

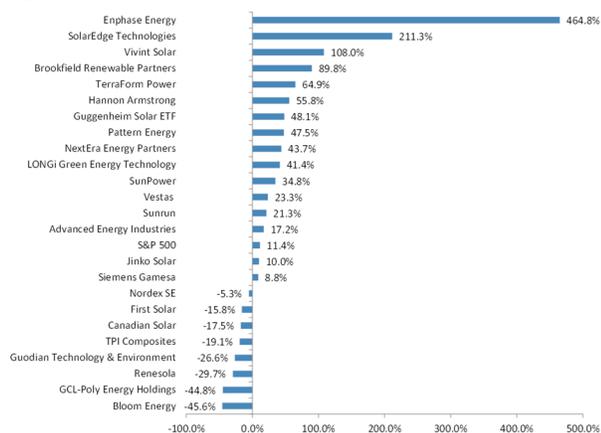
## Alt Energy

### Alt Energy Stocks Might be Last In but First Out of the COVID-19 Bear Market

As recently as March 9<sup>th</sup>, wind and solar stocks were outperforming the S&P500 massively on a YTD basis, but the oil shock and COVID-19 caught up with the space, which has since underperformed dramatically in just one week of trading. Last into the bear market, we can see justification for Alt Energy stocks to be first out once COVID-19 peaks because a) supply-chains and production have already largely recovered, b) most utility-scale projects have long lead-times that should buoy demand through a one-quarter recession, and c) falling wind and solar unit costs should continue to buoy medium-to-long-term demand for renewables with or without policy support. Our Top Picks remain First Solar (FSLR), Solar Edge (SEDG), Sunnova (NOVA) and SunRun (RUN), all Overweight Rated (see [Exiting the Print note](#)):

- **What happened to the solar safe haven?** On March 9<sup>th</sup>, we noted the strong YTD outperformance of the Solar stocks (see [note](#)), since which time the raging bear market has claimed this 'safe haven' as a victim, spurred on by the oil shock that coincided with our note.

Figure 1: From First: YTD Stock Performance as of March 3rd

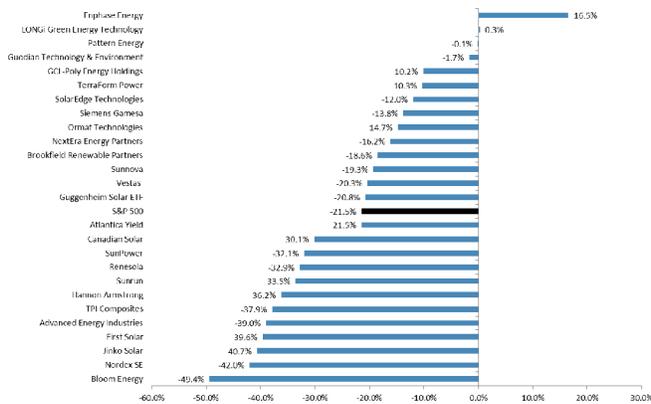


Source: Bloomberg, J.P.Morgan

- **What a difference a week makes.** Whereas on March 9<sup>th</sup> our Alt Energy coverage stocks were up an average of 25% YTD (S&P down 8%), they have since slumped dramatically and are down an average of 28% YTD (S&P500 down 21.5% at mid-day 03/17) a swing of 53 percentage points in just one week (versus 13.5 pct pts swing in the S&P500). Since analysts haven't even had time to adjust estimates, the sector has clearly re-rated and investors have priced in a precipitous and prolonged slump, evidence for which is thin on the ground, in our view.

Figure 2: To Worst: YTD Stock Performance as of March 17<sup>th</sup>.

% YTD Return



Source: Bloomberg, J.P.Morgan. Stocks under coverage include: ENPH, TERP, SEDG, ORA, NOVA, CSIQ, SPWR, RUN, HASI, TPIC, FSLR, BE

- Oil-Shock sell-off is a knee-jerk reaction.** The oil shock as most proximate cause of the sell-off doesn't make a lot of sense to us. Oil is a major input into the transportation and industrials sectors, but accounts for less than 5% of global power sector capacity, only competing head-to-head with wind and solar in some unique locations (e.g. island nations).
- COVID-19 is of course the other cause of the sell-off,** but to-date neither wind nor solar (generally long lead-time activity, not labor intensive, diverse end-markets) have been much impacted in terms of supply or demand, and most CEOs seem cautiously optimistic providing global T&L infrastructure remains operational. We also note that demand for wind and solar growth is largely fueled by falling unit costs that put renewables increasingly in-the-money versus gas and coal in the power sector, so we expect demand to hold up over the longer-term even if policy support is withdrawn as a result of a recessionary environment. That said, wind and solar investment activity will likely inevitably take a hit if COVID-19 spurs a recession. The renewables sector is capital-hungry, so a capital markets hiatus will likely stifle some development activity, and expose over-leveraged developers (a mild re-run of the 2015-2016 SunEdison failure will probably arise in some corner of the downstream renewables space). Social-distancing will likely slow sales and some installation activity in the distributed solar space, where the industry comes into contact with end-customers. Capital rationing could weigh on some C&I investment activity (but not stop current projects we believe), and lower aggregate demand-load in a slow economy could weigh on utilities investment in infrastructure. But the solar and wind industry have so much near-term inertia from long-cycle projects that we think it will be several months before end-market demand slows, at which point we may be in a post-COVID recovery world. Last in first out may be a credible outcome for the Alt Energy stocks, in our view.
- Upstream Solar Recovers from China Production Hiatus** BNEF trimmed 2020 global PV Solar demand by ~8% to 125GW at the mid-point, which implies y/y shipment growth of about 10% but a potential 5% y/y decline at the low-end of the range of expectations (104-143GWs). Though BNEF sees limited impact on the supply-chain or from recently-restored panel operations (in China), analysts anticipate about 10GWs negative demand-impact (relative to prior expectations) from China's decision to push out auction activity and project commissioning deadlines, and for a global GDP slowdown to weigh on demand in other regions of the world. Tier 1 supply seems to have returned to normal, confirmed by Jinko and Canadian Solar, and mono manufacturers are less likely to be impacted by the slow down than multi suppliers, which informs J.P.Morgan analyst, Alan Hon's, positive view on Daqo (DQ/OW); see Alan's [03/16 note](#).
- Utility-Scale Solar is Long-Cycle Business in Remote Locations.** Utility-scale solar, typically deployed in remote locations, has long deployment cycles and is unlikely to be much impacted by COVID-19 from a labor perspective. Jinko (JKS/NR) stated that COVID-19 had no material impact on operations, 400-500MW of panel production slipped from 1Q to 2Q, and the firm reiterated 2020 shipment guidance and capacity expansion plans. Canadian Solar (CSIQ/N) has also seen a quick recovery in operations, and demand conditions vary by region; the company will provide guidance next week.
- DG Solar is Socially Awkward.** Distributed solar is a short-cycle business and both door-to-door sales and installation activity could be negatively impacted by social distancing. That said, both Sunnova and SunRun

([CEO Spotlight Call](#)) are introducing workforce practices to mitigate the impact of COVID-19, and it seems like business as usual for now. Indeed, it's even possible that the virus is feeding homeowner interest in energy resilience and independence; RUN expects to double storage deployments y/y and attach-rates are over 60% in California, and NOVA sees ~100% attach-rates in Hawaii and the overall attach-rate was 24% in 4Q19. There is however a probable slowdown in sales activity ahead (NOVA seems slightly better positioned for this owing to its deal network), and some risk to funding growth if the capital markets are closed for a lengthy period. There's also growing credit risk in the event that the economy slows. We believe the disruption to DG solar deployments will be short-lived, demand should remain robust even in a recession (customers save money) and we remain constructive; NOVA and RUN are both rated Overweight.

- **Wind Spurred on by Year-End Deadlines.** BNEF still expects a record year for the wind industry but sees downside risk to the 75.4GW forecast for 2020, largely owing to the impact of COVID-19 on Chinese suppliers. The rush remains on to beat the PTC deadline in the U.S. and the subsidy deadline in China (reaffirmed on March 10th), so there is no evidence of a demand problem so far. TPIC, the leading independent supplier of blade manufacturing services, sees no impact from COVID on demand though logistics are starting to impact shipping activity at ports. At this time wind deployment activity is only modestly impacted by COVID-19. With a longer term perspective, an economic slowdown and tighter capital markets could weigh on medium-term growth.

---

#### **IT Hardware, Alternative Energy**

**Paul Coster, CFA** <sup>AC</sup>

(1-212) 622-6425

paul.coster@jpmorgan.com

**Bloomberg** JPMA COSTER <GO>

**Mark Strouse, CFA**

(1-212) 622-8244

mark.w.strouse@jpmorgan.com

**Paul J Chung**

(1-212) 622-5552

paul.j.chung@jpmorgan.com

J.P. Morgan Securities LLC

---

[www.jpmorganmarkets.com](http://www.jpmorganmarkets.com)

## Companies Discussed in This Report (all prices in this report as of market close on 16 March 2020)

Bloom Energy (BE/\$5.31/Overweight), Canadian Solar (CSIQ/\$13.24/Neutral), First Solar, Inc (FSLR/\$31.54/Overweight), Hannon Armstrong (HASI/\$19.71/Overweight), Ormat Technologies (ORA/\$59.76/Neutral), SolarEdge Technologies (SEDG/\$81.19/Overweight), SunPower Corporation (SPWR/\$4.49/Neutral), Sunnova (NOVA/\$9.02/Overweight), Sunrun Inc. (RUN/\$9.49/Overweight), TPI Composites (TPIC/\$11.26/Neutral), TerraForm Power, Inc. (TERP/\$12.01/Neutral)

**Analyst Certification:** The research analyst(s) denoted by an “AC” on the cover of this report certifies (or, where multiple research analysts are primarily responsible for this report, the research analyst denoted by an “AC” on the cover or within the document individually certifies, with respect to each security or issuer that the research analyst covers in this research) that: (1) all of the views expressed in this report accurately reflect the research analyst’s personal views about any and all of the subject securities or issuers; and (2) no part of any of the research analyst’s compensation was, is, or will be directly or indirectly related to the specific recommendations or views expressed by the research analyst(s) in this report. For all Korea-based research analysts listed on the front cover, if applicable, they also certify, as per KOFIA requirements, that their analysis was made in good faith and that the views reflect their own opinion, without undue influence or intervention.

All authors named within this report are research analysts unless otherwise specified. In Europe, Sector Specialists may be shown on this report as contacts but are not authors of the report or part of the Research Department.

J.P. Morgan does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

## Important Disclosures

---

**Company-Specific Disclosures:** Important disclosures, including price charts and credit opinion history tables, are available for compendium reports and all J.P. Morgan–covered companies by visiting <https://www.jpmm.com/research/disclosures>, calling 1-800-477-0406, or e-mailing [research.disclosure.inquiries@jpmorgan.com](mailto:research.disclosure.inquiries@jpmorgan.com) with your request. J.P. Morgan’s Strategy, Technical, and Quantitative Research teams may screen companies not covered by J.P. Morgan. For important disclosures for these companies, please call 1-800-477-0406 or e-mail [research.disclosure.inquiries@jpmorgan.com](mailto:research.disclosure.inquiries@jpmorgan.com).

### Explanation of Equity Research Ratings, Designations and Analyst(s) Coverage Universe:

J.P. Morgan uses the following rating system: Overweight [Over the next six to twelve months, we expect this stock will outperform the average total return of the stocks in the analyst’s (or the analyst’s team’s) coverage universe.] Neutral [Over the next six to twelve months, we expect this stock will perform in line with the average total return of the stocks in the analyst’s (or the analyst’s team’s) coverage universe.] Underweight [Over the next six to twelve months, we expect this stock will underperform the average total return of the stocks in the analyst’s (or the analyst’s team’s) coverage universe.] Not Rated (NR): J.P. Morgan has removed the rating and, if applicable, the price target, for this stock because of either a lack of a sufficient fundamental basis or for legal, regulatory or policy reasons. The previous rating and, if applicable, the price target, no longer should be relied upon. An NR designation is not a recommendation or a rating. In our Asia (ex-Australia and ex-India) and U.K. small- and mid-cap equity research, each stock’s expected total return is compared to the expected total return of a benchmark country market index, not to those analysts’ coverage universe. If it does not appear in the Important Disclosures section of this report, the certifying analyst’s coverage universe can be found on J.P. Morgan’s research website, [www.jpmm.com](http://www.jpmm.com).

**Coverage Universe: Coster, Paul:** 3D Systems Corporation (DDD), Bloom Energy (BE), CDW (CDW), CalAmp Corp (CAMP), Cambium Networks (CMBM), Cognex (CGNX), Cree (CREE), Dell Technologies (DELL), Diebold Nixdorf Inc (DBD), First Solar, Inc (FSLR), Flex Ltd (FLEX), GoPro, Inc. (GPRO), HP Inc (HPQ), Hewlett Packard Enterprise (HPE), Insight (NSIT), Jabil Inc (JBL), Motorola Solutions Inc (MSI), NCR Corporation (NCR), NICE Ltd (NICE), NetApp, Inc. (NTAP), Ormat Technologies (ORA), Plexus (PLXS), Poly (PLT), Strataysys, Ltd. (SSYS), Sunnova (NOVA), TPI Composites (TPIC), TTM Technologies (TTMI), Verint Systems, Inc. (VRNT), Vivint Smart Home (VVNT), Xerox Holdings Corp (XRX), Zebra Technologies (ZBRA)

### J.P. Morgan Equity Research Ratings Distribution, as of January 02, 2020

	Overweight (buy)	Neutral (hold)	Underweight (sell)
J.P. Morgan Global Equity Research Coverage	45%	41%	15%
IB clients*	51%	47%	39%
JPMS Equity Research Coverage	43%	42%	14%
IB clients*	75%	64%	56%

\*Percentage of subject companies within each of the "buy," "hold" and "sell" categories for which J.P. Morgan has provided investment banking services within the previous 12 months. Please note that the percentages might not add to 100% because of rounding.

For purposes only of FINRA ratings distribution rules, our Overweight rating falls into a buy rating category; our Neutral rating falls into a hold rating category; and our Underweight rating falls into a sell rating category. Please note that stocks with an NR designation are not included in the table above. This information is current as of the end of the most recent calendar quarter.

**Equity Valuation and Risks:** For valuation methodology and risks associated with covered companies or price targets for covered companies, please see the most recent company-specific research report at <http://www.jpmm.com>, contact the primary analyst or your J.P. Morgan representative, or email [research.disclosure.inquiries@jpmorgan.com](mailto:research.disclosure.inquiries@jpmorgan.com). For material information about the proprietary

models used, please see the Summary of Financials in company-specific research reports and the Company Tearsheets, which are available to download on the company pages of our client website, <http://www.jpmorganmarkets.com>. This report also sets out within it the material underlying assumptions used.

**Analysts' Compensation:** The research analysts responsible for the preparation of this report receive compensation based upon various factors, including the quality and accuracy of research, client feedback, competitive factors, and overall firm revenues.

## Other Disclosures

---

J.P. Morgan is a marketing name for investment banking businesses of JPMorgan Chase & Co. and its subsidiaries and affiliates worldwide.

All research reports made available to clients are simultaneously available on our client website, J.P. Morgan Markets. Not all research content is redistributed, e-mailed or made available to third-party aggregators. For all research reports available on a particular stock, please contact your sales representative.

Any data discrepancies in this report could be the result of different calculations and/or adjustments.

Any long form nomenclature for references to China; Hong Kong; Taiwan; and Macau within this research report are Mainland China; Hong Kong SAR, China; Taiwan, China; Macau SAR, China.

**Options and Futures related research:** If the information contained herein regards options or futures related research, such information is available only to persons who have received the proper options or futures risk disclosure documents. Please contact your J.P. Morgan Representative or visit <https://www.theocc.com/components/docs/riskstoc.pdf> for a copy of the Option Clearing Corporation's Characteristics and Risks of Standardized Options or [http://www.finra.org/sites/default/files/Security\\_Futures\\_Risk\\_Disclosure\\_Statement\\_2018.pdf](http://www.finra.org/sites/default/files/Security_Futures_Risk_Disclosure_Statement_2018.pdf) for a copy of the Security Futures Risk Disclosure Statement.

**Private Bank Clients:** Where you are receiving research as a client of the private banking businesses offered by JPMorgan Chase & Co. and its subsidiaries ("J.P. Morgan Private Bank"), research is provided to you by J.P. Morgan Private Bank and not by any other division of J.P. Morgan, including but not limited to the J.P. Morgan corporate and investment bank and its research division.

**Legal entity responsible for the production of research:** The legal entity identified below the name of the Reg AC research analyst who authored this report is the legal entity responsible for the production of this research. Where multiple Reg AC research analysts authored this report with different legal entities identified below their names, these legal entities are jointly responsible for the production of this research.

### Legal Entities Disclosures

**U.S.:** JPMS is a member of NYSE, FINRA, SIPC and the NFA. JPMorgan Chase Bank, N.A. is a member of FDIC. **Canada:** J.P. Morgan Securities Canada Inc. is a registered investment dealer, regulated by the Investment Industry Regulatory Organization of Canada and the Ontario Securities Commission and is the participating member on Canadian exchanges. **U.K.:** JPMorgan Chase N.A., London Branch, is authorised by the Prudential Regulation Authority and is subject to regulation by the Financial Conduct Authority and to limited regulation by the Prudential Regulation Authority. Details about the extent of our regulation by the Prudential Regulation Authority are available from J.P. Morgan on request. J.P. Morgan Securities plc (JPMS plc) is a member of the London Stock Exchange and is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. Registered in England & Wales No. 2711006. Registered Office 25 Bank Street, London, E14 5JP. **Germany:** This material is distributed in Germany by J.P. Morgan Securities plc, Frankfurt Branch which is regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht and also by J.P. Morgan AG (JPM AG) which is a member of the Frankfurt stock exchange and is regulated by the Federal Financial Supervisory Authority (BaFin), JPM AG is a company incorporated in the Federal Republic of Germany with registered office at Taunustor 1, 60310 Frankfurt am Main, the Federal Republic of Germany. **South Africa:** J.P. Morgan Equities South Africa Proprietary Limited is a member of the Johannesburg Securities Exchange and is regulated by the Financial Services Board. **Hong Kong:** J.P. Morgan Securities (Asia Pacific) Limited (CE number AAJ321) is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission in Hong Kong and/or J.P. Morgan Broking (Hong Kong) Limited (CE number AAB027) is regulated by the Securities and Futures Commission in Hong Kong. JP Morgan Chase Bank, N.A., Hong Kong is organized under the laws of U.S.A. with limited liability. **China:** J.P. Morgan Securities (China) Company Limited has been approved by CSRC to conduct the securities investment consultancy business. **Korea:** This material is issued and distributed in Korea by or through J.P. Morgan Securities (Far East) Limited, Seoul Branch, which is a member of the Korea Exchange(KRX) and is regulated by the Financial Services Commission (FSC) and the Financial Supervisory Service (FSS). **Australia:** J.P. Morgan Securities Australia Limited (JPMSAL) (ABN 61 003 245 234/AFS Licence No: 238066) is regulated by ASIC and is a Market, Clearing and Settlement Participant of ASX Limited and CHI-X. **Taiwan:** J.P. Morgan Securities (Taiwan) Limited is a participant of the Taiwan Stock Exchange (company-type) and regulated by the Taiwan Securities and Futures Bureau. **India:** J.P. Morgan India Private Limited (Corporate Identity Number - U67120MH1992FTC068724), having its registered office at J.P. Morgan Tower, Off. C.S.T. Road, Kalina, Santaacruz - East, Mumbai - 400098, is registered with Securities and Exchange Board of India (SEBI) as a 'Research Analyst' having registration number INH000001873. J.P. Morgan India Private Limited is also registered with SEBI as a member of the National Stock Exchange of India Limited and the Bombay Stock Exchange Limited (SEBI Registration Number - INZ000239730) and as a Merchant Banker (SEBI Registration Number - MB/INM000002970). Telephone: 91-22-6157 3000, Facsimile: 91-22-6157 3990 and Website: [www.jpmpil.com](http://www.jpmpil.com). For non local research reports, this material is not distributed in India by J.P. Morgan India Private Limited. **Thailand:** This material is issued and distributed in Thailand by JPMorgan Securities (Thailand) Ltd., which is a member of the Stock Exchange of Thailand and is regulated by the Ministry of Finance and the Securities and Exchange Commission and its registered address is 3rd Floor, 20 North Sathorn Road, Silom, Bangrak, Bangkok 10500. **Indonesia:** PT J.P. Morgan Sekuritas Indonesia is a member of the Indonesia Stock Exchange and is regulated by the OJK a.k.a. BAPEPAM LK. **Philippines:** J.P. Morgan Securities Philippines Inc. is a Trading Participant of the Philippine Stock Exchange and a member of the Securities Clearing Corporation of the Philippines and the Securities Investor Protection Fund. It is regulated by the Securities and Exchange Commission. **Brazil:** Banco J.P. Morgan S.A. is regulated by the Comissao de Valores Mobiliarios (CVM) and by the Central Bank of Brazil. **Mexico:** J.P. Morgan Casa de Bolsa, S.A. de C.V., J.P. Morgan Grupo Financiero is a member of the Mexican Stock Exchange and authorized to act as a broker dealer by the National Banking and Securities Exchange Commission. **Singapore:** This material is issued and distributed in Singapore by or through J.P. Morgan Securities Singapore Private Limited (JPMSS) [MCI (P) 058/04/2019 and Co. Reg. No.: 199405335R], which is a member of the Singapore Exchange Securities Trading Limited and/or JPMorgan Chase Bank, N.A., Singapore branch (JPMCB Singapore) [MCI (P) 070/09/2019], both of which are regulated by the Monetary Authority of Singapore. This material is issued and distributed in Singapore only to accredited investors, expert investors and institutional investors, as defined in Section 4A of the Securities and Futures Act, Cap. 289 (SFA). This material is not intended to be issued or distributed to any retail investors or any other investors that do not fall into the classes of "accredited investors," "expert investors" or "institutional investors," as defined under Section 4A of the SFA. Recipients of this document are to contact JPMSS or JPMCB Singapore in respect of any matters arising from, or in connection with, the document. **Japan:** JPMorgan Securities Japan Co., Ltd. and JPMorgan Chase Bank, N.A., Tokyo Branch are regulated by the Financial Services Agency in Japan. **Malaysia:** This material is issued and distributed in Malaysia by JPMorgan Securities (Malaysia) Sdn Bhd (18146-X) which is a Participating Organization of Bursa Malaysia Berhad and a holder of Capital Markets Services License issued by the Securities Commission in Malaysia. **Pakistan:** J.

P. Morgan Pakistan Broking (Pvt.) Ltd is a member of the Karachi Stock Exchange and regulated by the Securities and Exchange Commission of Pakistan. **Dubai:** JPMorgan Chase Bank, N.A., Dubai Branch is regulated by the Dubai Financial Services Authority (DFSA) and its registered address is Dubai International Financial Centre - Building 3, Level 7, PO Box 506551, Dubai, UAE. **Russia:** CB J.P. Morgan Bank International LLC is regulated by the Central Bank of Russia. **Argentina:** JPMorgan Chase Bank Sucursal Buenos Aires is regulated by Banco Central de la República Argentina ("BCRA"- Central Bank of Argentina) and Comisión Nacional de Valores ("CNV"- Argentinian Securities Commission")

#### Country and Region Specific Disclosures

**U.K. and European Economic Area (EEA):** Unless specified to the contrary, issued and approved for distribution in the U.K. and the EEA by JPMS plc. Investment research issued by JPMS plc has been prepared in accordance with JPMS plc's policies for managing conflicts of interest arising as a result of publication and distribution of investment research. Many European regulators require a firm to establish, implement and maintain such a policy. Further information about J.P. Morgan's conflict of interest policy and a description of the effective internal organisations and administrative arrangements set up for the prevention and avoidance of conflicts of interest is set out at the following link <https://www.jpmorgan.com/jmpdf/1320742677360.pdf>. This report has been issued in the U.K. only to persons of a kind described in Article 19 (5), 38, 47 and 49 of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (all such persons being referred to as "relevant persons"). This document must not be acted on or relied on by persons who are not relevant persons. Any investment or investment activity to which this document relates is only available to relevant persons and will be engaged in only with relevant persons. In other EEA countries, the report has been issued to persons regarded as professional investors (or equivalent) in their home jurisdiction. **Australia:** This material is issued and distributed by JPMSAL in Australia to "wholesale clients" only. This material does not take into account the specific investment objectives, financial situation or particular needs of the recipient. The recipient of this material must not distribute it to any third party or outside Australia without the prior written consent of JPMSAL. For the purposes of this paragraph the term "wholesale client" has the meaning given in section 761G of the Corporations Act 2001. J.P. Morgan's research coverage universe spans listed securities across the ASX All Ordinaries index, securities listed on offshore markets, unlisted issuers and investment products which Research management deem to be relevant to the investor base from time to time. J.P. Morgan seeks to cover companies of relevance to the domestic and international investor base across all GIC sectors, as well as across a range of market capitalisation sizes. **Germany:** This material is distributed in Germany by J.P. Morgan Securities plc, Frankfurt Branch which is regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht. **Korea:** This report may have been edited or contributed to from time to time by affiliates of J.P. Morgan Securities (Far East) Limited, Seoul Branch. **Singapore:** As at the date of this report, JPMSS is a designated market maker for certain structured warrants listed on the Singapore Exchange where the underlying securities may be the securities discussed in this report. Arising from its role as designated market maker for such structured warrants, JPMSS may conduct hedging activities in respect of such underlying securities and hold or have an interest in such underlying securities as a result. The updated list of structured warrants for which JPMSS acts as designated market maker may be found on the website of the Singapore Exchange Limited: <http://www.sgx.com>. In addition, JPMSS and/or its affiliates may also have an interest or holding in any of the securities discussed in this report – please see the Important Disclosures section above. For securities where the holding is 1% or greater, the holding may be found in the Important Disclosures section above. For all other securities mentioned in this report, JPMSS and/or its affiliates may have a holding of less than 1% in such securities and may trade them in ways different from those discussed in this report. Employees of JPMSS and/or its affiliates not involved in the preparation of this report may have investments in the securities (or derivatives of such securities) mentioned in this report and may trade them in ways different from those discussed in this report. **Taiwan:** Research relating to equity securities is issued and distributed in Taiwan by J.P. Morgan Securities (Taiwan) Limited, subject to the license scope and the applicable laws and the regulations in Taiwan. According to Paragraph 2, Article 7-1 of Operational Regulations Governing Securities Firms Recommending Trades in Securities to Customers (as amended or supplemented) and/or other applicable laws or regulations, please note that the recipient of this material is not permitted to engage in any activities in connection with the material which may give rise to conflicts of interests, unless otherwise disclosed in the "Important Disclosures" in this material. **India:** For private circulation only, not for sale. **Pakistan:** For private circulation only, not for sale. **New Zealand:** This material is issued and distributed by JPMSAL in New Zealand only to "wholesale clients" (as defined in the Financial Advisers Act 2008). The recipient of this material must not distribute it to any third party or outside New Zealand without the prior written consent of JPMSAL. **Canada:** This report is distributed in Canada by or on behalf of J.P. Morgan Securities Canada Inc. The information contained herein is not, and under no circumstances is to be construed as an offer to sell securities described herein, or solicitation of an offer to buy securities described herein, in Canada or any province or territory thereof. The information contained herein is under no circumstances to be construed as investment advice in any province or territory of Canada and is not tailored to the needs of the recipient. **Dubai:** This report has been distributed to persons regarded as professional clients or market counterparties as defined under the DFSA rules. **Brazil:** Ombudsman J.P. Morgan: 0800-7700847 / [ouvidoria.jp.morgan@jpmorgan.com](mailto:ouvidoria.jp.morgan@jpmorgan.com).

**General:** Additional information is available upon request. Information has been obtained from sources believed to be reliable but JPMorgan Chase & Co. or its affiliates and/or subsidiaries (collectively J.P. Morgan) do not warrant its completeness or accuracy except with respect to any disclosures relative to JPMS and/or its affiliates and the analyst's involvement with the issuer that is the subject of the research. All pricing is indicative as of the close of market for the securities discussed, unless otherwise stated. Opinions and estimates constitute our judgment as of the date of this material and are subject to change without notice. Past performance is not indicative of future results. This material is not intended as an offer or solicitation for the purchase or sale of any financial instrument. The opinions and recommendations herein do not take into account individual client circumstances, objectives, or needs and are not intended as recommendations of particular securities, financial instruments or strategies to particular clients. The recipient of this report must make its own independent decisions regarding any securities or financial instruments mentioned herein. JPMS distributes in the U.S. research published by non-U.S. affiliates and accepts responsibility for its contents. Periodic updates may be provided on companies/industries based on company specific developments or announcements, market conditions or any other publicly available information. Clients should contact analysts and execute transactions through a J.P. Morgan subsidiary or affiliate in their home jurisdiction unless governing law permits otherwise.

"Other Disclosures" last revised March 08, 2020.

---

**Copyright 2020 JPMorgan Chase & Co. All rights reserved. This report or any portion hereof may not be reprinted, sold or redistributed without the written consent of J.P. Morgan.**