even more appropriate for the NREL announcement. That's why our part 2 tweet to the NREL announcement [LINK] was "*2/2. Reminds of 1989 when waste food to jet fuel first got on screens. Doc Brown showed it could be done with Mr. Fusion in Back to the Future II".*

Figure 43: Back to the Future II (1989) Mr. Fusion Powering Flux Capacitor

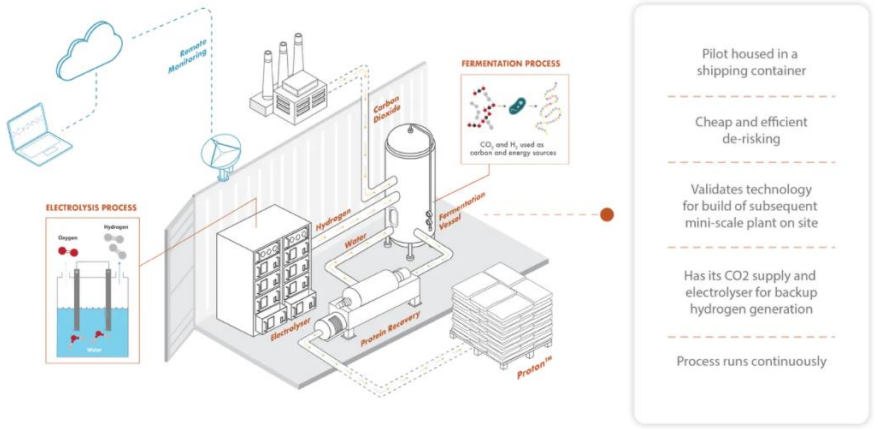
Source: The Green Head

Deep Branch converts waste CO2 into protein

Energy Transition – Total backs start up recycling CO2 into proteins for animal feed

This week, Deep Branch announced the completion of an 8mm euro financing round, partially funded by Total [LINK] providing the capital needed to complete their pilot-scale hub for the conversion of carbon dioxide to protein, called Proton, which can be used in various animal feeds. Bloomberg covered this release and wrote *"The company uses a fermentation process similar to winemaking or pickling, except that microbes feed on CO_2 and hydrogen instead of sugars. The result is a 70% protein product called Proton that can replace conventional livestock feed such as fishmeal and soybeans".* Deep Branch has stated that Proton offers a 90% saving on carbon footprint vs traditional agriculture methods which would include emissions related to livestock, avoiding further deforestation, and the fuels needed to manufacture fertilizer.

Figure 44: Proton Manufacturing Process



Source: Deep Branch

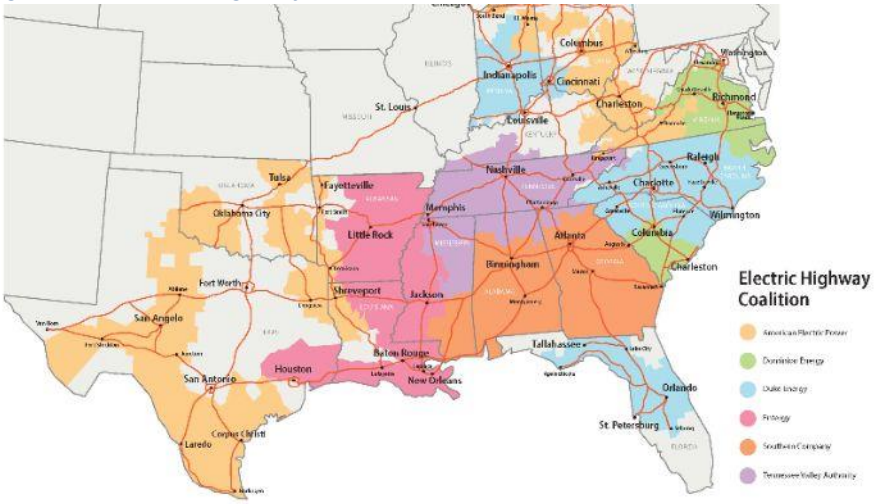
Major EV charging infra buildout

Energy Transition – 6 US utilities planning extensive EV fast charge network

There is no question that utilities are seeing the increasing momentum to EVs and are jumping on board to make sure they are being positioned to share in the growth. American

Electric Power announced on Tuesday that it, along with the 5 other major utilities forming the Electric Highway Coalition, plans to create a network of charging stations across major highway systems in the United States [LINK]. One of the major limiting factors to EV adoption has been concerns on range, especially in extreme warm/cold temps, so an extensive network of fast charge stations would help to alleviate some of this concern. They plan to provide fast chargers capable of re-charging vehicles in approximately 20-30 minutes. This is a good reminder that with longer stop times vs filling a gas tank, service stations will be adding more in their shops with the captive EV driver there for 20-30 mins.

Figure 45: Electric Highway Coalition



Source: American Electric Power

Energy Transition – Bill Gates Reddit comments on range of energy transition items

Bill Gates on Reddit

Bill Gates has a Reddit session on Friday [LINK] that included his views (some new) on a range of energy transition and climate change items. (i) Niche technologies to fight climate change. Gates "*We need a lot of technologies - synthetic meat, energy storage, new ways of making building materials...We want to be open to ideas that seem wild. Fusion might come along but we can't count on* it." (ii) Seawater desalination. Gates "*The problem is that it is expensive to desalinate it and move it to where it is needed. This is all about the cost of energy. The cost is prohibitive for agricultural use of water."* (iii) Advice to Winnipegger on what can be done locally. Gates "*Electric buses are becoming economic. There has been an issue with cold and hot temperatures but that is being solved as the demand scales up. Cities are often involved in electricity generation so they can help drive demand for clean generation."* (iv) On engineering and carbon offsets. Gates "*Direct Air Capture will be important for things we can't solve directly. Today the cost is over $600 per ton. I think it can come down to $100 with companies like Carbon Engineering as they scale up over the next decade. We don't know if we can get it cheaper than that. Companies that are buying offsets are fantastic. We need to work on rating different offset on how impactful they are. I even am putting together something called Catalyst which will direct offset money from companies to getting green products to be less expensive. Geoengineering should be explored but only as a backup."* (v) Reminds of cow methane problem. Gates "*If the cost of making synthetic meat comes down it might be competitive even without considering climate or animal welfare. There are 2 approaches - one is growing the meat in the lab (cells), the other is using plant material to make the meat. Right now the plant approach used by Beyond and Impossible is*

cheaper. I hope we can reduce emissions from cattle also since a lot of people depend on the value of their livestock. There is some research on this." (vi) singles out the oil companies on their past climate disinformation. Gates "*The damage in the past was huge. Now the oil companies have stopped funding these things so I think climate denial will go down. There are issues about how we go about reducing emissions but I hope all young people agree that is a critical goal*." (vii) On his personal footprint, Gates "*on the personal front, I am doing a lot more. I am driving electric cars. I have solar panels at my house. I eat synthetic, meat (some of the time). I buy green aviation fuel. I pay for direct air capture by Climeworks. I help finance electric heat pumps in low cost housing to replace natural gas. I plan to fly a lot less now that the pandemic has shown we can get by with less trips."* (viii) There were a few other items. Our Supplemental Documents package includes the Bill Gates replies on climate change, energy transition and his added income/inheritance tax comments.

Energy Transition – IMF, another capital allocator adding climate change to its criteria

IMF adding climate change

Yesterday, the IMF spoke at the China Development Forum [LINK]. (i) The headline from the speech will be that their Jan forecast for global GDP growth of 5.5% in 2021 is low and they plan to increase in their upcoming April World Economic Outlook. The IMF said "*In January, we projected 2021 global growth at 5.5 percent, but prospects of a stronger recovery are emerging – because of additional fiscal stimulus, especially in the U.S., and the prospects of broader vaccination. We will update our global forecasts in the new World Economic Outlook coming out in early April."* (ii) The IMF doesn't come out and say it directly, but we believe one of the big global themes in 2021 will be increased pressure on western economies to give more money for developing economies. And that the rationale will be to help recover as these developing countries are harder hit by Covid. The IMF notes how there has been this divergence in economic impact under Covid and says "*Third, we must mitigate divergence across countries. This includes providing access to liquidity for developing economies and preventing climate change from hampering their economic growth and convergence."* (iii) Perhaps the most significant disclosure in the speech is that the IMF will be another capital provider that will using climate change in their capital allocation. The IMF said *"Lastly, we are incorporating climate change into our country and financial risk assessments, while scaling up capacity development".* Our Supplemental Documents package includes the IMF speech.

ESG – Former BlackRock CIO Sustainable Investing says govt needs to step in

More role for govts in climate change

There was another good example of how you get a very different takeaway by reading the source document versus the reporting on a document. In this case, it was CNBC Closing Bell, who interviewed Tariq Fancy, former BlackRock CIO of sustainable investing, on his op-ed. We missed the interview, but saw the replay [LINK]. CNBC tweeted on the interview [LINK] ""*ESG is not as good for investing processes as people claim," says former BlackRock CIO of Sustainable Investing Tariq Fancy. "The reality is it doesn't pay that much to be responsible ...and none of it has any real social impact*." There is no question the tweet picks up some of Fancy's comments. We went to the op-ed and didn't think the tweet did justice to his conclusion on ESG and how it would be a mistake to leave it to investors and companies with their climate statements. He concludes his op-ed ""*When I left the industry in late 2019, due to family business obligations following the passing of my father-in-law, I was frustrated by the lack of any real change. But I took some comfort in believing that if we weren't doing as much as we could, at least we weren't doing any harm. Since my departure, I have had a lot of time to think about this issue, and I've reassessed my opinion. I believe we are doing irreversible harm by stalling and greenwashing. And all in the name of profits. We're running out of time and need to accept the truth: To fix our system and curb a growing disaster, we need government to fix the rules*." We have been watching and are surprised that we haven't

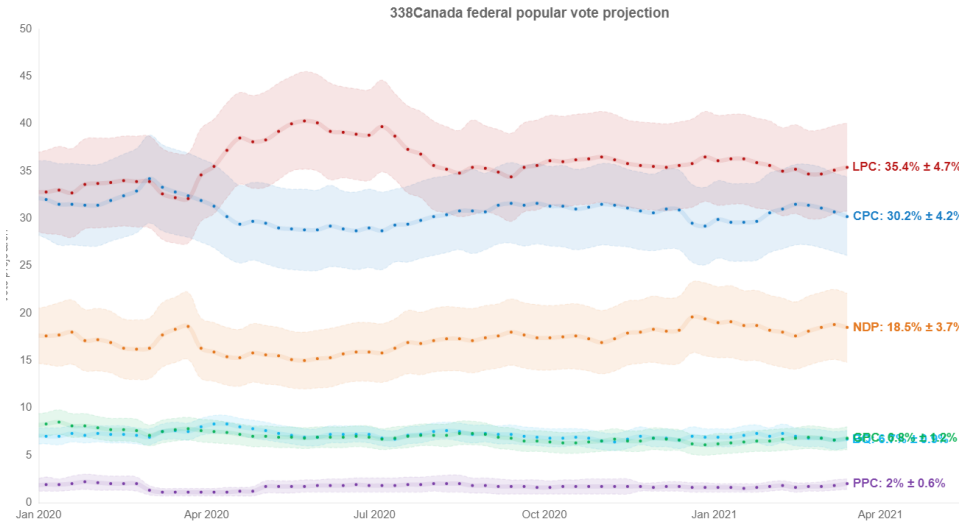
seen the Liberals in Canada or Democrats in the US jump on this view yet. We have a broad readership of our Energy Tidbits and perhaps we will see it picked up more? Our Supplemental Documents package includes the Fancy op-ed.

Climate Change – Conservative Party votes down adding climate change to policy book

Conservative Party on climate change

I hope my many conservative party friends in Canada realize that i am not jumping to conclusions but I have to wonder if yesterday's Conservative Party convention decisions ends up being the difference between a Liberal majority vs minority in the next election, which is widely expected to be coming this year. The National Post reported [LINK] and all other Cdn media on leader Erin O'Toole's keynote speech Friday included "we cannot ignore the reality of climate change" "the debate is over". The National Post reported "*But the next day, it was announced that the 3,100 voting delegates at the convention had narrowly rejected a resolution to add language into the party's policy book saying that: "We recognize that climate change is real. The Conservative Party is willing to act*." No surprise social media is all over this and portraying the party as dinosaurs on climate change. The Conservatives had inched up in 2020 with the Liberals poor handling of Covid. But they didn't break thru. The challenge for the Conservatives is to break thru and take votes away from the Liberals, NDP, Bloc or Green. Its hard to see this as being a tool to do so and the concern is that it loses some of the centre/right side of the Conservatives not necessarily to vote for the other parties, but to stay home in the next election. I just wonder if this creates an increasing chance for a Liberal majority. Below is the 338Canada federal popular vote projection as of March 14. [LINK]

Figure 46: 338 Canada federal popular vote projection, last update March 14, 2021



Source: 338Canada

Capital Markets – Bill Gates supports marginal tax rates of up to 50%

Bill Gates supports higher taxes

One of the headlines from the Bill Gates Reddit Q&A Friday [LINK] was his views on taxes. Thre isn't any surprise here from some of his prior comments on tax. He is in favor of higher taxes, but to a limit. Here is the Q&A exchange. "*Hi Bill, What do you think is a reasonable percentage tax rate for the extremely-wealthy to pay? Either on their income, gains, or total wealth. Thisisbillgates 5 hours ago·edited 5 hours ago I have pushed for the Estate tax to be higher. I think it is an effective tool for revenue and avoiding dynastic wealth. I have a piece*

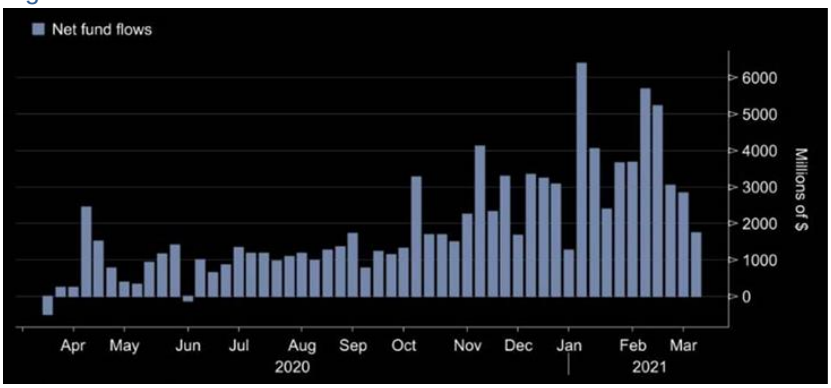
on Gates Notes that talks about more progressive taxation. You can tax income up to 50% but once you get much above that you have to worry that people waste a lot of time getting around the taxes. Each country has to consider what works for them. I only know the US system and it can be somewhat more progressive. Gates basic tax concept is "*That's why I'm for a tax system in which, if you have more money, you pay a higher percentage in taxes*". Our Supplemental Documents package includes his view on higher taxes from Dec 30, 2019 "What I'm thinking about this New Year's Eve". [LINK]

Capital Markets – ESG ETFs Inflows -38% last week

Investments in ESG ETFs -38% last week

Investments in ESG ETFs were down in the week ended March 12. Net inflows totaled $1.75B in the week ended March 12, compared to inflows of $2.83B the prior week. This was the smallest inflow since the week of Jan 1, which had an inflow of $1.27B. IShares ESG Aware MSCI USA had the biggest inflow of this past year, of $8.24B. AUM for 541 ESG ETFs totaled $275.1B.

Figure 47: ESG ETF Flows Over the Past Year



Source: Bloomberg

Capital Markets – Real estate & investments are 79% of US net wealth

Real estate & investments 79% of net wealth

Based on the reports, it looks like Elizabeth Warren's Ultra Millionaires Wealth tax won't be part of Biden's expected tax increases on corporate and high income earners. When this was being pushed in early March, we included a recap of her plan in the March 7, 2021 Energy Tidbits and had a number of people believe her plan couldn't be implemented because it would be impossible to value all assets with more than $50,000 value. The Warren proposal is for all assets included in the calculation including personal property with a value of >$50,000. Our response was that we don't disagree with the challenge to get to 100% valuation, but reminded that the vast majority of wealth is in already measured valuations including real estate, bank accounts and investment accounts. So maybe its hard to value 100% of a person's wealth, but it would be easy to value 75% or so. Last week, the Federal Reserve posted its "*Financial Accounts of the United States"* for Q4/20. [LINK] Table "*B.1 Derivation of U.S. Net Wealth*" splits net wealth into various categories. The Fed estimates US net wealth at Dec 31/2020 at $114,291.1b including Real Estate $35,789.2b and Market value of domestic corporations at $53,989.5b. These two categories are 79% of total net wealth. All it means is that it would be relatively easy for a wealth tax to be calculated on ~79% of Americans net wealth. Our Supplemental Documents package includes Table B.1.

Capital Markets – Goldman investment banking analysts reported survey

Goldman investment banking analyst survey

I feel like i have to state my bias as a former co-head of an investment banking group. Anyone who has ever worked in the investment dealer business and has known people at Goldman was likely shocked to see the apparently real "*Investment Banking Division. Working Conditions Survey. Goldman Sachs & Co. LLC. February 2021",* which is reportedly a survey of first-year investment banking analysts, 13 respondents. [LINK] Apparently, it is real and Goldman says they are listening to their concerns and taking multiple steps to address them. Bloomberg reported "*"We recognize that our people are very busy, because business is strong and volumes are at historic levels," said Nicole Sharp, a spokeswoman for Goldman Sachs. "A year into Covid, people are understandably quite stretched, and that's why we are listening to their concerns and taking multiple steps to address them."* The headline concerns were that they work 98 hours a week, on average, since Jan. That didn't necessarily surprise as I would have expected perhaps slightly lower ie. 90 hours a week, after all this is Goldman. What is interesting to investment bankers is the 13 analyst's situation recommendations. Anyone who has been an investment banker is chuckling at some of their recommendations such as no changes to a client deal pitch within 12 horus of the meeting, don't schedule a client deal pitch unless at least 1 week to do the pitch, etc. Regardless, its good reading. I would be curious to how many analysts did not participate in the survey. It is important to remember that Goldman is considered the best and that the work is harder at the top investment dealers than at the less successful investment dealers. It's the people and the effort. Wouldn't it be amazing if these 13 analysts changed the culture of Goldman and, if so, what that will do to Goldman's status over time. Their success wouldn't change over night, but its just math. Lesser effort means a lesser product/performance over time. Our Supplemental Documents package includes excerpts from the reported survey.

Must watch is Jim Cramer (former Goldman) on the survey

If you didn't see it, its worth taking a look at the video clip that is included in this story. [LINK] The story notes some of his comments but one that is true is "*Give me a break!" Cramer continued. "You go to Goldman Sachs because of the deal you make! You can make the money and then you can go do something great! "* There is much more and worth a viewing.

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

@Energy_Tidbits on Twitter

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

LinkedIn – Look for quick energy items from me on LinkedIn

Look for energy items on LinkedIn

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

Misc Facts and Figures.

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

BNN Bloomberg's new western bureau chief, Tara Weber

One of the daily shows we try not to miss is BNN Bloomberg's Commodities with Andy Bell. The challenge is that its during the peak of work day, which means we are generally only half listening until we hear a subject of interest and then pay attention. That half listening is why we missed a recent BNN Bloomberg promotion and why we tweeted [LINK] "*congrats @TaraNWeber didn't realize you were now BNNBloomberg western bureau chief until i heard @AndrewBellBNN introduce you earlier. keep up the great work reporting on the west. we need to make sure western issues aren't overlooked."* Tara does a great job reporting on the oil patch issues/news and also on western Canada items. And the reality is that the oil and gas sector needs to make sure people across Canada at least hear about the sector.

U2's Sunday Bloody Sunday was released 38 years ago today

Anyone who has seen a U2 concert has seen a great show, but the song that stood out the most from the famous 2001 North American Elevation Tour was Sunday Bloody Sunday. Probably their most political song, and it seems like the song sung with the most passion. Sunday Bloody Sunday was released on March 21, 1983, 38 years ago. We don't know about concerts over the last several years, but Sunday Bloody Sunday was one of the few songs that was pretty well every U2 concert for at least 30 years. Its not fair to look back at haircuts from the 80's, but if for those who have never seen the Edge in anything but a wearing a beanie, check out their Sunday Bloody Sunday performance at Live Aid 1985 (held on July 13, 1985) [LINK] If you ever want to see the best world's best bands/singers and the top hits from that era, just YouTube Live Aid 1985. It was an amazing event with 16 hours of the best musicians in simultaneous concerts from Wembley Stadium in London and JFK Stadium in Philadelphia to raise money for the famine disaster in Ethiopia.

Energy transition drives big increase in catalytic converter thefts from vehicles

The energy transition is also driving a new focus for thieves. We always see reports in foreign countries on items like stealing copper wire for the value of the copper. But the energy transition is driving a new pickup – taking catalytic converters from vehicles for the precious metals like rhodium, palladium and platinum. We had noted this until Thurs, when BNN Bloomberg Commodities ran a short CTV new report of catalytic converter thefts from a small bus out east. Just google catalytic converter theft and there are so many stories. Again all for the precious metals. Its not just in Canada, it's a huge issue in the US. For background, the New York Times had a good background Feb 9, 2021 piece "Thieves Nationwide Are Slithering Under Cars, Swiping Catalytic Converters". Our Supplemental Documents package includes the New York Times report. [LINK]

No overseas spectators at Tokyo Olympics

Its hard to believe the Tokyo Olympics are now 4 months away, starting on Friday July 23 and ending on Sunday Aug 8. There has never been this low a media or athlete focus this close to an Olympics. On Saturday, the organizers announced that there will not be any overseas spectators due to Covid concerns. Other baby boomers will likely remember the Tokyo 1964 Olympics because it was the first overseas Olympics broadcast back to the US and Canada. The other reason I remember is that there was huge interest in the Agincourt area (very NE part of Toronto) because of Bill Crothers, who lived ½ mile away and won the silver medal in the 800 metre.