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ECONOMIC UPDATE

Number 21 • FEBRUARY 2022

EXECUTIVE SUMMARY

AMERICAS: THE U.S. ECONOMY NOTCHED ITS STRONGEST ANNUAL GROWTH IN NEARLY FOUR DECADES IN 2021, surging 5.7% after contracting 3.4% in 2020. The stunning reversal came as GDP increased at a 6.9% annualized rate in the fourth quarter. **U.S. payrolls** grew sharply by 467,000 in January and the jobless rate rose slightly to 4%, as the economy weathered the Omicron wave and staffing shortages. **Manufacturing activity** fell to a 14-month low in January. The ISM survey of national factory activity noted there was another tentative sign of improving supply chains, but prices at the factory gate continued to march higher. **Durable goods orders** fell a sharp 0.9% in December. New orders for cars and planes fell 3.9% and have declined in three of the last four months. **Producer prices** increased 0.2% in December, their smallest advance in 13 months. **Retail sales** tumbled 1.9% in December, due to early holiday shopping starting in October to avoid empty shelves. Receipts at auto dealerships slipped 0.4%. **Leading economic indicators** increased a strong 0.8% in December, suggesting America's expansion would continue. The Conference Board is forecasting growth of 3.5% this year.

OVERSEAS: EUROZONE BUSINESSES REPORTED A WEAKER THAN EXPECTED START TO THE YEAR with activity growing at its slowest rate for eleven months in January despite an easing of supply bottlenecks. Manufacturers reported some reduction of the supply chain problems that have caused record order backlogs in factories, congestion at ports and shortages of materials. **China's GDP** expanded by 8.1% in 2021, but the figure masks a significant loss of growth momentum and weak consumer demand due to China's strict COVID-19 containment measures. Chinese retail sales weakened further in December, rising just 1.7% from a year earlier.

STEEL: U.S. STEEL WILL BUILD ITS NEWEST STEEL MILL IN OSCEOLA, ARKANSAS, close to the company's existing Big River Steel mill. The new \$3 billion mini mill will add two electric arc furnaces to the site. **Russian steelmaker NLMK** developed a new steel product with an anti-bacterial coating which can be used in medical, food preparation and other facilities that require strict cleanliness and safety. **Stainless steel domestic availability** remains tight but imports have increased and service centers have built inventories up 18% vs. December 2020. February surcharges increased as LME nickel gains more than offsets the drop in ferrous scrap.

AUTOMOTIVE: TESLA'S ANNUAL VEHICLE DELIVERIES SURGED 87% IN 2021, growing at their fastest pace in years. The company delivered more than 936,000 vehicles globally in 2021, up from nearly half a million the previous year. **Novelis** plans to build a \$365 million automotive recycling plant in Guthrie, KY, expanding its closed-loop recycling operations. The plant will reclaim aluminum from vehicles at the end of their useful lives and aluminum scrap from auto production. **Toyota** lowered its planned February output by 150,000 vehicles globally (25,000 to 30,000 units in North America) due to the ongoing semiconductor shortage still plaguing the industry.

ENERGY: THE WORLD'S FIRST FLOATING NUCLEAR POWER PLANT IS PART OF PUTIN'S AMBITIONS for Russia's Far East. This nuclear plant moored on the northern coast of Siberia is part of Moscow's plan to open up a major shipping lane through the Arctic and bring natural resources within easier reach. **Solar power** will account for nearly half of new U.S. electric generating capacity installed in 2022, as an estimated 46.1 gigawatts of new utility-scale electric generating capacity is added to the power grid.

MEDICAL: ABBOTT UNVEILED A NEW BIOWEARABLES CATEGORY AT THE CONSUMER ELECTRONICS SHOW. *Lingo* encompasses future biowearable devices that are being designed to translate the body's unique language, allowing a person to track key biomarkers in the body, such as glucose, ketones, lactate and alcohol, to better understand a person's general health and wellness. **Pfizer/BioNTech** started a trial evaluating an adapted version of their COVID-19 vaccine that targets the Omicron variant.

INNOVATION: BMW SHOWED OFF ITS WILD IMAGINATION at the 2022 Consumer Electronics show by unveiling a radical concept SUV called the iX Flow which can change color in the blink of an eye. The Flow is wrapped in something called E Ink—the material used in the displays of e-readers—which allows it to shift through shades of white, grey and black. **The first 3-D-printed steel bridge** in the world opened to the public in Amsterdam. The six-ton stainless steel bridge is as an award-winning feat of engineering by MX3D.

AEROSPACE: BOEING INCURRED \$4.5 BILLION IN CHARGES ON ITS SIDELINED 787 PROGRAM, obscuring its long-awaited return to positive cash flow fueled by rebounding 737 MAX deliveries. **Airbus** kept its crown as the world's largest commercial airplane supplier for the third consecutive year, outstripping Boeing by delivering 611 jets in 2021. Boeing only handed over 340 jets. The Fed TC filed an antitrust lawsuit to block **Lockheed's \$4.4 billion plan** to acquire rocket maker Aerojet Rocketdyne.

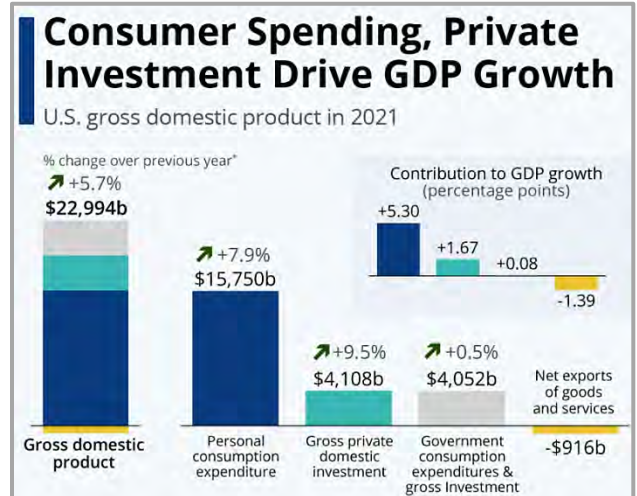
COMMODITIES: THE PRICE OF ALUMINUM ON THE LME HAS INCREASED BY 24% OVER THE PAST 6 MONTHS to more than \$3,100 a metric ton, approaching a decade high. **Uranium prices** spiked as violent protests in Kazakhstan stoked concerns about security of supply. **Oil prices** hit their highest level in over 7 years in January, threatening to fuel a further rise in global inflation. **Benchmark nickel futures** on the LME traded below \$23,000/tonne (\$10.43/lb) at the end of January, not far from a decade high.



THE AMERICAS

- **U.S. producer prices** increased 0.2% in December, their smallest advance in 13 months. Goods prices fell 0.4%, held down by decreases in wholesale food and energy prices. Wholesale services prices rose 0.5%, accounting for the increase in the overall producer price index. In the 12 months through December, the PPI increased 9.7%.
- **The Index of Leading Economic Indicators** increased a strong 0.8% in December, suggesting the expansion would continue, despite challenges from the pandemic and anticipated interest rate increases from the Fed. The Conference Board is forecasting growth of 3.5% this year.
- **U.S. import prices** fell 0.2% in December amid a 6.5% decline in the cost of petroleum products, adding to signs that the worst of high inflation was probably over. Export prices tumbled 1.8% but were up 14.7% YOY in December.
- **The U.S. trade deficit in goods** widened to an all-time high of \$101 billion in December. Imports rose 2%, reflecting the ongoing recovery in domestic demand due to rising wages and an expanding economy. Imports rose for automotive vehicles (+8.4%) and consumer goods (+7.6%). U.S. exports rose at a slower 1.4% pace to \$157.3 billion. During 2021, the U.S. posted a goods trade gap record of \$1.086 trillion.
- **U.S. retail sales** tumbled 1.9% in December, likely the result of early holiday shopping starting in October to avoid empty shelves. Retail sales increased 16.9% YOY. Receipts at auto dealerships slipped 0.4% after rising 0.2% in November. Automobiles remain scarce because of a global chip shortage. Receipts at restaurants and bars fell 0.8% but were up 41.3% from December 2020.
- **Durable goods orders** fell a sharp 0.9% in December, as orders for transportation equipment drove the decline. Bookings for commercial aircraft decreased 14.4%. Boeing reported 80 orders, down from 109 a month earlier. Orders for motor vehicles rose 1.4% in December. Durable goods orders excluding transportation equipment advanced 0.4%.
Key Update: The data suggest limited availability of materials and components due to supply chain constraints and labor shortages tempered business investment growth at the end of the 4thQtr. As the Fed tightens monetary policy, higher borrowing costs may limit capital spending plans over the longer term.
- **U.S. factory orders** fell 0.4% in December, but manufacturing remains supported by businesses replenishing inventories. Inventory investment surged at an annualized rate of \$173.5 billion in the 4thQtr. Orders for machinery, primary metals and fabricated metal products increased.

- **The U.S. economy** notched its strongest annual growth in nearly four decades in 2021, surging 5.7% after contracting 3.4% in 2020. The stunning reversal came as GDP increased at a 6.9% annualized rate in last year's 4thQtr.



- **U.S. inflation** in 2021 was the highest since 1982, with December consumer prices up 7% YOY. Prices for autos and other durable goods continue to drive much of the inflationary surge. On a monthly basis, the CPI increased 0.5% in December, decelerating from October and November. Prices of used cars and trucks soared 37.3% in December from a year earlier.
- **Production at U.S. factories** fell 0.3% in December, pulled down by a 1.3% decline in output at motor vehicle plants. Motor vehicle output is 6% below its year-earlier level. Mining output rose 2.0%. Overall industrial production grew at a 4.0% rate in the 4thQtr, following a 3.5% pace of increase in the 3rdQtr. Capacity utilization for the manufacturing sector decreased 0.2% to 77.0% in December.
- **Americans' optimism** about the outlook for their finances, growth and the labor market dimmed at the start of the year, reflecting concerns about the Omicron surge and inflation. The Conference Board's consumer confidence index slid for the first time in four months in January.
- **U.S. payrolls** grew sharply by 467,000 in January and the jobless rate rose to 4% as the economy weathered the Omicron wave and staffing shortages. Employers in leisure and hospitality, retail, transportation and warehousing added jobs last month. The automotive industry shed jobs. Wages grew 5.7% in January from a year earlier, nearly double the average of about 3% before the pandemic hit.
- **Consumer spending** fell in 0.6% in December, suggesting the economy lost speed heading into the new year amid snarled supply chains and raging COVID-19 infections. Wages and salaries rose 1.1% last quarter and 4.5% YOY.

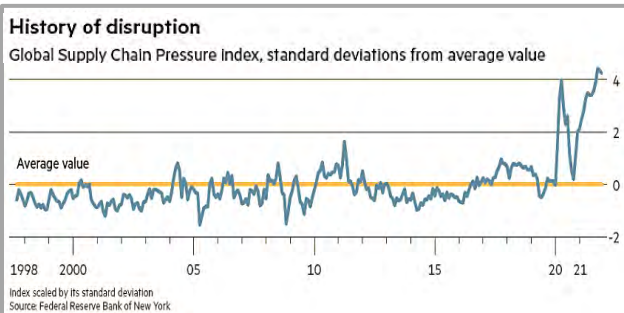


- **Existing home sales** fell 4.6% to an annual rate of 6.18 million units in December. A total of 6.12 million homes sold in 2021, with prices averaging a record \$346,900, up 16.9% from 2020. New home sales increased 11.9% to an annual rate of 811,000. Housing starts rose 1.4% to an annual rate of 1.702 million units, the highest level in nine months. Housing starts in 2021 totaled 1.595 million, up 15.6% from 2020. The aggregate cost of residential construction materials has increased 19% since December 2020.

- **U.S. manufacturing activity** fell to a 14-month low in January amid an outbreak of Omicron infections. The ISM index of national factory activity dropped to a reading of 57.6 from 58.8 in December. The ISM survey's forward-looking new orders sub-index fell to its the lowest reading since June 2020. It was the second straight monthly slowdown in new orders, but customer inventories remain depressed, which could help to limit the pace of moderation in order growth. There was another tentative sign of improving supply chains but prices at the factory gate continued to march higher.

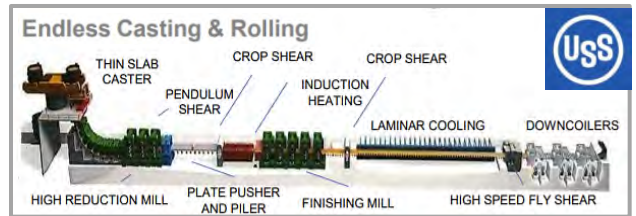
Key Update: Goldman Sachs slashed its 1stQtr GDP growth estimate on 1/31 to a 0.5% rate from a 2.0% pace, citing Omicron and less money from the government to households.

- **Supply chain pressures** remain well above their pre-pandemic levels, but signs are emerging that global trade relations could start to return to normal this year. A graph of worldwide supply chain constraints produced by the Federal Reserve Bank NY shows such pressures reached their highest point in October 2021. But the index (based on 27 variables, including global shipping rates and air freight costs) ticked slightly lower in November and December.



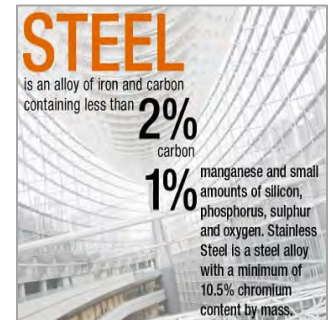
- **U.S. construction spending** rose 0.2% in December, less than expected as a solid rise in private projects was partially offset by a sharp decline in outlays on public projects. Construction spending increased 9.0% YOY in December.
- **Growth in the U.S. services sector** fell to 59.9 in January from a revised 62.3 in December in IHS Markit's PMI survey. There were declines in the readings for production, new orders and employment, while price growth slowed.

- **U.S. Steel** will build its newest steel mill in Osceola, Arkansas, close to the company's existing Big River Steel mill. The new \$3 billion mini mill will add two electric arc furnaces to the site, increasing its capacity by 3 million tons of raw steel to 6.3 million tons/year. USS is targeting the automotive, appliance and construction-markets. The mini mill will employ "endless casting" technology, the first use of endless casting and rolling technology available in the U.S. The company's 4thQtr net income topped \$1 billion, compared with \$49 million a year earlier.



Key Update: Steelmakers brought 8 million tons of flat-rolled steel capacity into the U.S. market in the past two years that were largely offset by closing or idling older, higher-cost mills.

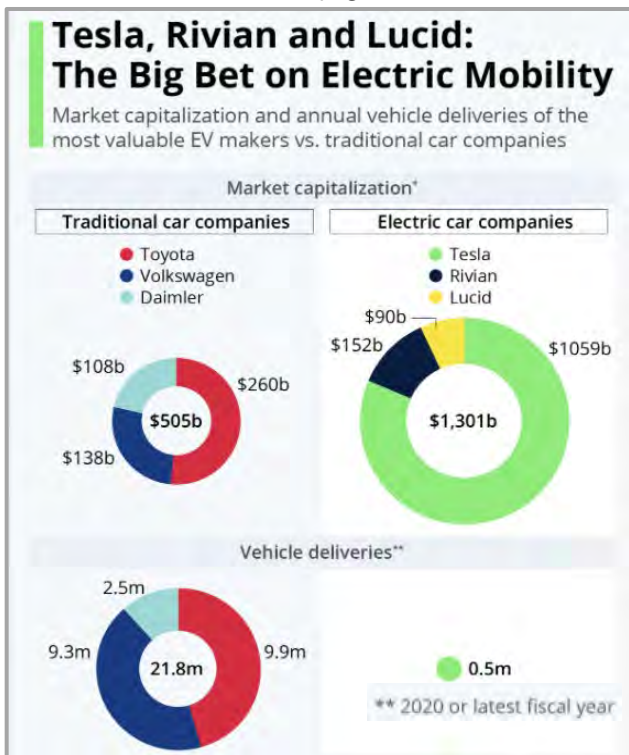
- **Stainless steel mills** started 2022 with long lead times and a base price increase on cold-rolled coil. Demand remains steady with residential construction driving sales of new appliances, while automotive industrial food processing and retail food/beverage industries managed gradual recoveries. Domestic availability remains constrained but imports have increased over the last few months and service centers have built inventories, which at year-end were up 18% from the prior year. Total stainless shipments were up 12% in 2021 to 1.8 million tons. With supply



- catching up and prices at 10-year highs, service centers are taking a more cautious approach to buying and inventory levels. In February, surcharges will increase as LME nickel more than offsets the decline in ferrous scrap.
- **Steel mills** shipped 7.893 million tons of steel last November, a 3.9% drop from October but a 16.9% increase from a year earlier. Shipments YTD through November were 86.848 million tons, a 17.4% increase vs. the same eleven month period in 2020. (See **Appendix: Steel**, page 8)
- **Light vehicle production** in N. America was cut by 175,000 units in January and more reductions have been announced for February. IHS Market predicts a slow recovery in sales this year and that it could take until 2024 or 2025 to satisfy pent-up demand and replenish dealer inventories.

- **Tesla's annual vehicle deliveries** surged 87% in 2021, growing at their fastest pace in years, as the company delivered more than 936,000 vehicles globally in 2021, up from nearly half a million the previous year. Tesla said it will not launch new models like Cybertruck this year because it would dent volume growth in the face of supply chain headwinds that would be alleviated only next year. Tesla will focus on ramping up volume of existing models in 2022 by more than 50%. The warning bodes ill for legacy automakers and startups, which have promised new electric vehicle (EV) models in coming months.

(See **Appendix: Automotive**, page 9)



- **General Motors** will invest \$7 billion in Michigan, much of that aimed at dramatically boosting production of full-size electric pickups, intensifying a battle with Ford for EV supremacy in North America. GM's Detroit-Hamtramck and Orion Township plants will be able to build more than 600,000 electric trucks a year by late 2024, with three other plants in Tennessee, Ontario and Mexico boosting the company's total North America electric vehicle production capacity to more than a million units by late 2025.

Key Update: Michigan's Governor is proposing a combined \$2,500 rebate for the purchase of an electric vehicle and charging equipment. GM and Tesla have both exceeded the threshold for qualifying for a federal EV tax credit of \$7,500 but Congress is considering lifting the cap and expanding federal credits for up to \$12,500.

- **U.S. auto sales** were expected to have dipped 15.6% in January from a year earlier to 932,000 units. Reduced manufacturing due to the Omicron variant, supply chain constraints and global inflation caused prices to soar amid high demand. The average new-vehicle retail transaction price in January is expected to reach \$44,905, the previous high was in December 2021 at \$45,283. The volume of new vehicles delivered to dealerships in January was insufficient to meet demand, resulting in a diminished sales pace.
- **Novelis** plans to build a \$365 million automotive recycling plant in Guthrie, KY, expanding its closed-loop recycling operations by reclaiming aluminum from vehicles at the end of their useful lives and aluminum scrap leftover from auto production. The facility will have a casting capacity of 240k tonnes of sheet ingot and bring another 140 jobs to the local economy. Novelis said the impact on its carbon emissions will be dramatic since recycling aluminum uses only 5% of the energy needed to produce primary ingot.
- **Intel** plans to invest at least \$20 billion in new chip-making capacity outside Columbus, Ohio, bolstering the company's semiconductor production ambitions. Intel will make some of its most cutting-edge processors at the new sites. Planning for the first two factories will start immediately, with construction expected to begin late in 2022, and production is expected to come online in 2025. The company also pledged \$100 million toward partnerships with educational institutions to build a pipeline of talent and bolster research programs in the region.

Key Update: The semiconductor industry, which just topped \$500 billion in combined annual sales, is expected to double by the end of the decade.

- **Coal-fired electric generating capacity** slated to retire in 2022 will amount to 85% of the total U.S. generating capacity retirements scheduled. Natural gas will account for 8% of retirements and nuclear 5%. While coal capacity retirements slowed to 4.6 GW in 2021, it will increase again this year, with 12.6 GW of coal capacity scheduled to retire in 2022. Nuclear capacity retirements in 2022 will amount to 0.8 GW, or less than 1% of the operating U.S. nuclear fleet.
- **U.S. greenhouse gas emissions** rose by 6.2% from 2020 levels last year as the use of coal-fired electricity jumped 17% and drivers returned to the roads after the first year of the coronavirus pandemic. The U.S. is now further off the Biden administration's target under the Paris climate agreement to slash emissions 50-52% below 2005 levels by 2030. U.S. greenhouse gas emissions were 17.4% below 2005 levels in 2021, up from 22.2% below 2005 levels in 2020. (See **Appendix: Energy**, page 12)



- **Solar power** will account for nearly half of new U.S. electric generating capacity in 2022, as an estimated 46.1 gigawatts of new utility-scale electric generating capacity is added to the power grid. Natural gas will account for 21% of the capacity and 17% will be wind. Another 5% of the country's planned electric capacity additions in 2022 will come from two new reactors at the Vogtle nuclear power plant in Georgia. Utility-scale battery storage capacity is expected to grow by 5.1 gigawatts, or 84% this year.

- **Boeing** is investing a further \$450 million in Wisk Aero to support development of future pilotless flying taxis (eVTOL). Wisk says it will use the new funds to undertake a period of rapid growth, adding new employees to its current workforce of approximately 350 people and kicking off a manufacturing process that it says will result in a full-scale, commercially operational air taxi business within the next five years. Once that happens, Wisk predicts that it will conduct 14 million flights annually in 20 major markets around the globe and one day that it will provide a flying taxi service that can be summoned with an app.



Key Update: *A number of electric vertical takeoff and landing (eVTOL) aircraft startups have emerged in recent years with prototypes intended for short flights within a city or regionally. Analysts predict that the flying taxi market could grow to \$150 billion in revenue by 2035.*

- **Textron** expects to continue ramping up business jet production in 2022 on demand from wealthy travelers, but broader industry supply-chain hiccups, labor shortages and recent surges in COVID-19 cases remain challenges. It delivered 167 jets in 2021, up from 132 in 2020, and reported an aviation backlog of \$4.1 billion at year end.
- **Boeing** incurred \$4.5 billion in charges in the 4thQtr on its sidelined 787 program, obscuring its long-awaited return to positive cash flow fueled by rebounding 737 MAX deliveries. The company reported a core operating loss of \$4.54 billion in the 4thQtr. Boeing currently has 335 of the 737 MAX airplanes in inventory and it anticipates delivering most of those jets by the end of 2023.
- **The Federal Trade Commission** filed an antitrust lawsuit to block Lockheed Martin's \$4.4 billion plan to acquire rocket maker Aerojet Rocketdyne. The FTC argued that the newly combined firm would harm Lockheed's rivals in ways that would substantially lessen competition in multiple markets for products critical to the national defense.

- **The Federal Aviation Administration** issued approvals for additional altimeters that allow about 90% of the U.S. commercial aviation fleet to perform low-visibility landings at airports where 5G wireless is deployed. AT&T and Verizon agreed in January to delay switching on new telecom towers near key airports even as they turned on the new 5G C-Band service. Alaska Air said the rollout of this new band is still creating disruptions for regional air travel.

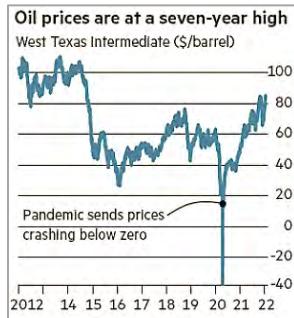
Key Update: *Some U.S. airlines are concerned about Verizon's plans to turn on additional towers and question if those new towers could impact any current operations.*

- **Qatar Airways** placed an order with Boeing for a new freighter version of its 777X passenger jet and a provisional order for 50 737 MAX jets. The order came days after Airbus revoked a Qatar order for 50 A321neo jets as part of a contractual and safety dispute involving a different model.
- **Pfizer/BioNTech** started a trial evaluating an adapted version of their COVID-19 vaccine that targets the Omicron variant. They began enrolling adults ages 18 to 55 in the U.S. and South Africa to examine the safety, tolerability and immune response generated by the vaccine if it is given either as a primary series or as a booster dose. Initial study results are expected in the first half of the year. Moderna plans to start a clinical trial of its Omicron-specific vaccine candidate within days. (See **Appendix: Medical**, page 11)
- **U.S. cutting tool sales** increased 7.9% in the first 10 months of 2021, according to the latest joint report by the Cutting Tool Institute and the Association for Manufacturing Technology. Cutting tool sales are a leading indicator of manufacturing activity, and the report foreshadows likely production increases in aerospace, automotive, medical equipment and off-road machinery.
- **Skyrocketing LTL rates** are expected to persist through March, fueled by labor and capacity constraints, sharp general rate increases and carrier consolidation. Per-pound LTL rates are expected to drop slightly in January and then climb through March, resulting in a 35.8% increase compared to the index's January 2018 baseline.
- **Parallel Systems** wants to build automated zero-emissions rail vehicles that are more flexible than traditional trains, allowing railroads to convert part of the \$700 billion U.S. trucking industry to rail. A prototype railcar that can carry one or two shipping containers is powered individually but can be linked with others to form a train that is able to split off to different destinations enroute.



EUROPE, AFRICA & THE MIDDLE EAST

- **Eurozone businesses** reported a weaker than expected start to the year with activity growing at its slowest rate for eleven months in January despite an easing of supply bottlenecks hobbling manufacturers, according to the IHS Markit flash eurozone composite PMI. Manufacturers reported some reduction of the supply chain problems that have caused record order backlogs in factories, congestion at ports and shortages of materials.
- **Oil prices** hit their highest level in over seven years in the third week of January, threatening to fuel a further rise in global inflation on bets that demand for crude could outstrip supply this year. Brent rose 1.9% to a high of \$88.13 a barrel, the highest level since October 2014 when oil topped \$115. Both Brent and the U.S. oil benchmark West Texas Intermediate have risen about 13% since the start of year. **Key Update:** *Some analysts forecast the crude benchmarks could pass \$100/bbl this year unless supply is increased.*
- **French carmakers** fume at plans to force them to attach the equivalent of a public health warning to their advertising. The law, which comes into effect in March, requires automakers to pick from a menu of disclaimers that includes: *For short journeys, walk or take a bike when possible, Consider carpooling and Take public transport for your daily journeys.* The requirements are part of a climate-change law that bans short-haul domestic flights if the journey could be made by train and imposed a blanket restriction on ads for SUVs starting in 2028.
- **Volkswagen** will be able to build 1 million electric vehicles a year in China in 2023, boosted by a new plant in Anhui province. The plant, a joint venture with China's Anhui Jianghuai Automobile Co (JAC) first announced in 2019, is set to produce 300,000 electric cars a year, with production starting in 2023. (See **Appendix: Automotive**, page 9)
- **Britain and the U.S.** agreed to launch talks aimed at resolving their trade dispute over U.S. steel and aluminum tariffs. Britain is keen to negotiate duty-free access to American steel and aluminum markets similar to that granted the EU as of January. As part of the U.S.-EU deal, Washington will allow 4 million tons of EU steel into the U.S. annually in exchange for Brussels dropping retaliatory tariffs against U.S. products.



- **Airbus** kept its crown as the world's largest commercial airplane supplier for the third consecutive year, outstripping Boeing by delivering 611 jets in 2021. Boeing only handed over 340 jets. Airbus sold 771 airplanes during the year, giving a net sales total of 507, after adjusting for cancellations. Boeing sold 909 planes that became a net total of 535 after cancellations. (See **Appendix: Aerospace**, page 13)
- **Total world crude steel production** was 1.950 billion tonnes (Bt) in 2021, a 3.6% increase compared to 2020. Chinese crude steel output fell 3% to 1.032 Bt last year. The U.S. produced 86 million tonnes (Mt), a gain of 18.3%. India's output was 118.1 Mt, +17.8%. Japan's crude steel production was 86.3 million tonnes, +15.8%. China's share of 2021 total crude steel output was 53%. December's total crude steel output was 158.7 Mt, -3.0% vs. the prior year.
- **Russian steelmaker NLMK** has developed a new steel product with an anti-bacterial coating which can be used in medical, food preparation and other facilities that require strict cleanliness and safety. The steel's coating is based on compounds of copper and silver ions, enabling a 100% reduction of bacteria on the steel surface. The ions are injected directly into the coating, making the product more resistant to mechanical impact and preserving the anti-bacterial properties for decades, according to NLMK.
- **The price of aluminum** on the LME has increased by 24% over the past six months to more than \$3,100 a metric ton, approaching a decade high. Energy costs have risen even faster, forcing the closure of plants in China and Europe that haven't been able to cut costs deep enough to remain profitable. Energy can account for up to half of the cost of making aluminum. **In Europe, natural-gas prices are almost five times as high as they were a year ago because of cold weather and a drop in the flow of gas from Russia. Tensions between the U.S. and Russia over Ukraine have buttressed prices. Traders fear disruptions to Russian aluminum exports if conflict breaks out.** (See **Appendix: Commodities**, page 15) **Key Update:** *About 4 million tons of capacity have been closed or mothballed globally as energy prices run high. Morgan Stanley recently estimated aluminum supply could fall 1 million tons short of demand in 2022.*

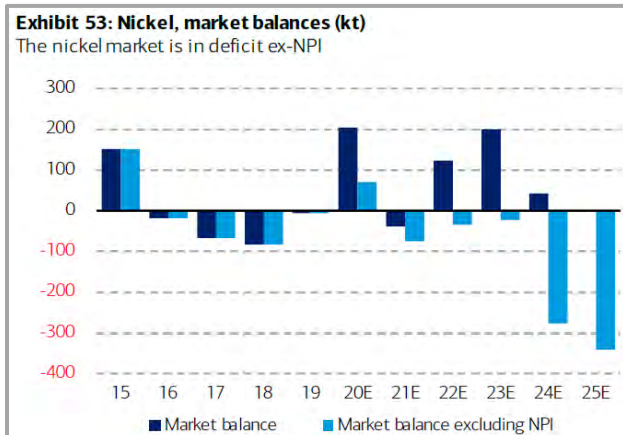


ASIA/PACIFIC, JAPAN, AUSTRALIA & INDIA

- **China's leaders** hope that they can put a floor under the economy, which expanded by just 4% in the 4thQtr of last year, the slowest pace since the beginning of the COVID recovery. China's GDP expanded by 8.1% in 2021, but the figure masks a significant loss of growth momentum and weak consumer demand caused by China's strict COVID-19 containment measures. Retail sales weakened further in December, rising just 1.7% from a year earlier. Over the past two years, monthly retail sales have increased just 3.9% on average in YOY terms, far below the roughly 8% level before the pandemic onset in 2020.

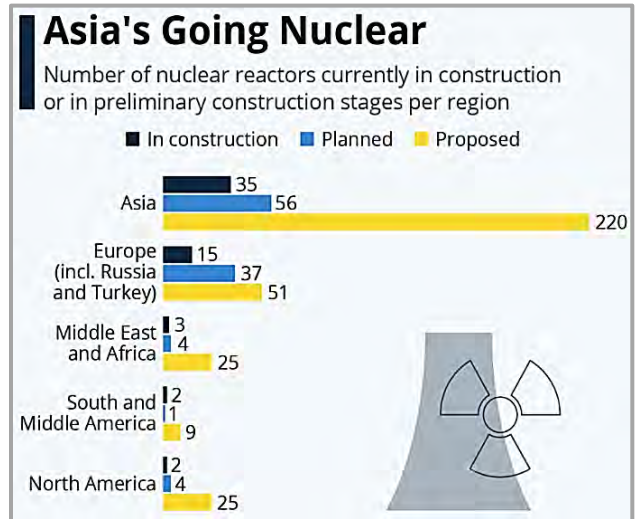
Key Update: *The global economic recovery from coronavirus will run into "multiple challenges" this year, the IMF said in late January as it warned of lower growth and higher inflation. The IMF's forecast for the global economy is for growth in GDP to slow from 5.9% in 2021 to 4.4% this year, weakening further in 2023 to 3.8%.*

- **Global stainless steel production**, historically the most important sector for nickel demand, is slowing as the post-COVID rebound is tailing off. However, a relentless increase of global EV production means that nickel consumption from the transportation sector is increasing exponentially. Even with Indonesia pushing more units into the market, Class 1 nickel will be in increasingly short supply. Note on market balance in chart below: Nickel pig iron (NPI) is a low grade ferronickel invented in China as a cheaper alternative to pure nickel for the production of stainless steel.



- **Toyota** lowered its planned February output by 150,000 vehicles globally (25,000 to 30,000 units in North America) due to the ongoing semiconductor shortage plaguing the industry. The new target of 700,000 vehicles is lower than January's estimated production of 800,000 units. Toyota said it is unlikely to reach its forecast of 9 million vehicles before the end of its fiscal year on March 31, 2022.

- **China's "artificial sun" project** has sustained a nuclear fusion reaction for more than 17 minutes, a new world record. In the latest experiment, superheated plasma reached 126 million degrees Fahrenheit—roughly five times hotter than the sun at its core. Nuclear fusion could be the cleanest energy source available because it replicates the sun's physics by merging atomic nuclei to generate large amounts of energy into electricity. The process requires no fossil fuels, leaves behind no radioactive waste and is a safer alternative to fission nuclear power.



- **The Japanese Atomic Energy Agency** and Mitsubishi Heavy Industries are set to cooperate with the U.S. and Bill Gates' venture company to build a high-tech nuclear reactor in Wyoming. The parties will sign an agreement for the Japanese to provide technical support and data from Japan's own advanced reactors. TerraPower, an advanced nuclear power venture founded by Gates, is set to open its Natrium plant in Wyoming in 2028. The U.S. government will provide funding to cover half of the \$4 billion project.

Key Update: *TerraPower's traveling wave reactor technology is a liquid sodium-cooled fast reactor that will simplify the current nuclear fuel cycle, reducing the need for uranium mining and spent fuel storage facilities.*

- **Uranium prices** spiked as violent protests in Kazakhstan stoked concerns about security of supply for the radioactive material used to fuel nuclear reactors. The metal was resurgent last year, rising more than 30% as investors bet that nuclear energy will be a key part of the move away from fossil fuels and the electrification of the global economy. The price has gained more than 8% to \$45.65/lb the first week of January. Kazakhstan is the world's biggest producer of uranium, supplying 40% of global demand. Its dominant position in uranium is akin to that of the Opec+ group in crude oil. (See **Appendix: Commodities**, page 15)

ECONOMIC UPDATE: APPENDIX TO THE FEBRUARY 2022 ISSUE**STEEL/INNOVATION: THE WORLD'S FIRST 3-D-PRINTED STAINLESS STEEL BRIDGE DEBUTS IN AMSTERDAM**

Last summer, the first 3-D-printed steel bridge in the world (an innovative project headed by Dutch company MX3D) opened to the public in Amsterdam. The novel landmark spans one of the city's oldest canals and sits in the center of the red-light district. **In addition to marking a milestone in the capabilities of 3-D printing technology, the 40-foot-long bridge doubles as a “living laboratory” with hidden sensors that collect real-time data about its performance.** Researchers will use this data to analyze how the bridge reacts over time as pedestrians use it. A 3-D-printed metal structure large and strong enough to handle pedestrian traffic has never been constructed before. Plans for construction of the smart bridge began in 2015, when MX3D proposed 3-D printing a metal bridge with state-of-the-art technology that combines robotics and welding. The six-ton stainless steel bridge stands as an award-winning feat of engineering. It was constructed remotely over six months with the help of four robots, then shipped to the site and lifted into place by crane. Tim Geurtjens, chief technology officer of MX3D, said that the project's success has exciting implications for the future of architecture. “If you want to have a really highly decorated bridge or really aesthetic bridge, suddenly it becomes a good option to print it,” he said. To assess how the printed steel behaves over time, the team created a “digital twin” of the bridge that will use incoming data from the sensors to simulate the state of its physical counterpart. **Information from this computerized model will help experts explore potential new uses for 3-D-printed steel and “teach” the bridge how to perform tasks like counting the number of pedestrians that cross it.** Mark Girolami, a civil engineer at the University of Cambridge who is working on the digital model, said bridge failures can often be attributed to overlooked deterioration. By constantly transmitting data about a bridge's status, 3-D-printed versions may be able to provide early warnings and prevent collapses. The bridge, whose embossed silver waves lend it a modern, futuristic look, stands out amid its surroundings: Amsterdam's oldest neighborhood and a place known for being the underbelly of the Dutch city. Micha Mos, a councillor at the Amsterdam municipality, hopes the new bridge will bring tourists to the area. “This may attract a new kind of visitor, one who is more interested in architecture and design, helping change the way the neighborhood is perceived and more a place you want to visit, but visit more respectfully than it has been over the few last decades.” A permit will allow the steel structure to remain in place for two years.

**STEEL: WORLD'S LARGEST SAILING SHIP IS STEELED FOR OCEAN TRAVEL**

Sitting on the Northern side of the Split peninsula in Croatia, the Brodosplit shipyard has been crafting and launching vessels for nearly 100 years. One of the shipyard's more recent projects stands out as a unique achievement. **The Golden Horizon is a steel-built, five-masted barque that, at 162-metres long, is the largest sailing ship in the world.**

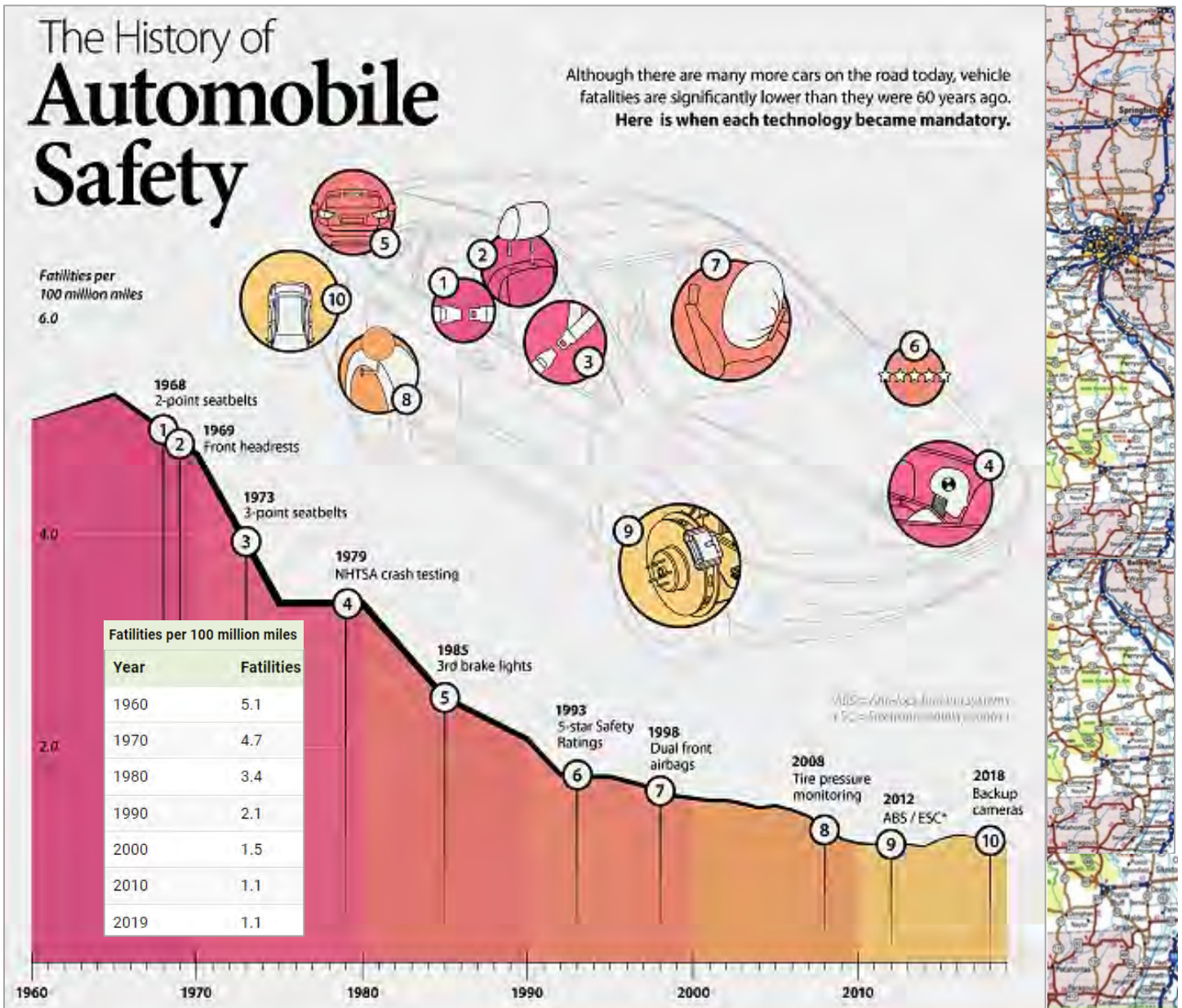


This €100 million premium class vessel requires a crew of 150 to serve its capacity of 300 passengers. The vessel's 224 cabins are set over six decks, with holidaymakers able to enjoy all the elements of a top-class cruise: three pools, multiple restaurants and bars, as well as a library and full spa. The large crew isn't just needed to provide hospitality. With the ship's 39 sails covering 6,400 m², the deck is staffed with highly trained sailors who allow the Golden Horizon to hit speeds of 20 knots per hour with a fair wind. Able to stay at sea for three months without refuelling, the vessel has been meticulously readied for storms, fires or even serious equipment failure. All its major systems have a compete duplicate, including two engine rooms that can provide a

speed of 16 knots per hour, as well as two full water and electric supply systems. Two of its electric motors also feature a diesel back-up, ensuring the ship can make a safe return to port whatever the situation. **At the heart of this unique vessel is its high-strength steel hull that means it can safely navigate from ice-laden polar seas to tropical coastlines and stormy oceans across the world.** “This ship was built from Ukrainian steel. Thanks to the steel's properties, the vessel can travel to the North Pole,” said project manager Radovan Načinović. Made from 90% steel, the Golden Horizon was constructed at Brodosplit from 4,500 tonnes of steel plate and sheet, with the majority provided by Ukrainian steel manufacturer Metinvest. With sustainability an increasing concern for the tourism sector, unique and ground-breaking vessels such as the Golden Horizon could become a more common sight on coastal seas.

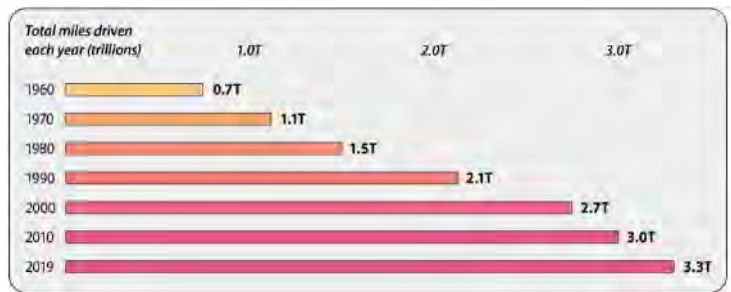


AUTOMOTIVE: THE HISTORY OF AUTOMOBILE SAFETY IN THE U.S.



How Has Automobile Safety Improved Over 60 Years?

In 2019, there were 6.7 million car accidents in the U.S., resulting in 36,096 deaths over the year—an awful statistic to say the least, but one that would be much worse if it weren't for seatbelts, airbags and other modern safety devices. In this infographic, data from the U.S. Bureau of Transportation is visualized to show how breakthroughs in car safety have drastically reduced the number of motor vehicle fatalities. **The data shows the number of fatalities for every 100 million miles driven. From a high of 5.1 in 1960 (the first year data is available), this metric has fallen by 78% to just 1.1.** What makes this even more impressive is the fact that there are more cars on the road today than in 1960. This can be measured by the total number of miles driven each year (above).





INNOVATION/AUTOMOTIVE: BMW IX FLOW MAKES THE SUV CHANGE COLOR USING E-READER TECHNOLOGY

At the 2022 Consumer Electronics technology show, BMW revealed two new products due to reach customers in the near future: the 2023 iX M60 electric SUV and a 31-inch screen with integrated Amazon Fire TV. BMW also showed off its wild imagination by unveiling a radical concept called the iX Flow.



Based on the iX SUV, the Flow is wrapped in something called E Ink—the material used in the displays of e-readers like the Kindle—which allows it to change color in the blink of an eye.

At the moment, the iX Flow can only shift through shades of white, grey, and black, but BMW suggested that adding vivid colors isn't out of the realm of possibility. The E Ink wrap consists of millions of microcapsules containing negatively charged white pigments and positively charged black pigments. This microcapsules, which have a diameter equal to the thickness of a human hair, can be stimulated by an electrical field to bring different amounts of each pigment to the surface of the microcapsule, changing the shade of the car. BMW sees a few uses for the E Ink technology in future BMWs. The color-changing wrap would allow the driver to adjust their vehicle's appearance based on their aesthetic preferences. E Ink could also make the car more efficient—in hot, sunny settings, the iX Flow could turn white to reduce the amount of heat absorbed by the body of the car and decrease the reliance on the air conditioning. In cold weather, the iX Flow could switch to black to absorb as much heat as possible and lessen the energy required for the heating system. Having the climate control systems using less juice from the batteries would help an EV maintain a longer range in more extreme temperatures. BMW also suggests applying the material to the interior to prevent certain surfaces, like the dashboard, from heating up too much when left in the sun. **The E Ink technology is also very energy efficient itself, only using energy during the quick color-changing phase, since the E Ink does not require a current to maintain the chosen shade.** BMW has not elaborated on the production possibilities of the E Ink technology seen on the iX Flow, but suggested that applying the material was not unrealistically expensive and that E Ink may eventually make its way onto production vehicles.

MEDICAL/STEEL: STAINLESS STEEL STILL VITAL IN VACCINE PRODUCTION

Although 2020 and 2021 were filled with much bad news and suffering caused by COVID-19, vaccine development was the one bright spot that continues to bring hope that the pandemic may be brought under control. The rapid development of highly effective vaccines by pharmaceutical companies will be remembered as one of the greatest accomplishments of our time. With the development of these vaccines, the next challenge is to produce hundreds of millions of doses as quickly as possible, but traditional pharmaceutical vaccine production capacity is not readily available. The construction and approval of a new pharmaceutical plant with bio-reactors and the supporting "water for injection" (WFI) and clean-in-place (CIP) systems can take 18 months or longer to be operational. During a pandemic this timing is too slow. To speed up vaccine production the industry turned to single-use technologies. With this approach, plastic materials are used for the bio-reactors which are sanitized using gamma irradiation and are disposed after one use. This technology does not require the supporting WFI and CIP systems and production can be brought on line in a much shorter time period.



The most widely used material for construction in traditional pharmaceutical plants is nickel-containing Type 316L stainless steel, and when increased corrosion resistance is needed, higher alloyed stainless steels or nickel alloys are selected. With the single-use approach a polymer bag is used as the bio-reactor. This method employs less stainless steel and other corrosion resistant alloys than traditional production. Although single-use production does displace some stainless steels, the nickel-containing austenitic stainless steels continue to play a vital role in vaccine production. The plastic bio-reactor bags must be placed inside metal containers called "totes" for mechanical support and temperature control. **The totes are constructed from polished Type 304L stainless steel to maintain hygiene and cleanability of the production environment.** The purification of the vaccine product is an important and necessary step in the production process. With single-use production, the purification is achieved using tangential flow filtration (TFF). This technique employs membrane filtration where a feed stream passes parallel to a membrane face. A portion of the stream passes through the membrane, the permeate, and the remainder of the stream, the retentate, is recirculated back to the feed. During vaccine production this process is performed in a purification skid. **The structural frame of the skid is constructed of polished Type 304L stainless steel and the tubing, which is in contact with the product, is constructed of electropolished Type 316L stainless steel.** The worldwide demand for COVID-19 vaccines will continue for the foreseeable future and large traditional production facilities will eventually be built. Until that is accomplished, single-use production will continue to be employed for rapid production of these lifesavers. In either case, nickel-containing alloys will continue to serve as vital materials of construction.

MEDICAL: ABBOTT UNVEILS NEW BIOWEARABLES CATEGORY AT CONSUMER ELECTRONICS SHOW

Abbott CEO Robert Ford's keynote at the Consumer Electronics Show 2022 was the first time a healthcare company delivered the keynote at CES, the most influential tech event in the world. "Health tech is a big part of CES. It isn't new to CES, but health innovation has taken on a new urgency since we last gathered two years ago in Las Vegas," said Gary Shapiro, president and CEO at the Consumer Technology Association, as he introduced Ford to the stage. "First and foremost, without incredible innovations in health tech – COVID vaccines, testing, and treatments – we just wouldn't be sitting here together in this room."

Ford's keynote unveiled a new category of Abbott consumer biowearables called Lingo, which encompasses future biowearables that are being designed to translate the body's unique language, allowing a person to track key biomarkers in the body – such as glucose, ketones, lactate and alcohol – to help better understand your general health and wellness. Lingo extends the Abbott sensing technology platform the company first developed for people with diabetes through the introduction of the Abbott Freestyle Libre continuous glucose monitoring system, and later expanded into a product designed for athletes. "Now the technology will have the potential to impact a broader pool of consumers. It's about learning your body's unique language, a language that most of us have yet to learn how to speak," Ford said. "What if we could decode the messages our body is trying to send us as a way to maintain and improve health?" Ford noted that diabetes was Abbott's first priority with the sensing technology. He said that Abbott now has the evidence and the expertise that comes from 3.5 million users, and Abbott intends to take it to the next level by translating a wide range of biometric signals – glucose, ketones, lactate, and alcohol – all important parts of metabolic health. Lingo is being designed to measure these biomarkers and provide more meaningful insights. For individuals following a keto diet, the technology will offer real-time feedback as to whether or not their body is in ketosis. Similarly, understanding one's glucose patterns is key to a broad range of health benefits from weight management to improved energy levels and sleep quality. **Ford concluded, "The Lingo alcohol sensor is going to help you make some better decisions. It's amazing what our bodies can tell us, and with Lingo, you'll understand what your body really needs, and what's good for you. Your body is constantly talking to you, and now it's time to listen."**

**MEDICAL: SCI-FI TYPES OF MEDICAL IMPLANTS WILL SOON BECOME REALITY, RESEARCHERS SAY**

For decades, doctors have embedded pacemakers, cochlear implants and cardiac defibrillators into their patients' bodies. More recently, consumers have started tracking their own heart rates and number of steps taken with watches, bracelets, cellphones and other wearable devices. **Researchers and doctors are now dreaming up more ways to merge those technologies,**



to move consumer-driven monitors inside bodies. In some ways, this is already happening: The medical field has rapidly adopted microchip implants, ultra-slim and flexible digital tags that can control a prosthetic limb, for example. Such technology can also monitor the movements of Parkinson's patients using accelerometers to detect tremors, which offers neurologists a detailed assessment of a patient's physical behavior before they visit for their next appointment, aiding in the selection of appropriate doses of medicine. Researchers at the University of Illinois developed

electronic sensors that can be embedded into temporary skin tattoos to track and stimulate brain waves to prevent seizures. This technology offers the potential for screening before an appointment without having to send a patient to a lab for testing. It could also allow patients to always carry their medical records. "With the lab-on-chip, general practitioners and paramedics will have a tool at their disposal to carry out tests on the patient before going to the laboratory," said Giuseppe Barillaro, an associate professor of electronics at the University of Pisa and the co-author of a study on bioabsorbable materials, which aid in healing and fully dissolve once the implant is no longer needed. He said that the technology is still maturing and the commercial availability for broad use is not available for all applications. **As health-care costs continue to rise, hospital stays have often been shortened and researchers are exploring the potential for ambulatory monitoring.** An example of this is a continuous glucose monitoring implant for adults with diabetes that pairs with a mobile app, first approved by the FDA in 2018. The tech has been slow to develop as fewer volunteers are willing to sign up to clinical studies, unlike vaccine pathways that draw hundreds of thousands willing to test preliminary doses, said Hubert Lim, a professor who researches implantable medical tech at the University of Minnesota's Department. Lim said people don't want things in their body, but he learned with deep brain stimulation and hip replacement that it's something that people adapt to it as they see the benefits of it.



ENERGY: HOW ENERGY PRICES PERFORMED IN 2021

A year after the start of the COVID-19 pandemic, the world started to reopen and generate insatiable energy demand. Supply shortages and the clean energy transition further fueled the rise of all energy commodities. Even in a year where markets and commodities performed strongly, energy prices stood out. The energy component of the Goldman Sachs Commodity Index rose by 59% in 2021, returning more than double any other component in the index. Here's how energy commodities performed in 2021, as tracked by *Trading Economics* and *TradingView*.

Energy Price Increases Last Year

After dipping into negative prices in April of 2020, West Texas Intermediate (WTI) crude oil had a strong bounce back. Many of crude oil's derivative products also increased in price by double digits, resulting in higher gas prices at the pump. The U.S. average retail price for gasoline increased by 45.8% to close at \$3.28/gal, while wholesale prices of Reformulated Blendstock for Oxygen Blending (RBOB) gasoline also climbed by 57.8%. Natural gas prices in Europe

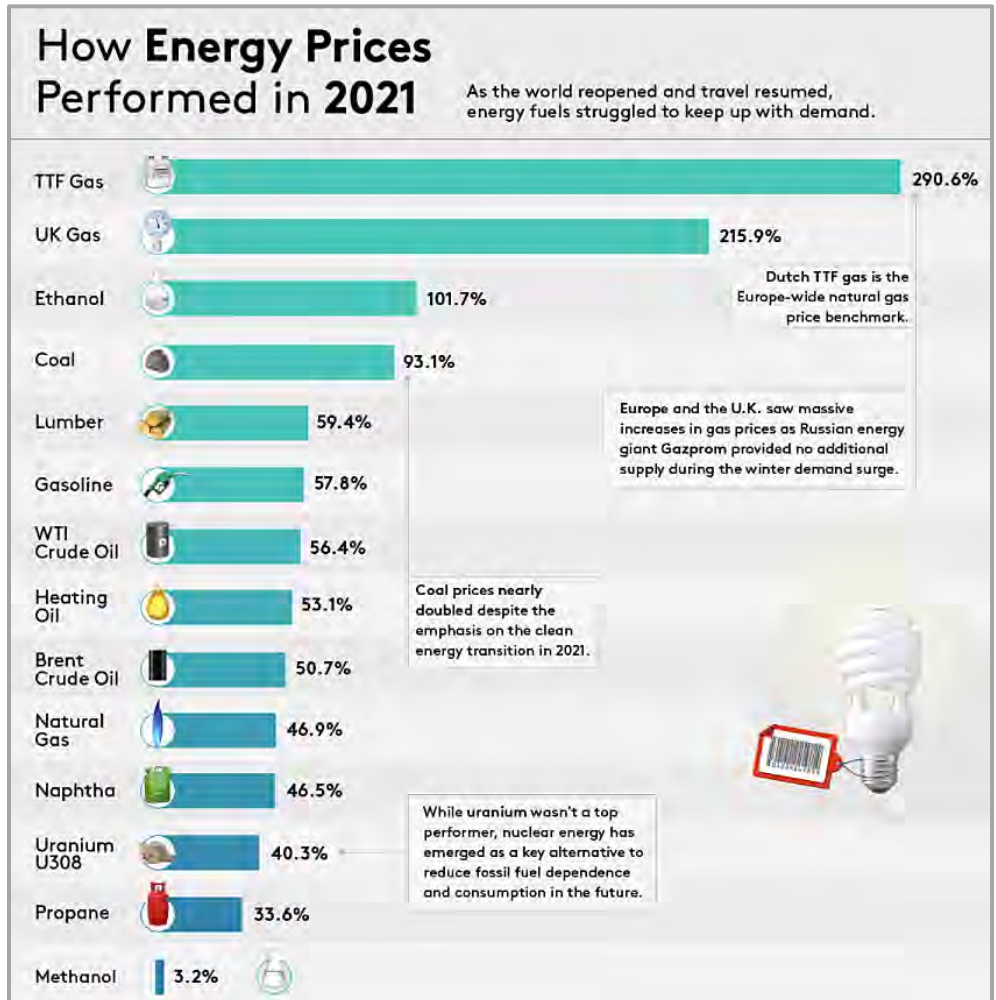
and the UK saw the biggest price increases in 2021, jumping more than 200%. They were followed by ethanol, a biofuel that oil refiners are required to blend with their products. This requirement, along with the price rises in corn and sugar (ethanol's primary raw materials around the world), made this hot commodity even more expensive.

Rising Natural Gas Prices Fuel Tension and Unrest

While the U.S. also saw increases in its gasoline prices, these were mild compared to surges in Europe and elsewhere. With close to 43% of Europe's total gas imports coming from Russia, no additional supply was provided during the cold winter months. This was compounded as Germany's approval of the Nord Stream 2 pipeline has remained in limbo. So far, 2022 has been a continuation of these trends. Liquefied petroleum gas (LPG) prices have nearly doubled due to unrest in Kazakhstan. The Kazakhstan government's decision to lift price controls on LPG (the primary fuel for Kazakh cars) saw prices surge and led to days of protests and Russian intervention.

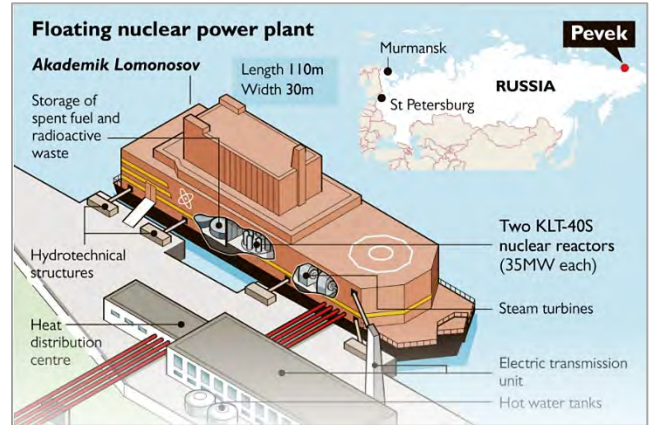
Coal Stays Strong Despite the Clean Energy Transition

Despite 2021's emphasis on the clean energy transition, coal prices nearly doubled as the world was unable to shake off its dependence on the fossil fuel. Even pledges from the COP26 climate change conference, such as China's to reduce coal consumption after 2025, are not yet having an impact on prices. That's because the country is still planning to add up to 150 gigawatts of new coal-fired capacity before then. On the other hand, uranium couldn't keep up with the price rises of fossil fuels. Although the energy metal had a breakout year as one of the recently renewed hopes for cleaner energy, the outlook for nuclear energy adoption and development is still mixed. While China is expected to invest as much as \$440 billion in new nuclear power plants over the next 10 years, Germany shut down half of its remaining plants in 2021. After the surge of energy prices in 2021, nations will need to carefully manage their clean energy transitions to avoid further unsustainable price rises.



ENERGY: FLOATING NUCLEAR PLANT FUELS PUTIN'S RUSSIAN ARCTIC VISION

Moored off the small Arctic town of Pevek is the Akademik Lomonosov, the world's first floating nuclear power plant and a sign of how President Putin's ambitions for Russia's Far East are taking shape. **This port on the northern coast of Siberia is part of Moscow's plan to open up a major shipping lane through the Arctic and bring natural resources within easier reach.** Pevek's harbor is ice-free for only four months a year but is intended to become a hub for commercial shipping on the so-called Northern Sea Route (NSR) as climate change gradually eases the passage through the Arctic. The power provided by the Akademik Lomonosov is intended to help Pevek become a gateway to Chukotka, a region close to Alaska and rich in gold, silver, copper, lithium and other metals. Development of the NSR is in the hands of Rosatom, the state nuclear corporation. Rosatom is also in charge of nuclear-powered icebreakers that it expects will help to open up year-round Arctic navigation by the middle of the decade. Rosatom has not revealed how much it is investing but insists that its Arctic ventures will make a return. When fully operational in 2023, the nuclear plant is expected to power several resources projects including Mayskoye, a gold mine, and Pyrkakay, one of the country's largest tin deposits. **Rosatom plans to install four more floating nuclear plants by the end of the decade across the Chaunskaya Bay to provide power to the Baimskaya copper mining project.**



The deposit of a metal in high demand for its use in renewable energy technologies was discovered in Soviet days, but lack of technology, equipment and infrastructure delayed its

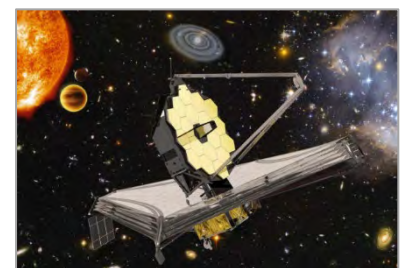


development. The \$12 billion project is expected to start production by 2028. Developing Chukotka along with the rest of the Arctic has long been a goal for Putin and Russia, which hosted a plenary meeting of the Arctic Council, where the eight countries of the region are represented. NSR shipments have increased from 1.5 million tonnes in 2000 to 33 million tonnes last year, mainly of gas and oil. Putin has said volumes should reach 80 million tonnes in 2024. Rosatom expects the volume of all Russian exports going via the route to reach 110 million tonnes in the next decade. Rosatom says the route is often shorter and can be competitive despite the need to hire icebreakers to escort ships in winter. For example, a trip from Busan in South Korea to Rotterdam in the Netherlands would take 27 to 28 days via the NSR compared with 40 days via the Suez Canal. Managing efficient shipping all year round remains a challenge for Rosatom, although climate change is playing a part. In the past 40 years, the Arctic ice cap has halved in the warmest month of September and by 10% in the coldest month of

March, according to the Arctic and Antarctic Research Institute. By 2050, it expects ice levels to lose another two-thirds in the summer and to halve in winter. The warming ocean is expected to help cut shipment cost. Less ice means fewer icebreakers and faster journeys.

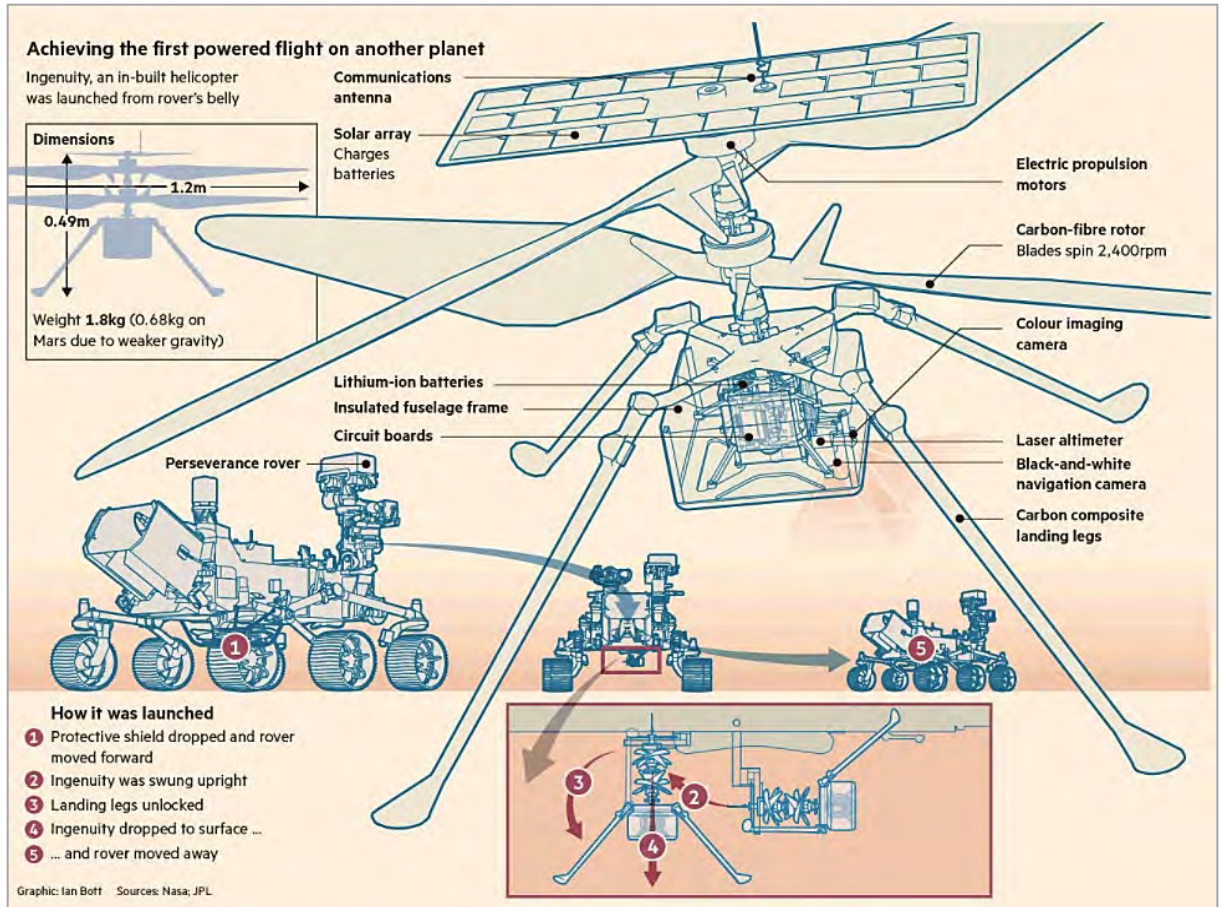
AEROSPACE: THE JAMES WEBB SPACE TELESCOPE HAS FINALLY LAUNCHED

The James Webb Space Telescope successfully launched on Christmas Day and began the month-long journey to its destination in space. Webb is designed to peer farther back in time and in finer detail than any other telescope. It's resolution will be 100 times that of its aging predecessor, Hubble. In the six months after launch, the spacecraft will perform a series of exquisitely choreographed maneuvers to get ready to observe the cosmos. **One misstep throughout the entire process could jeopardize the mission. It must flawlessly unfold like an intricate piece of origami.** First, the sun shield will deploy and begin to cool down the telescope. Then Webb's secondary mirror will unfurl, followed by the much larger primary mirror. Once all parts of the telescope are unwrapped and it cools to its operating temperature (-370° F), alignment and calibration of its multiple instruments and sensors will begin. Webb will travel roughly 930,000 miles over the course of a month to a point in space where the gravitational pull of the sun and Earth balance out the centripetal force needed for the telescope to remain stable in its orbit. Webb may help to solve some of the most pressing mysteries in the universe. For instance, the telescope could witness the birth of some of the universe's youngest galaxies, born just 50 million years after the Big Bang. It'll likely shed light on how stars and planetary systems form and reveal new and exciting worlds lurking in the shadows of faraway stars. The mission is designed to last ten years, but Webb will likely operate for much longer.



AEROSPACE: ACHIEVING THE FIRST POWERED FLIGHT ON ANOTHER PLANET

On December 17 1903, the Wright brothers achieved the first flight of a powered aircraft when Orville Wright piloted their Wright Flyer for 12 seconds, travelling 36 metres. On April 19 2021, a small piece of muslin from the brothers' first aircraft made a profound statement about technological achievement when it flew again, this time on another planet. Attached to Ingenuity, Nasa's Mars helicopter, it completed a flight of 39.1 seconds, ascending vertically to 3 metres over the red planet's surface. Ingenuity had reached Mars attached to the underside of the Perseverance rover, it completed a flight of 39.1 seconds, ascending vertically to 3 metres over the red planet's surface. Ingenuity had reached Mars attached to the underside of the Perseverance rover. By December 2021 Ingenuity had flown 18 times, and covered a total of nearly 4km in over 30 minutes.



COMMODITIES: HOW WILL THE WEST SECURE COPPER FOR ITS ENERGY TRANSITION?

The green energy transition cannot be accomplished without copper and other essential metals. Copper, with its high conductivity, efficient heat transfer and ductility, is critical for motors, transformers, wiring and, in a warming world, air-conditioner piping. As North



America, Europe and Australia accelerate the transition, their own domestic production is in long-term decline. According to CRU, copper demand from renewables will be about 801,000 tonnes in 2022 out of total global consumption of about 25 million tonnes. Over the next

four years, EVs and renewables will account for 72% of the total growth in refined copper demand. After some lean years in the past decade, the incumbent metals companies conserved cash flow and pulled back from new projects. The Chinese moved in to take their place, particularly in Africa. The COP26 "pledges" included a lot of commitments to EVs, solar panel installation, charging stations and wind turbines but nothing whatsoever about producing new metals to build them. **The IMF pointed out that current copper, lithium and platinum supplies are inadequate to satisfy future needs, with a 30 to 40% gap versus demand.** The metals industry response has been very impressive in terms of greenwashing graphics in annual reports, less so in new project development. There has not been an announcement of a large-scale new greenfield copper mine for more than two years. The markets have noticed, and copper prices were up about 25% last year. At close to \$10,000 per tonne (\$4.54/lb), LME copper has been "in backwardation", or short physical supply, for several months. The current "visible" warehouse stocks are sufficient for just six days' consumption. A Goldman Sachs note in mid-December said, "We continue to forecast copper prices rising to \$15,000 (\$6.80/lb) by 2024 and even higher through 2025."





COMMODITIES: EVS DRIVE UP METALS DEMAND — ESPECIALLY NICKEL, COPPER AND LITHIUM

ELECTRIC VEHICLES DRIVE UP THE DEMAND FOR METALS

2019-2030 Demand Growth Coming from the EV Industry



Here's a look at the expected demand growth for some of the metals required for the production of electric vehicles.

The demand for EVs is driving the demand for metals, with EVs expected to represent 58% of car sales by 2040.

Copper, nickel, and lithium are some of the key metals used in EV battery production.



Electric vehicle (EV) sales were abruptly interrupted in 2020-2021 due to COVID, but the consumer base for these cars isn't going away any time soon. EVs are becoming more popular due to higher environmental awareness, falling costs and ever-improving infrastructure.

Demand for Metals on the Rise: Demand from the EV industry for key metals is on a swift upward trajectory. Copper, nickel and lithium are some of the key metals required for EV battery production. Consequently, demand for nickel from EVs is expected to increase 14 times between 2019-2030. Lithium and copper are expected to experience demand growth of 9-10x.

What's Driving Demand? As consumer awareness increases around climate change and demand shifts away from the oil and gas industry, the demand for EVs grows immensely. EVs are expected to be over half of all passenger vehicle sales by 2040. Many governments have committed to the

production of EVs in a bid to decrease their dependency on fossil fuels. China has a goal of having EVs make up 20% of new car sales by 2025.

Nickel Prices Are Soaring: Benchmark nickel futures on the LME traded below \$23,000 a tonne (\$10.43/lb) at the end of January, not far from a decade high of \$24,320 (\$11.03/lb) touched on January 21st, as risk-off sentiment drove a correction, while rising demand and low inventories continue to buoy the prices. On-warrant nickel stocks were at their lowest since December 2019 at 48,846 tonnes and nickel stocks in Shanghai Futures Exchange warehouses are close to record lows at 4,859 tonnes. Meanwhile, the demand from the battery sector remains firm as EV sales are rising and economic growth in China is set to pick up again amid further stimulus.



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ULBRICH ACQUIRES PICO RIVERA FACILITY FROM ATI SPECIALTY ROLLED PRODUCTS



Effective Jan 31, 2022, this service center facility will operate under the name *Ulbrich of California*. On this date, all shipments from the Pico Rivera operation will become orders serviced by Ulbrich. ATI will continue supplying Ulbrich with the quality Nickel, Titanium and Specialty alloy products their customers rely on. Ulbrich and ATI are committed to a seamless transition and are working together to ensure the product quality & service from this location continues to exceed customer expectations. The Ulbrich family is excited to operate a facility once again on the West Coast!

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Charles was a Senior Vice President of procurement in the metal container industry, with a career spanning nearly four decades. He specializes in steel and aluminum procurement and utilizes his expansive knowledge of the steel and aluminum industry in the production of this detailed monthly update for Ulbrich and the company's valued employees and partners.



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