EXECUTIVE SUMMARY

AMERICAS: THE FEDERAL RESERVE RAISED INTEREST RATES BY A QUARTER POINT IN MAY and signaled it may pause further increases, giving officials time to assess the fallout from recent bank failures, wait on the resolution of a standoff over the U.S. debt ceiling and monitor the course of inflation. April data showed: **U.S. hiring and workers' pay gains** accelerated in April. Nonfarm payrolls increased 253,000. **The manufacturing sector** registered a slight improvement in operating conditions as output strengthened, with production increasing at the fastest pace since May 2022. **Consumer confidence** fell to a nine-month low led by a darkening outlook that augers a recession. March data showed: Including mining and utilities, **total industrial production** climbed 0.4%. Production at U.S. factories fell 0.5%. **Durable goods orders** jumped 3.2%, boosted by a surge in orders for commercial aircraft. **Factory orders** rose 0.9%, boosted by a 78% jump in civilian aircraft bookings. **The leading economic indicators** fell 1.2% to its lowest level since November of 2020. **Consumer prices** climbed just 0.1% in March and year-to-date the CPI was up 5.0%, the smallest 12-month gain since May 2021. **Producer prices** fell 0.5%, and there were signs that underlying producer inflation was subsiding. **Retail sales** fell 1% as consumers cut back on purchases of motor vehicles and other big-ticket items. **The trade deficit** contracted sharply, down 9.1% to $64.2 billion.

OVERSEAS: CHINA'S SERVICES SECTOR GREW AT A HEALTHY PACE IN APRIL, a sign that Chinese consumers continue to drive the country's economic rebound as its factory sector quickly decelerates. Activity in manufacturing fell unexpectedly below the 50 line in April, suggesting activity in the sector shrank over the past month. **Eurozone business activity** gathered momentum in April. The bloc's dominant services industry saw already-buoyant demand rise, more than offsetting a deepening downturn in manufacturing.

STEEL: ACERINOX EARNED $150MN IN THE 1ST QTR, DRIVEN BY GROWTH IN ITS U.S. OPERATIONS, and forecast slightly better earnings in the 2nd Qtr. Robust demand for steel in early 2023 in the U.S., its biggest market, offset persisting difficulties in Europe. **ArcelorMittal** entered a joint venture to build an onshore wind farm in Brazil to help decarbonize its expanding steel operations there. The wind farm will cover nearly 40% of ArcelorMittal's power needs in Brazil in 2030. The project's estimated cost is $800mn.

AUTOMOTIVE: A NEW CATEGORY OF RANGE-BOOSTING BATTERY TECHNOLOGY is moving into mass production for EVs. Sila Inc. is in the later stages of qualification with auto manufacturers before a new factory begins production late next year. Sila says its Titan anodes will immediately boost maximum vehicle ranges by 20%. **Tesla** cut prices for some of its Model Y and Model 3 vehicles in the U.S. for the sixth time this year to spur demand as competition among electric vehicle makers heats up around the world.

ENERGY: GERMANY'S LAST REMAINING NUCLEAR POWER PLANTS were switched off in April, marking a watershed moment in a country that has long harbored deep skepticism of atomic energy. Critics see the shutdown as an act of madness while Europe's energy supplies remain precarious, and the world is striving to wean itself off fossil fuels. **Carrier Global Corp.** agreed to pay €12 billion to acquire a German unit of Viessmann Group that produces heat pumps, allowing Carrier to capitalize on the green energy transition underway.

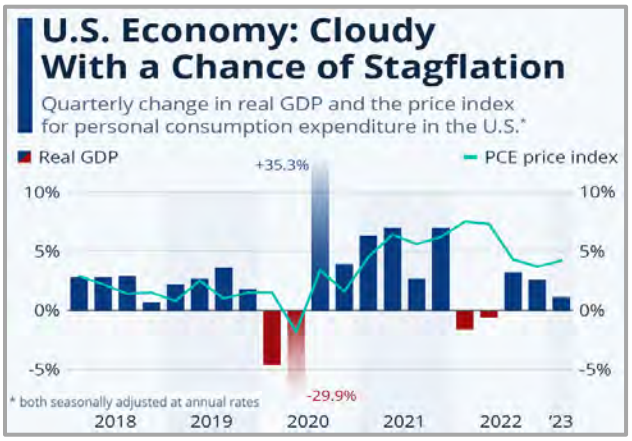
MEDICAL: INSULET RECEIVED FDA CLEARANCE FOR A TUBELESS INSULIN PUMP designed for people with Type 2 diabetes. The device, called Omnipod GO, is intended to replace daily injections of long-acting insulin. **Blackstone** is trying to curb rising employee health costs with an AI-powered individualized approach to diabetes to reduce people's reliance on costly new drugs. It is testing an app from Twin Health with workers across its companies. **AntennaWare** has a newly patented technology that may improve how implants wirelessly send data from within the human body, reducing the energy needed to transmit data and increasing the life span of devices.

AEROSPACE: AN ARIANE-5 ROCKET LAUNCHED EUROPE'S €1.6BN JUICE SPACECRAFT on an eight-year voyage to Jupiter and its icy moons, where it will search for signs that liquid oceans lie beneath their frozen surfaces that might support life. Jupiter Icy Moons Explorer is the most complex planetary space mission ever attempted. **SpaceX's attempt to send its Starship system** into space ended in a blast after an engine failure forced it to blow up the rocket shortly after liftoff. **Boeing** announced 130 airplane deliveries over the 1st Qtr, inching past rival Airbus, which delivered 127 jets. Boeing's deliveries were up 27% from a year earlier, when it delivered 95 jets.

COMMODITIES: A LACK OF NEW COPPER MINING ACTIVITY has added to worries that there won't be enough of the red metal for the energy transition. Electrification is expected to increase annual copper demand to 36.6mn tonnes by 2031, with supply forecast to be around 30.1mn tonnes, creating a 6.5mn tonne shortfall by 2030. **The U.S. has become reliant on foreign sources** to meet domestic demand for minerals and fossil fuels. Today, it is 100% import-reliant for 17 mineral commodities and at least 50% for 30 others.

THE AMERICAS

- **Retail sales** fell 1% in March as consumers cut back on purchases of motor vehicles and other big-ticket items, suggesting that the economy was losing steam at the end of the 1st Qtr because of higher interest rates. Receipts at auto dealers dropped 1.6% after fading 1.3% in February. Furniture store sales fell 1.2%. Electronics and appliance stores tumbled 2.1%. Lower gasoline prices depressed sales at service stations, which plunged 5.5%.
- **The U.S. trade deficit** narrowed sharply in March as exports increased, which could position trade to continue contributing to economic growth in the 2nd Qtr. The trade deficit contracted 9.1% to $64.2bn. Exports increased 2.1% to $256.2bn; Imports slipped 0.3% to $320.4bn. Trade has contributed to GDP growth for four straight quarters.
- **U.S. import prices** fell 0.6% in March, leading to the biggest year-on-year decline since mid-2020, further evidence that inflation pressures were subsiding. In the 12 months through March, import prices decreased 4.6%. Export prices fell 0.3% in March and were down 4.8% year-on-year.
- **Durable goods orders** jumped 3.2% in March, boosted by a surge in orders for commercial aircraft, but the value of core capital goods orders, a proxy for investment in equipment that excludes aircraft and military hardware, decreased 0.4%. Bookings for primary metals and machinery inched higher, while orders for motor vehicles slid.
- **Production at U.S. factories** fell 0.5% in March, while February data was revised upward to 0.6%. Including mining and utilities, total industrial production climbed 0.4% in March. Manufacturing output rose at a 0.3% annualized rate in the 1st Qtr after declining at a 3.1% pace in the October-December period. The modest growth in production last quarter is at odds with surveys that have suggested that manufacturing was in deep recession.
- **Producer prices** fell 0.5% in March, and there were signs that underlying producer inflation was subsiding. Cooling supplier prices can signal future fading of consumer inflation if firms pass on lower costs. In the 12 months through March, the PPI increased 2.7%, the smallest YOY rise since January 2021 and followed a 4.9% advance in February. The annual PPI rate is subsiding as last year's large increases drop out of the calculation.
- **The U.S. leading economic indicators** fell 1.2% in March to 108.4 following a revised decline of 0.5% in February. "The LEI index fell to its lowest level since November of 2020, consistent with worsening economic conditions ahead," said The Conference Board.
- **Gross domestic product** rose an annualized 1.1% in the 1st Qtr. The slowdown was largely driven by an inventory drawdown with an acceleration in consumer spending providing the main impetus for growth. Economists warned that momentum slowed as the quarter progressed in a warning sign for the current quarter. The Fed's preferred core gauge of prices, which excludes food and energy, picked up to 4.9% in the 1st Qtr, the quickest pace in a year.



- **The Federal Reserve** raised interest rates on May 3rd by 0.25 and signaled it may pause further increases, giving officials time to assess the fallout from recent bank failures, wait on the resolution of a political standoff over the U.S. debt ceiling and monitor the course of inflation. The unanimous decision lifted the Fed's benchmark rate to 5.00%-5.25%, and it was the 10th consecutive increase since March 2022.
- **Consumer prices** climbed just 0.1% in March, and the CPI was up 5.0% YTD, the smallest 12-month gain since May 2021. The cost of food consumed at home fell 0.3%, the first decline since September 2020.The cost of gasoline fell 4.6%, but stubbornly high rents kept underlying inflation pressures simmering, solidifying the Federal Reserve determination to raise interest rates again in May.
- **The U.S. manufacturing sector** registered a slight improvement in operating conditions during April, according to the latest PMI survey from S&P Global. The rise in output strengthened with production increasing at the fastest pace since May 2022. The uptick in demand was centered on the domestic market as new export orders contracted further. Nonetheless, anticipation of greater future sales led firms to ramp up employment.
- **U.S. hiring and workers' pay gains** accelerated in April, showing signs of labor-market resilience and fresh inflationary pressures in the face of economic headwinds. Nonfarm payrolls increased 253,000. The unemployment rate fell back to a multi-decade low of 3.4%. Average hourly earnings rose 0.5% in April and 4.4% from a year ago.

- **New orders for U.S.-manufactured goods** rose 0.9% in March, boosted by a 78% jump in civilian aircraft bookings, but the overall manufacturing industry continued to struggle under the weight of higher interest rates. Motor vehicle orders fell 0.6%. Excluding transportation, orders fell 0.7% for a second straight month.
- **Consumer confidence** fell to a nine-month low in April led by a darkening outlook that augers a recession beginning in the near future, according to The Conference Board. Its consumer confidence index fell to 101.3 from a downwardly revised 104.0 in March.
- **Existing home sales** dropped 2.4% in March to an annual rate of 4.44mn units as a reversal in mortgage rates pushed buyers back to the sidelines. March marked the 13th time in the previous 14 months that sales have slowed. Sales of new single-family homes surged 9.6% to a one-year high. Single-family housing starts, which account for the bulk of homebuilding, rose 2.7% to an annual rate of 861,000 units. Single-family home prices increased 0.2% in February as a dip in mortgage rates at the start of the year fueled demand, but the overall trend continued to point to a slowdown.

  Key Update: *The Fed's aggressive interest rate campaign has plunged the housing market into recession, with residential investment contracting for seven straight quarters, the longest such streak since the collapse of the housing bubble triggered by the 2007-2009 Great Recession.*
- **The U.S. services sector** maintained a steady pace of growth in April as new orders increased amid a surge in exports, but businesses continued to face higher prices for inputs, indicating that inflation could remain elevated.
- **Construction spending** increased 0.3% in March, boosted by investment in nonresidential structures, but single-family homebuilding remained depressed amid higher mortgage rates. Residential investment has contracted for eight straight quarters but the pace of decline is slowing.
- **Consumer spending** was unchanged in March as an increase in outlays on services was offset by a decline in goods. The personal consumption expenditures (PCE) price index gained 0.1% in March, the smallest increase since last July. In the 12 months through March, the PCE price index increased 4.2% and followed a 5.1% rise in February.
- **U.S. manufacturing projects** amounting to more than $200bn have been announced since Congress passed sweeping subsidies last year. New investment in chips and clean tech is double that made in the same sectors in 2021, and nearly 20 times the amount in 2019. While there were four projects worth at least $1bn each in these sectors in 2019, there were 31 after August 2022.
- **Steel imports** in March totaled 2.614mn tons, including 1.906mn tons of finished steel. Total and finished steel imports were down 11.5% and 14.5% respectively YTD vs. 2022. Finished steel import market share was an estimated 22% in March and 23% over the first three months of 2023.
- **Stainless steel demand** is slowing, particularly from the appliance industry, as interest rate hikes have curbed growth in residential construction and home remodeling. March service center shipments of stainless products at 145,900 tons were down 21.2% YOY, and YTD shipments at 417,700 tons were lower by 11.5% compared to the same 2022 period. Service center inventories have been worked down to more manageable levels of 474,900 tons at the end of March or 3.3 months' supply. LME nickel prices have risen by almost 10% since the end of March and are now above $25,400 per tonne. (See **Appendix: Steel**, page 8)
- **ArcelorMittal** entered a joint venture to build a 554MW Babilonia onshore wind farm in Brazil. ArcelorMittal Brazil will hold a 55% stake in the JV, while Total-Energies backed Casa dos Ventos will hold the remaining 45%. The project's estimated cost is $800mn, including an equity investment of $150mn from ArcelorMittal, who will use the wind farm to help decarbonize its expanding steel operations in Brazil. It has already signed a 20-year power purchase agreement with the JV, and it estimated the farm will cover nearly 40% of its power needs in Brazil in 2030.

- **U.S. Steel 1stQtr adjusted earnings** dropped sharply from last year but the company said it expects to deliver stronger 2ndQtr results because of higher steel prices. Net income plummeted to $199mn from $882mn in the year-ago quarter, as total revenues fell 14.5% to $4.47bn. Results were marked by sharp earnings decline in the Flat-Rolled segment, which swung to a $7mn loss from a $529mn profit a year ago. USS Europe fell to a $34mn loss from $264mn in earnings, and the Mini Mill segment's net slumped to $12mn from $278mn. Steel shipments and production for all four of USS's segments increased in the 1stQtr from a year ago.
- **Acerinox** earned a net profit of $150mn in the 1stQtr, driven by growth in its U.S. operations (NAS), and forecast slightly better earnings in the 2ndQtr. Robust demand for steel in early 2023 in the U.S., its biggest market, offset persistent difficulties in Europe. In January, Acerinox said it would invest $244mn to raise annual capacity by 20%, or 200,000 tonnes, at its largest U.S. stainless steel factory.

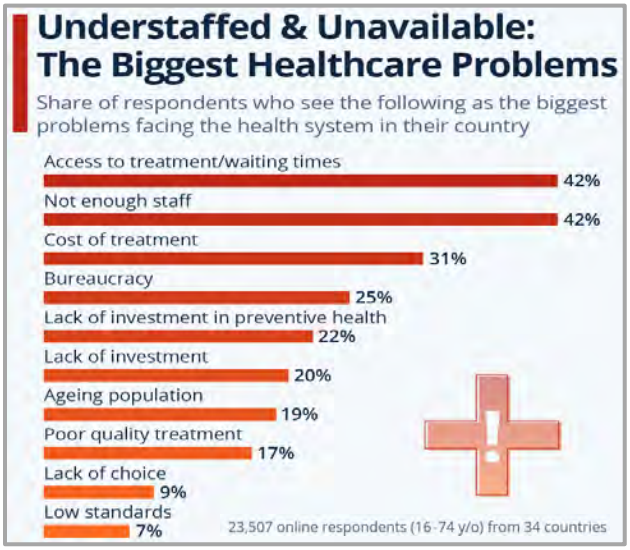
- **The Administration** is proposing rules to ensure that two-thirds of new cars and a quarter of new heavy trucks sold in the U.S. by 2032 are all-electric. The EPA cannot mandate that carmakers sell a certain number of EVs but under the Clean Air Act, the agency can limit the pollution generated by the total number of cars each manufacturer sells. The agency has set that limit so tightly that the only way manufacturers can comply is to sell a certain percentage of zero-emissions vehicles. Companies that fall short of the standard could be penalized, including fines of billions of dollars. (See **Appendix: Automotive**, page 11)

- **UAW union President Shawn Fain** criticized a GM joint venture battery plant for paying workers much less than assembly plant employees even though it benefits from hefty U.S. government tax credits. Workers at the Warren, Ohio, joint venture Ultium Cells LLC plant start at $16.50/hr, rising to $20/hr after seven years, while union workers at a nearby Ohio GM assembly plant made $32/hr. Workers at Warren voted to join the UAW but have not yet reached a first contract agreement. The Ultium plant at full production will receive $1.2bn a year in battery production tax credits under the Inflation Reduction Act (IRA).
- **Americans' gasoline usage** was an average of 392mn gallons of gasoline a day in 2018, an all-time high. In 2022, that was down to 369mn gallons. The main reason to expect consumption to continue to fall is the electrification of driving. One side effect of the decline in consumption could be, paradoxically, higher gasoline prices. Cutbacks in U.S. refining capacity in the face of falling gasoline demand may bring bigger refiner profit margins. On the West Coast, where EV market share is highest (it was 17.1% in California in 2022), refinery capacity has fallen faster than gasoline consumption since 2010. That translates to fatter margins for refiners and higher and faster-rising gasoline prices in the region than elsewhere in the country.
- **The ILWU,** which represents more than 22,000 dockworkers at ports from Southern California to Washington state, reached agreement with employers on the use of automation, one of the biggest obstacles in negotiations that began nearly a year ago. That leaves wages as one of the main dividing points in reaching a new multiyear agreement. The tentative agreement marks the first significant advance in the talks since a pact on healthcare benefits was reached last summer.
- **Tesla** cut prices for some of its Model Y and Model 3 vehicles in the U.S. for the sixth time this year to spur demand as competition among EV makers heats up around the world. Tesla has slashed prices in numerous markets worldwide to stay ahead of legacy U.S. competitors, while it strives to catch up with Chinese automakers in its second-largest market. Tesla's 1st Qtr net profit fell by nearly a quarter to $2.51bn from a year earlier on revenue of $23.33bn. After the company implemented global price cuts of as much as 20% in January, CEO Musk's strategy of investing in long-term market share over short-term profit led to a 10-point YOY drop in gross profit margin in the first quarter.

- **Boeing** announced 130 airplane deliveries over the 1st Qtr, inching past rival Airbus, which delivered 127 jets. Boeing's deliveries were up 27% from a year earlier, when it delivered 95 jets. The U.S. planemaker delivered 64 aircraft in March, 36% more than the 41 jets transferred to customers in the same month last year. The 737 MAX made up 52 of that sum, with United and Southwest Airlines each taking ownership of 12 MAX jets. Airbus handed over 127 jets in its 1st Qtr, including 61 deliveries in March.
- **A manufacturing problem with Boeing 737 MAX jets** that led to a pause in some deliveries threatens to disrupt plans by U.S. carriers to boost capacity to capitalize on a busy summer travel season. It is expected to result not just in lost revenue, but it will likely also drive up airlines' operating costs. Boeing's latest problem affects a portion of the 737 MAX family of airplanes, including the bestselling MAX 8. The problem is not deemed to be a safety of flight issue and in-service planes can continue to operate.

Key Update: *Carriers are already grappling with shortages of pilots, air traffic controllers and new planes, making it harder to add more flights. They are leaning on bigger planes that can accommodate more passengers to get around operational challenges.*

- **SpaceX's attempt to send its Starship system** into space ended in an explosion after an engine failure forced mission control to blow up the rocket shortly after liftoff. SpaceX said it blew up Starship and its Super Heavy booster after they failed to separate. It cited problems with some of Starship's 33 engines. The mishap potentially complicates CEO Elon Musk's goal to send humans back to the moon and Mars. The test was a crucial one for Starship, the largest rocket ever built, and ewas meant to show that the vehicle could reach space and complete a partial orbit of Earth.
- **Healthcare systems** around the world have been put to the toughest possible test during the COVID-19 pandemic, but they also face a wide range of challenges even during "normal" times. These complexities can affect the quality and accessibility of care provided to patients and vary widely from country to country. According to Ipsos' *2022 Global Health Monitor*, some problems are very widespread internationally, despite the many different approaches in how healthcare is funded and provided.



- **Blackstone** is trying to curb rising employee health costs with an AI-powered individualized approach to diabetes to reduce people's reliance on costly new drugs. Blackstone is testing a program from startup Twin Health with workers across its portfolio companies. The app is designed to help diabetics rely less on expensive drugs to lose weight and control their blood sugar. Twin Health uses AI and machine learning to analyze data from glucose monitors, activity trackers and surveys. The result is instant, personalized advice for diet, exercise and other activities that takes into account how users are feeling, what they've eaten or where they are. If users are able to get their blood sugar under control with these behavior changes, they may avoid higher-priced drugs. (See **Appendix: Medical**, page 13)

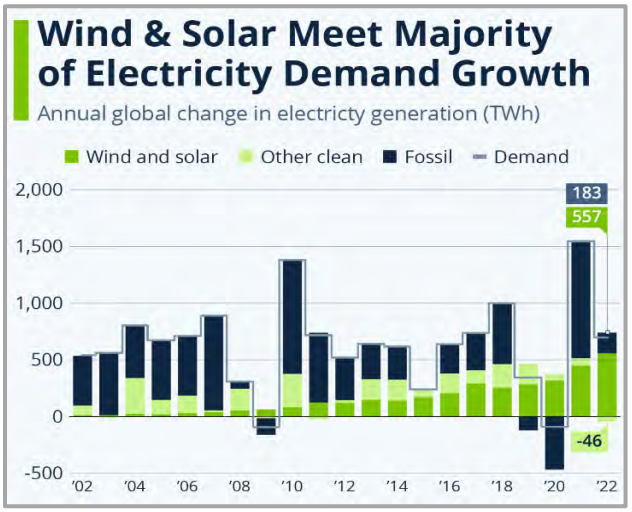
- **Insulet** received FDA clearance for a tubeless insulin pump designed for people with Type 2 diabetes in the early stages of insulin treatment. The device, called Omnipod GO, is intended to replace daily injections of long-acting insulin. The device was designed to serve more than 3 million people who use basal insulin or are transitioning to insulin therapy to treat Type 2 diabetes.
- **Apple** is working on an AI-powered health coaching service and new technology for tracking emotions, its latest attempt to lock in users with health and wellness features. The service is designed to keep users motivated to exercise, improve eating habits and help them sleep better.
- **The Internet of Medical Things (IoMT)** enabled medical devices to transmit data and physicians to remotely adjust settings to tailor treatments, but it also created cybersecurity risks. Infusion pumps and medication dispensing technologies are the riskiest medical devices with Internet connectivity. The conclusion is based on an analysis of common vulnerabilities and exposures (CVEs). Armis Security's assessment found 27% of infusion pumps have unpatched critical severity CVEs.

  Key Update: *The Armis report comes as the FDA moves to require medical device makers to provide cybersecurity information as part of their pre-market submissions.*
- **GE's union workers** ratified a two-year contract extension that provides a 12% wage increase. The extension, which covers about 3,000 American workers, will also ensure labor protections after the spinoff of the company's aerospace and energy divisions in early 2024 . The contract extension takes effect on July 1 and continue through June 22, 2025. (See **Appendix: Energy**, page 9)
- **The EPA** is preparing to issue new rules that would slash the amount of planet-warming greenhouse gases produced by power plants in the coming decades. For the first time, emissions from both new and existing natural-gas plants, as well as existing coal-fired plants, would be regulated. Electric utilities would have various options for meeting the tougher standards by installing new carbon-capture systems or switching to cleaner fuels such as hydrogen.
- **Carrier Global Corp.** has agreed to pay €12bn to acquire a unit of Viessmann Group, based north of Frankfurt, that produces heat pumps. The cash-and-stock deal would allow Carrier to expand in Europe and capitalize on the green energy transition underway on the continent, the company said. It also comes days after Berlin announced a ban on new furnaces fired by fossil fuels, starting next year.

EUROPE, AFRICA & THE MIDDLE EAST

- **Eurozone business activity** gathered momentum in April, despite central bankers signaling they are nearing the peak of their interest rate increases. The bloc's dominant services industry saw already-buoyant demand rise, more than offsetting a deepening downturn in manufacturing. The S&P Global flash Composite PMI, seen as a good gauge of overall economic health, jumped to an eleven-month high of 54.4 from March's 53.7. The manufacturing PMI fell to 45.5 from 47.3, its lowest since the coronavirus pandemic was cementing its grip on the world three years ago.
- **ThyssenKrupp** announced the departure of its CEO Martina Merz, who had been leading the German conglomerate's restructuring, triggering a 13% drop in its shares.
  Key Update: *A person close to management said that Merz's departure risked derailing plans to sell ThyssenKrupp's steel unit — the original activity of the group — amid growing pressure from unions to ensure that jobs were protected.*
- **Royal Philips,** the Dutch health technology company, has set aside €575 million against the resolution of a class-action lawsuit in the U.S. brought after the 2021 discovery of a faulty component in its machines used to help sleep apnoea patients breathe. The provision is in addition to €204 million in costs related to job cuts and problems with the respiratory devices. Phillips has had to repair or replace more than five million of the machines.
- **A newly patented technology** may improve how implants wirelessly send data from within the human body, reducing the energy needed to transmit data and increasing the life span of devices. AntennaWare received a European patent for multi-mode antenna technology that could eliminate the need to manually hold readers over the implant to receive data. The technology would increase the upload frequency of existing automated communication devices and allow for deep-tissue implants that could unlock new ways to monitor and treat disease.

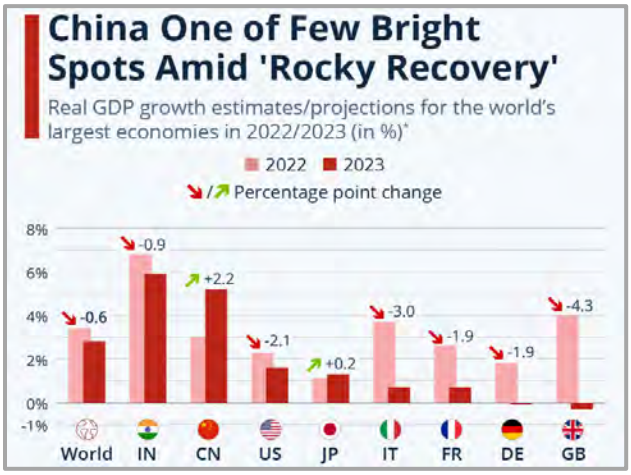
- **Finland** has started regular electricity output at Europe's largest nuclear reactor. The long-delayed Olkiluoto 3 reactor is the first new European nuclear-power facility to open in 16 years. Alongside two other nuclear reactors on the Olkiluoto island off Finland's west coast, the new 1.6-gigawatt reactor will eventually produce nearly one-third of the country's electricity.
- **Wind and solar power** accounted for 12% of global electricity in 2022 and rises to 39% when combined with other renewables and nuclear. The world saw a 2.5% increase in demand on average for electricity in 2022. However, demand differs greatly by region. Asia has the largest growing electricity needs, while Latin America was the only region to have increased clean power fast enough to meet rising electricity demand over the past seven years, while at the same time reducing its fossil generation.



- **Germany's last remaining nuclear power plants** were switched off in April, marking a watershed moment in a country that has long harbored deep skepticism of atomic energy. Anti-nuclear activists hailed the shutdown of three reactors as a triumph, following a temporary delay after Putin's invasion of Ukraine forced Berlin to seek alternatives to Russian gas. Critics see the shutdown as an act of madness, while Europe's energy supplies remain precarious and the world is striving to wean itself off fossil fuels. (See **Appendix: Energy**, page 10)
- **An Ariane-5 rocket** has launched Europe's €1.6bn Juice spacecraft on an eight-year voyage to Jupiter and its icy moons, which it will investigate for signs that liquid oceans beneath their frozen surfaces might support life. Juice — short for Jupiter Icy Moons Explorer — is the most complex planetary space mission ever attempted. Although Juice will provide a wealth of information about the atmosphere and magnetic environment of Jupiter, most public attention will focus on what it discovers about what lies beneath the moons' icy surfaces. The mission is due to end with Juice crashing into Ganymede in late 2035.
  Key Update: *The six-tonne Ariane spacecraft's 6.6bn-kilometer route involves four "slingshot" gravity assists around Earth and Venus — the last one in 2029 — before reaching Jupiter, the solar system's biggest planet, in 2031.*

ASIA/PACIFIC, JAPAN, AUSTRALIA & INDIA

- **The International Monetary Fund** cut its growth forecast for the world economy in 2023 by 0.1% and now expects the global GDP to grow by 2.8%. China and Japan are the only two among the world's eight largest economies expected to see economic growth pick up this year. At the other end of the spectrum, advanced economies, particularly across Europe, are expected to see a substantial economic slowdown this year. The IMF warned of a "hard landing" for the global economy if steep inflation keeps interest rates higher for longer and amplifies financial risks.



- **China's economy** appears to have shaken off the effects of the pandemic, posting growth of 4.5% in the 1st Qtr and beating economists' expectations. Speaking about the figures, Oxford Economics said, "The combination of a steady uptick in consumer confidence as well as the still-incomplete release of pent-up demand suggest to us that the consumer-led recovery still has room to run."
- **Chinese equities** have suffered a brutal sell-off since China reported a strong 1st Qtr of economic growth, a sign of investor doubts over whether the country can sustain its rebound. Stocks included in the benchmark indices of the Shanghai and Shenzhen stock exchanges have together lost $519bn in market capitalization since April 18 when China reported annual quarterly growth of 4.5%.
- **The export engine at the heart of the Chinese economy** has roared back to life, defying expectations and bolstering hopes that Beijing will achieve its 5% growth target this year. Despite weak global growth, exports from the world's second-biggest economy surged nearly 15% in March, fuelled by sales of electric vehicles and their components, as well as a surge in trade with Russia. Customs data showed exports expanded 14.8% compared with a year earlier, after falling 6.8% in January and February.
- **China's services sector** grew at a healthy pace in April, a sign that Chinese consumers continue to drive the country's economic rebound as its factory sector quickly decelerates. China's nonmanufacturing PMI came in at 56.4 in April, a weaker reading than March's 58.2. Activity in manufacturing fell unexpectedly below the 50 line in April, dropping to 49.2 from the previous month's 51.9 reading, suggesting activity in the sector shrank over the past month.
- **Total world crude steel production** was 165.1 million tonnes (Mt) in March, a 1.7% increase vs. a year ago. China produced 95.7 Mt, up 6.9% on March 2022. India's output was 11.4 Mt, up 2.7%. Japan produced 7.5 MT of steel, down 5.9% YOY. U.S. production was 6.7 MT, down 2.1% from a year ago. (See **Appendix: Steel**, page 8)
- **Tokyo-based Ispace Inc.** said it could not confirm if its spacecraft successfully landed on the moon. It was poised to become the first commercial space attempt to place a lander on the moon intact with its Hakuto-R Mission 1. The company lost communication with the lander at some point during its descent to the lunar surface on April 26. There is a high chance it didn't land as intended, the company said.
- **Samsung Electronics** said it would make a "meaningful" cut in memory chip production in a significant move to ease an industry glut as its quarterly operating profit plunged 96% to the lowest level in 14 years. The long-anticipated action comes as the South Korean company's semiconductor division is estimated to have suffered billions of dollars of losses in the 1st Qtr as the slowing global economy saps demand for chips. Samsung flagged its 1st Qtr operating profit at an estimated US$456 million, compared with $10.613 billion a year earlier.

  Key Update: *The memory chip losses are likely to continue in the 2nd Qtr as inventories remain at record levels, piling pressure on chip prices. Tech demand remains sluggish in the face of inflation and higher interest rates.*
- **A lack of new copper mining activity** has added to worries that there won't be enough of the red metal for the energy transition. Copper is used in electric vehicles, solar panels and other green technologies. Electrification is expected to increase annual copper demand to 36.6mn tonnes by 2031, with supply forecast to be around 30.1mn tonnes, creating a 6.5mn tonne shortfall at the start of the next decade, according to McKinsey & Co. Green uses of copper accounted for 4% of copper consumption in 2020, but this is expected to rise to 17% by 2030. A "net-zero emissions" path would mean the world would need an additional 54% of copper by 2030 on top of that forecast.
  (See **Appendix: Commodities**, page 14)

ECONOMIC UPDATE: APPENDIX TO THE MAY 2023 ISSUE

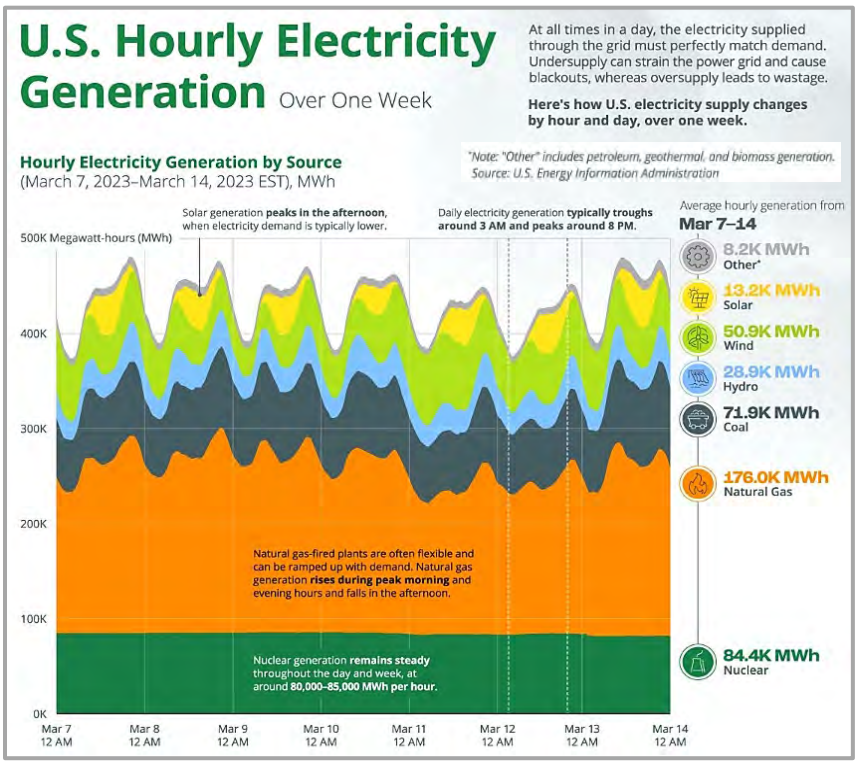
STEEL/ENVIRONMENT: "THE LINE" REPRESENTS A NEW VISION FOR ZERO-EMISSION CITIES

A linear smart city is under construction in Saudi Arabia: It is designed to have no cars, streets or carbon emissions and will be powered entirely by renewable energy. As part of the Saudi Vision 2030 project, The Line is part of Neom– a $500bn smart redevelopment of land at the northern tip of the Red Sea. Here in the province of Tabuk a group of mega projects that make up Neom's smart city complex will be constructed. These include Neom Bay and Neom Bay Airport, as well as a floating industrial complex known as the Oxagon and 16,000 acres of agricultural land. Neom's industrial expansion will be married with ambitious hospitality projects, including the Saudi Arabian peninsula's first major outdoor skiing facility and a luxury resort complex featuring three hotels and a sprawling marina. **A new model city?** The jewel in Neom's crown is arguably The Line. Set to span 105 miles, it will stretch east to west from the Red Sea coast all the way to the city of Tabuk. Its unique design features a central outdoor space flanked by two 1641/foot-tall, steel-built mirrored buildings. Designed as an alternative to traditional city structures that spread in all directions from a central point, The Line will have a compact footprint, putting all daily needs within a five-minute walk for its residents. Its linear structure confronts many of the issues facing modern cities, including the overpowering presence of automobiles, ongoing urban sprawl, and the air pollution found at the heart of large municipal centers. Powered entirely by renewable energy, the zero-car city will also feature a steel-built, high speed rail system with an end-to-end transit of just 20 minutes. **A zero-carbon nature corridor in the desert:** Another benefit of the city's unique layout is it is lessened impact on nature and biodiversity. The linear model does not affect a region's natural resources the way a traditional sprawl would. Instead, curated flows for water and wildlife will be integrated into the city. The mirrored surfaces of The Line's buildings will also be given façade treatments to prevent bird deaths by collision, and the structure will be aligned with migratory patterns. The Line will only cover 13 sq. miles, limiting its impact on the natural environment**.** The Line is designed as a 'net-zero carbon city', with a dedicated research team using the greenest construction materials possible, considering the supply chain and operational emissions from the structure's usage. The project will also be supported by technologies that remove atmospheric carbon. The Neom team are exploring digitized and modular design to minimize environmental impact and reduce build time. **In addition to being 100% recyclable, structural steel can be precision manufactured offsite, simplifying on-site assembly and speeding up the construction process. With steel-built innovations at its heart, The Line represents a unique opportunity to set a new benchmark for sustainable, livable cities.**

STEEL: SWEDISH 'GREEN STEEL' START-UP PLANS €1.5BN EQUITY FUNDRAISING

A Swedish start-up backed by the Agnelli, Wallenberg and Maersk families is moving to raise more than €1.5bn of equity funding to further its ambitions of building steel plants with virtually no carbon emissions. H2 Green Steel, which is also backed by Mercedes, Scania and Spotify's chief executive, is in the preliminary stages of seeking funding and is collaborating with advisers from Morgan Stanley. H2GS confirmed that it had begun the final part of its strategy to raise more than €5bn, including €3.5bn in debt. A €1.5bn equity financing would rank among the largest such deals in Europe this year. **H2GS is one of the most prominent new businesses in the race to develop green steel, which is made using electric rather than coal-fed furnaces and is going up against many of the sector's incumbent leaders.** It is aiming to tap into northern Sweden's abundant and relatively cheap hydropower resources for the large amount of electricity needed and plans to cut 95% of the emissions from producing steel, an industry making up about 7% of global emissions. There are growing questions in Sweden about the power needs of H2GS and its rival Hybrit, founded by three Swedish state-controlled companies, that together have demands for the next decades equivalent to nearly its entire existing electricity production. H2GS will use the new equity funding, which comes on top of €350mn already raised, to help build its first factory in Boden, close to the Arctic Circle. It is hoping to start full-scale production in 2025-26, a year or two later than its initial plan, and it will need about 10 terawatt hours of electricity annually to produce 2.5mn tonnes of steel. Sweden produced 169TWh of electricity in 2021, while Europe produces about 150mn tonnes of steel in total. LKAB, the Swedish state-run mining company that will supply Hybrit and possibly H2GS with sponge iron, estimates it will need 70TWh of power by 2050 to decarbonize its production. H2GS has support from European financial institutions for its €3.5bn debt financing. H2GS also closed a €260mn equity deal from backers Hitachi Energy and Kobe Steel.

ENERGY: HOW DOES U.S. ELECTRICITY GENERATION CHANGE OVER ONE WEEK?



The U.S. has a dynamic electricity mix, with a range of energy sources generating electricity at different times of the day. At all times, the amount of electricity generated must match demand to keep the power grid in balance, which leads to cyclical patterns in daily and weekly electricity generation. The graphic tracks hourly changes in electricity generation over a week.

The Three Types of Power Plants: It is important to distinguish between the three main types of power plants in the U.S. electricity mix. ***Base load*** plants generally run at full or near-full capacity and are used to meet the base load or the minimum amount of electricity always demanded. These are typically coal-fired or nuclear power plants. If regionally available, geothermal and hydropower plants can also be used as baseload sources. ***Peak load*** or peaking power plants are typically dispatchable and can be ramped up quickly during periods of high demand. These plants usually operate at maximum capacity only for a few hours a day and include gas-fired and pumped-storage hydropower plants. **Intermediate load** plants are used during the transitory hours between base load and peak load demand. Intermittent renewable sources like wind and solar (without battery storage) are suitable for intermediate use, along with other sources.

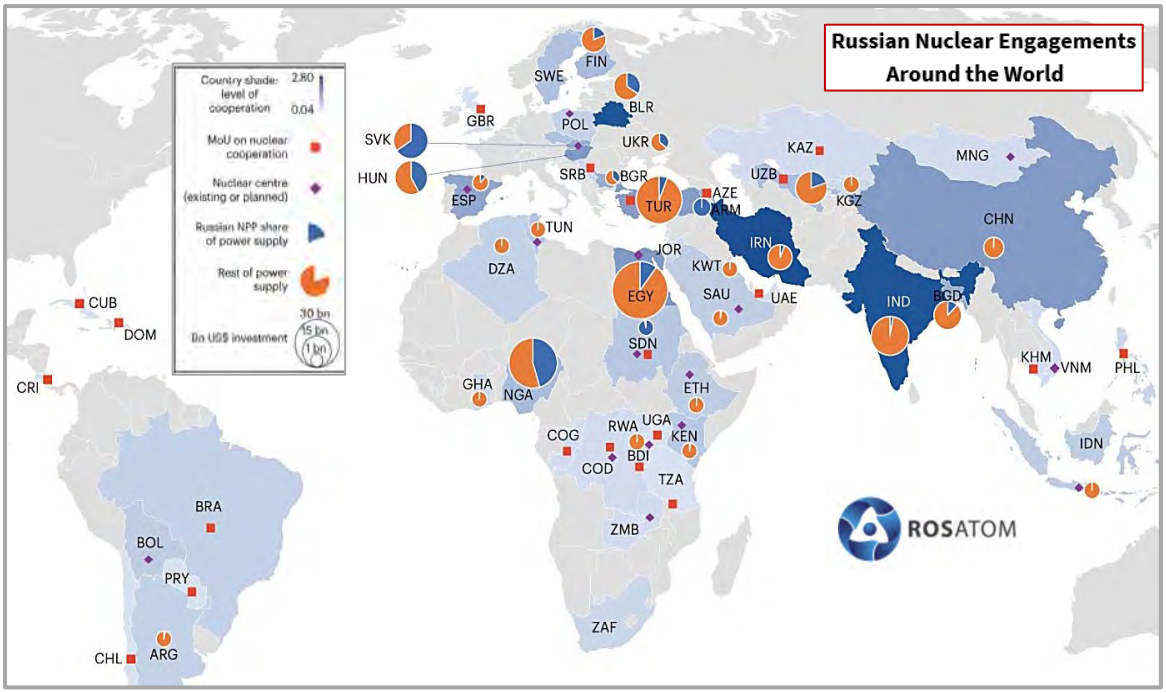
Zooming In — The U.S. Hourly Electricity Mix: With that context, the table below provides an overview of average hourly electricity generation by source for the week of March 7–March 14, 2023, in the Eastern Time Zone. It is worth noting that while this is representative of a typical week of electricity generation, these patterns can change with the seasons. For example, in June, electricity demand usually peaks around 5 PM, when solar generation is still high, unlike in March. Natural gas is the country's largest source of electricity, with gas-fired plants generating an average of 176,000 MWh of electricity per hour throughout the week outlined above. The dispatchable nature of natural gas is evident in the chart, with gas-fired generation falling in the wee hours and rising during business hours. Meanwhile, nuclear electricity generation remains steady throughout the given days and week, ranging between 80,000–85,000 MWh per hour. Nuclear plants are designed to operate for long durations (1.5 to 2 years) before refueling and require less maintenance, allowing them to provide reliable baseload energy. Wind and solar generation tend to see large fluctuations throughout the week. For example, during the week of March 7–14, wind generation ranged between 26,875 MWh and 77,185 MWh per hour, based on wind speeds. Solar generation had stronger extremes, often reaching zero or net-negative at night and rising to over 40,000 MWh in the afternoon. Because wind and solar are often variable and location-specific, integrating them into the grid can pose challenges for grid operators, who rely on forecasts to keep electricity supply and demand in balance.

Energy Source	Type	Avg. Hourly Electricity Generation, MWh (Mar 07–14, 2023, EST)
Natural Gas	Fossil fuel	175,967
Nuclear	Non-renewable	84,391
Coal	Fossil fuel	71,922
Wind	Renewable	50,942
Hydro	Renewable	28,889
Solar	Renewable	13,213
Other	Mixed	8,192

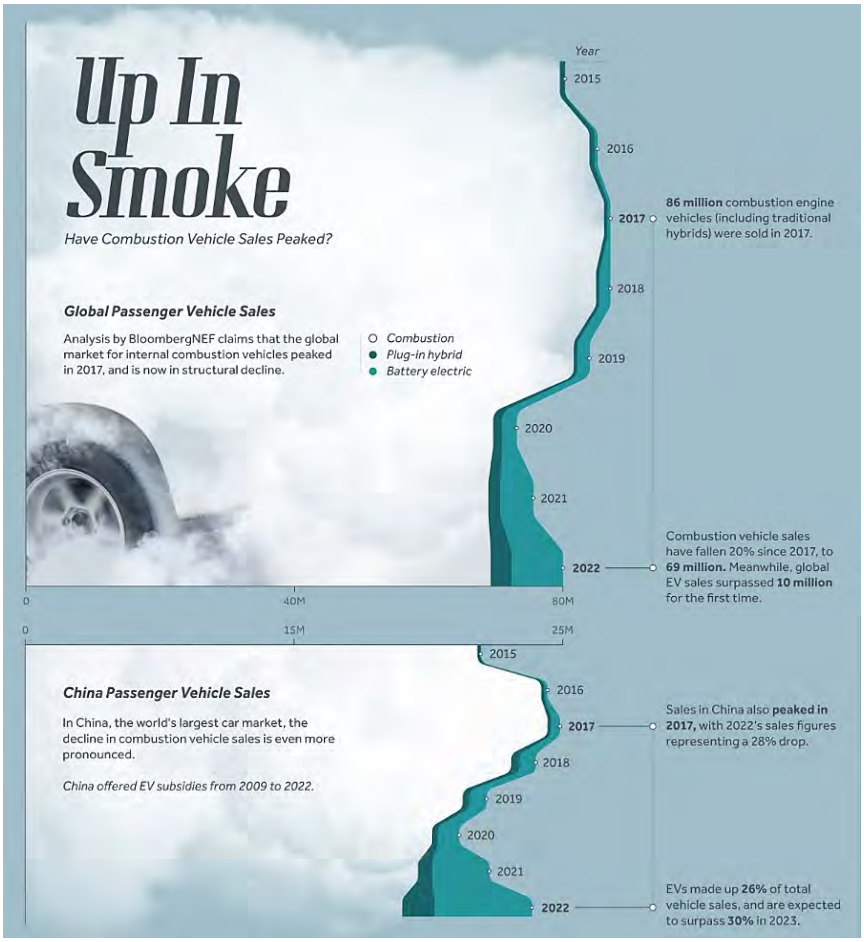
Solving the Renewable Intermittency Challenge: As more renewable capacity is deployed, here are three ways to make the transition smoother. ***Energy storage systems*** can be combined with renewables to mitigate variability. Batteries can store electricity during times of high generation (for example, in the afternoon for solar), and supply it during periods of peak demand. ***Demand-side management*** can be used to shift flexible demand to times of high renewable generation. For instance, utilities can collaborate with their industrial customers to ensure that certain factory lines only run in the afternoon, when solar generation peaks. ***Expanding transmission lines*** can help connect high-quality solar and wind resources in remote regions to centers of demand. In fact, as of the end of 2021, over 900 gigawatts of solar and wind capacity (notably more than the country's current renewable capacity) were queued for grid interconnection.

ENERGY: THE EXTENT OF WESTERN DEPENDENCY ON RUSSIAN NUCLEAR ENERGY

Russia's invasion of Ukraine in February 2022 had a profound impact on the economy, inflating the prices of energy and food, with detrimental consequences for both individuals and companies worldwide. As a result, many governments, particularly in Europe, have been discussing the possibility of reducing their dependence on Russian energy. Most of these ongoing discussions specifically focus on fossil fuel energy, leading to the gradual introduction of sanctions for purchasing Russian coal, oil and gas. However, **Russia is also a key global provider of nuclear power, particularly via a state-owned nuclear energy corporation called Rosatom.** Researchers at the Norwegian Institute of International Affairs (NUPI) have recently conducted a study investigating the activity and global portfolio of Rosatom and its subsidiaries**. Their findings highlight the high degree of European dependency on nuclear energy produced by this company, raising important questions about the need to find alternative energy suppliers.** "Our paper emerged as part of a longer project focusing on Russia's visions of a future where climate policy becomes a prominent factor and its strategies for coping in a decarbonizing world, considering that Russia is the largest global fossil fuel producer," Kacper Szulecki, one of the researchers said. "Consequently, we began to look at Russia's nuclear sector as an area where economic activity and Russia's global influence may be increasing. We were surprised that hardly anyone is talking about this sector in the context of sanctions or EU dependency." As part of their study, Szulecki examined data released by Rosatom and online media coverage, all regarding the company's projects and international activity since the invasion of Ukraine in 2022. At the time, Rosatom and its subsidiaries had 73 rolling projects, through which it provided energy to 29 countries. "Building on the data we already had and some additional research, we designed a study that helps us understand the levels of dependency different countries face," Szulecki explained. "We relied on publicly available data, Rosatom's self-reports, as well as statements and media coverage, for the basic data." To estimate different countries' dependency on Russian nuclear reactors, Szulecki defined a series of hypothetical scenarios that would occur if all projects in the company's pipeline were eventually completed. Based on these scenarios, they then calculated the share of electricity consumption in the 29 countries that Rosatom is operating in that would be covered by the company's nuclear reactors. "We used IEA data for these prognoses, and Rosatom's official capacity factor for the supply side," Szulecki said. "We also quantified all forms of cooperation to arrive at a composite index of levels of cooperation, which may be exploited for political advantage." **The countries that most heavily relied on nuclear energy from Russia included Iran, Belarus, and India, followed by China, Egypt, Hungary, Turkey, Spain, Armenia, Bangladesh, Bulgaria, Slovakia, Nigeria, Uzbekistan, Finland, Czechia, Sweden, Kenya, Sudan and Tunisia.** They also identified several other countries worldwide that cooperated with Russia over nuclear energy, albeit to a lower extent. Overall, the recent findings suggest that while Russia's invasion of Ukraine may have undermined Rosatom's collaboration with countries in the eurozone, limiting the energy it provides across Europe, many countries worldwide remain heavily dependent on Russian nuclear energy. In the future, this study could inform new efforts aimed at further reducing these countries' dependency on Russia for nuclear energy. "We are happy with the attention this paper has already received and we hope that it contributes to raising awareness on the worrying levels of Western dependency on Rosatom, as well as the scale of Russian nuclear energy diplomacy more broadly," Szulecki added.



AUTOMOTIVE: HAVE COMBUSTION VEHICLE SALES ALREADY PEAKED?



Electric vehicle (EV) sales have grown rapidly over the past few years, but have they managed to make a dent in the global market? Here is visualized data that breaks down annual vehicle sales by three categories: Internal combustion (including traditional hybrids), plug-in hybrids and battery electric. EVs are building up market share. In fact, combustion vehicle sales appear to have peaked in 2017. **Growth in EV Market Share:** The following table lists global EV sales, as well as their relative market share.

Year	EV Sales	EV Market Share (%)
2013	206,000	0.2
2014	320,000	0.4
2015	543,000	0.6
2016	791,000	0.9
2017	1,262,000	1.3
2018	2,082,000	2.2
2019	2,276,000	2.5
2020	3,244,000	4.2
2021	6,768,000	8.3
2022	10,522,000	13.0

**Includes plug-in hybrids. Source: EV Volumes*

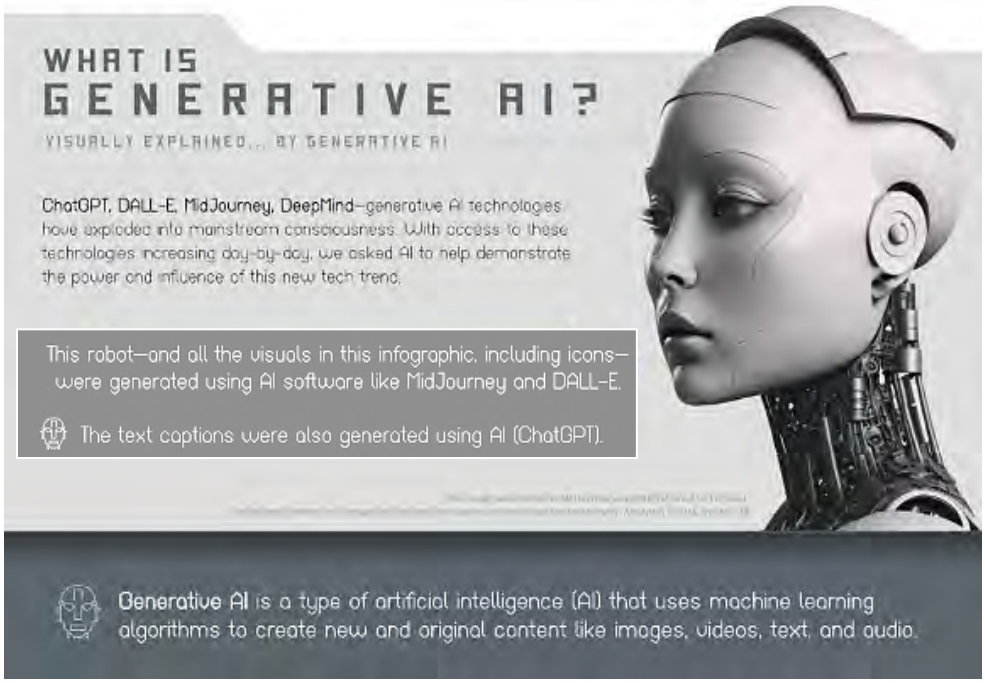
EV sales really picked up steam around 2019. This is likely due to various government subsidies and a growing list of models to choose from. EV ranges, once a major limiting factor, are also becoming less of a concern as battery technology improves and more charging stations become available. **Will Combustion Vehicle Sales Stage a Comeback?** It seems unlikely that combustion vehicles will be able to reclaim much of their lost market share. China is leading the world in terms of EV adoption. As of 2022, one in four new cars sold in the country is electric. The U.S. and EU are transitioning slower but should catch up thanks to government subsidies and a planned phase-out of fossil fuel vehicles. In the EU, the sale of new internal combustion vehicles will be banned by 2035. (An exemption was made on behalf of Germany to allow the sale of cars that run on synthetic fuels.) In the U.S., the 13 states that adhere to California's Zero Emissions Vehicle (ZEV) Program are aiming for 100% of cars sold in 2035 to be ZEVs.

AUTOMOTIVE/INNOVATION: A NEW CLASS OF LONG-RANGE EV BATTERIES IS HEADING TO PRODUCTION

After 12 years of development, a new category of range-boosting battery technology is moving into mass production for electric vehicles. **Sila Inc., a Silicon Valley-based battery materials company with more than $930mn in funding, says it has finalized a mass manufacturing process for the first silicon-based anodes.** The company is calling its new material "Titan Silicon," CEO Gene Berdichevsky said, and it is in the later stages of qualification with auto manufacturers before a new factory begins production late next year. **Sila says Titan anodes will immediately boost maximum vehicle ranges by 20%.** Its first customer is Mercedes, which will use Titan anodes in its long-range EQG SUV, starting in early 2025. Berdichevsky says that Sila will be able to make enough material for up to 200,000 electric vehicles a year by 2026 — and enough for a million vehicles a year by 2028. "We are ready to take on more automakers now," Berdichevsky said. Sila is not the only company in the race for silicon-anode bragging rights. Tesla, whose long-range vehicles account for half of U.S. EV sales, has been talking publicly about developing its own silicon anode since at least 2020. In Seattle, Group14 Technologies has secured $650mn and a supply agreement with Porsche, while OneD Battery Sciences based in Palo Alto, is working with General Motors. It is not clear who will be first to scale up the technology.

TECHNOLOGY/INNOVATION: GENERATIVE AI EXPLAINED BY AI

After years of research, it appears that artificial intelligence (AI) is reaching a sort of tipping point, capturing the imaginations of everyone from students saving time on their essay writing to leaders at the world's largest tech companies. Excitement is building around the possibilities that AI tools unlock, but what exactly these tools are capable of and how they work is still not widely understood. We *could* write about this in detail, but given how advanced tools like ChatGPT have become, it only seems right to see what generative AI has to say about itself. Everything in the infographic, from illustrations and icons to the text descriptions, was created using generative AI tools such as Midjourney. ***Everything that follows in this article was generated using ChatGPT based on specific prompts. Without further ado, generative AI as explained by generative AI.***

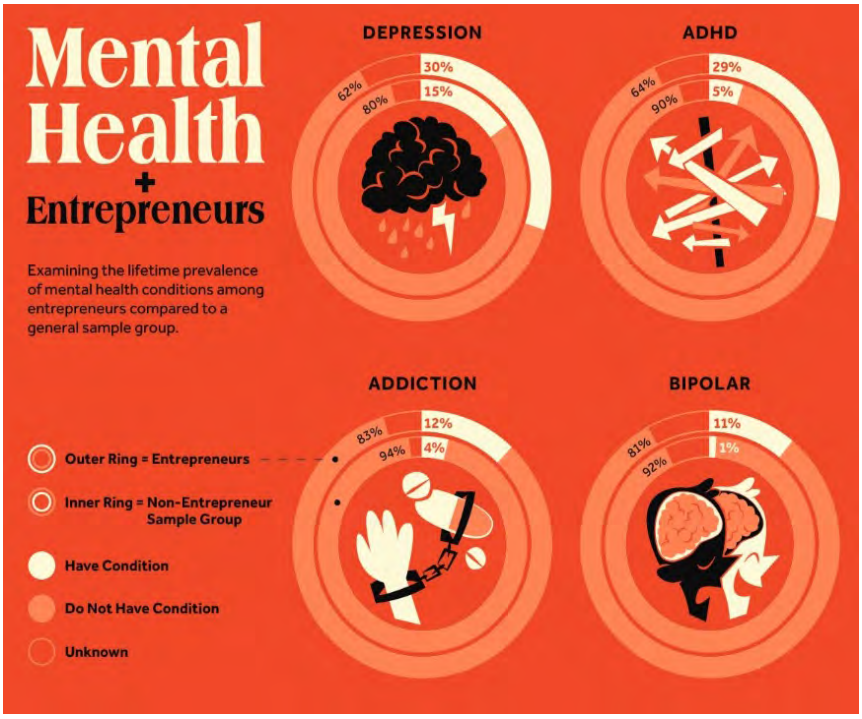


Generative AI — An Introduction: Generative AI refers to a category of artificial intelligence (AI) algorithms that generate new outputs based on the data they have been trained on. Unlike traditional AI systems that are designed to recognize patterns and make predictions, generative AI creates new content in the form of images, text, audio and more. Generative AI uses a type of deep learning called generative adversarial networks (GANs) to create new content. A GAN consists of two neural networks: a generator that creates new data and a discriminator that evaluates the data. The generator and discriminator work together, with the generator improving its outputs based on the feedback it receives from the discriminator until it generates content that is indistinguishable from real data. Generative AI has a wide range of applications, including: *Images* — Generative AI can create new images based on existing ones, such as creating a new portrait based on a person's face or a new landscape based on existing scenery; *Text* — Generative AI can be used to write news articles, poetry, and even scripts. It can also translate text from one language to another; *Audio* — Generative AI can generate new music tracks, sound effects, and even voice acting.

Disrupting Industries: People are concerned that generative AI and automation will lead to job displacement and unemployment, as machines become capable of performing tasks that were previously done by humans. They worry that the increasing use of AI will lead to a shrinking job market, particularly in industries such as manufacturing, customer service and data entry. Generative AI has the potential to disrupt several industries, including: Advertising — Generative AI can create new advertisements based on existing ones, making it easier for companies to reach new audiences; Art and Design — Generative AI can help artists and designers create new works by generating new ideas and concepts; Entertainment — Generative AI can create new video games, movies, and TV shows, making it easier for content creators to reach new audiences. Overall, while there are valid concerns about the impact of AI on the job market, there are also many potential benefits that could positively affect workers and the economy. In the short term, generative AI tools can have positive impacts on the job market as well. For example, AI can automate repetitive and time-consuming tasks, and help humans make faster and more informed decisions by processing and analyzing large amounts of data. AI tools can free up time for humans to focus on more creative and value-adding work.

How This Article Was Created: This article was created using a language model AI trained by OpenAI. The AI was trained on a large dataset of text and was able to generate a new article based on the prompt given. In simple terms, the AI was fed information about what to write about and then generated the article based on that information. In conclusion, generative AI is a powerful tool that has the potential to revolutionize several industries. With its ability to create new content based on existing data, generative AI has the potential to change the way we create and consume content in the future.

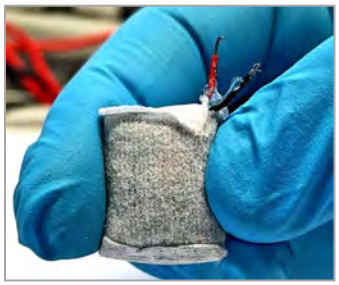
MEDICAL/INNOVATION: THE LINK BETWEEN ENTREPRENEURSHIP AND MENTAL HEALTH CONDITIONS



Entrepreneurship has long been associated with traits like risk-taking, persistence and creativity. It is no surprise that many of the world's most successful companies were brought to life by neurodivergent founders. Neuro-divergence refers to natural differences in brain function among individuals with conditions such as autism, ADHD, dyslexia and bipolar disorder. **As this 2019 study demonstrates, entrepreneurs appear to experience mental health and addiction issues more frequently than the general public and tend to have families with these illnesses at a higher rate.** Half of entrepreneurs included in the study have one or more mental health conditions. The research also looked at anxiety but found that levels were similar between entrepreneurs and the sample group. Obsessive-compulsive disorder (OCD), dyslexia and Asperger's Syndrome, which are not included in this research, are other noteworthy conditions that are sometimes connected with entrepreneurship. Asperger's is present in several successful founders, including Elon Musk and Bill Gates. Peter Thiel, billionaire investor and serial entrepreneur, has argued that this mild version of autism could be an asset in founding successful companies. There are two competing ideas around the link between entrepreneurship and mental health conditions. First, some posit that traits associated with mental health conditions (e.g., hyperfocus for ADHD, or attention to detail for Asperger's) are assets in the startup world. Secondly, it is also thought that because neurodivergent individuals have more trouble succeeding in conventional frameworks in academia and business, they are more likely to forge their own path by founding companies and pursuing self-employment. It is entirely possible that both these ideas are true.

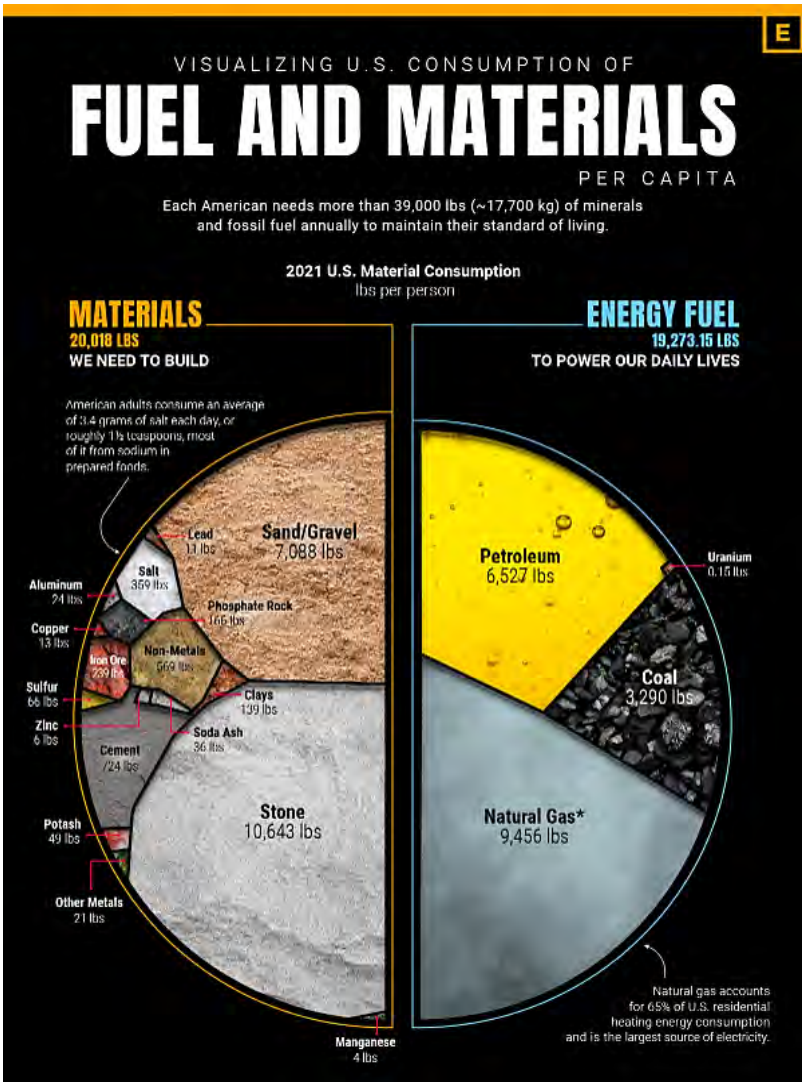
MEDICAL: RESEARCHERS USE AN IMPLANTED GLUCOSE-RUN FUEL CELL TO POWER INSULIN RELEASE

There is a need for better ways to power medical implants. Devices either have a battery that gradually runs down and eventually needs replacing in another procedure or they use rechargeable batteries that are powered wirelessly. Neither option is perfect. Ideally, batteries would not need replacing or charging manually. Rather, they would be self-sustaining. Researchers at ETH Zurich saw a way to realize that idea. **"Many people, especially in the Western industrialized nations, consume more carbohydrates than they need in everyday life," ETH Zurich's Martin Fussenegger said. "This gave us the idea of using this excess metabolic energy to produce electricity to power biomedical devices."** Earlier papers have described the development of glucose biofuel cells, but the idea has been held back by the limited shelf-life of key enzymes and the need for glucose concentrations above the physiological range. Fussenegger and his collaborators realized the vision, at least in mice, by using a copper-containing, conductively tuned 3D carbon nanotube composite. When the device detects hyperglycemia, it converts glucose into gluconic acid and a proton to generate electricity. The electricity is sufficient to power a small medical device, in this case a capsule containing artificial beta cells. Because the fuel cell only generates electricity during hyperglycemia, the device automatically stops releasing insulin once blood sugar levels have returned to normal. The fuel cell also made enough energy to support communication with external devices, such as smartphones, and enable doctors to remotely change the settings. The device is still a prototype, and the researchers see a long, uncertain road to market maturity. The financial and human resources needed to bring the device to market are beyond the reach of the team at ETH Zurich. An industry partner with the right resources and expertise will be needed to take the project forward. **If commercialized, the technology could disrupt continuous glucose monitor and insulin pump markets fought over by companies such as Abbott, Tandem and Medtronic.**



(Pictured above: The prototype fuel cell is wrapped in a fleece and is slightly larger than a thumbnail.)

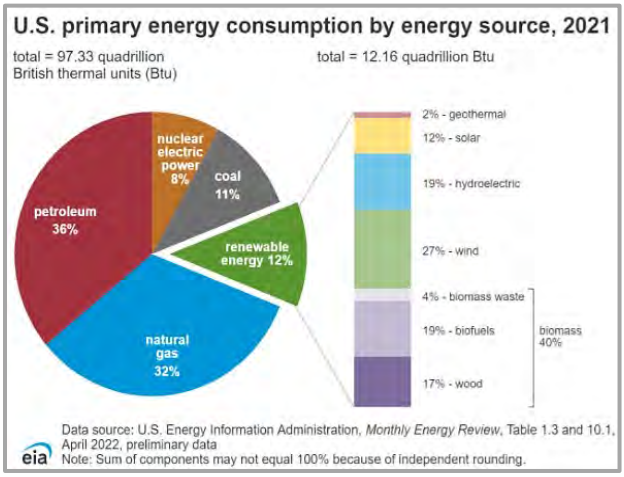
COMMODITIES: VISUALIZING U.S. CONSUMPTION OF FUEL AND MATERIALS PER CAPITA



Wealthy countries consume massive amounts of natural resources per capita, and Americans are no exception. According to data from the National Mining Association, each American needs more than 39,000 lbs. of minerals and fossil fuels annually to maintain their standard of living.

Materials We Need to Build: Every building around us and every sidewalk we walk on is made of sand, steel and cement. As a result, these materials lead consumption per capita in the U.S. On average, each person in America drives the demand of over 10,000 lbs. of stone and around 7,000 lbs. of sand and gravel per year. The construction industry is a major contributor to the U.S. economy. Crushed stone, sand, gravel and other construction aggregates represent half of the industrial minerals produced in the country, resulting in $29bn in revenue per year. Also on the list are crucial hard metals such as copper, aluminum, iron ore and many rarer metals used in smaller quantities each year. These rarer metals can make a big economic difference even when their uses are more concentrated and isolated—for example, palladium (primarily used in catalytic converters) costs $54 million per tonne.

Fuels Powering Our Lives: Despite ongoing efforts to fight climate change and reduce carbon emissions, each person in the U.S. uses over 19,000 lbs. of fossil fuels per year. In 2021, finished motor gasoline consumption averaged about 369 million gallons per day, equal to about 44% of total U.S. petroleum use. Distillate fuel oil (20%), hydrocarbon gas liquids (17%) and jet fuel (7%) were the next most important uses. **Reliance on Other Countries:** Over the past three decades, the U.S. has become reliant on foreign sources to meet domestic demand for minerals and fossil fuels. Today, it is 100% import-reliant for 17 mineral commodities and at least 50% for 30 others. To reduce the dependency on other countries, namely China, the Biden administration has been working to diversify supply chains in critical minerals. This includes strengthening alliances with other countries such as Australia, India and Japan. However, questions remain about how soon these policies can make an impact, and the degree to which they can ultimately help localize and diversify supply chains.



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PMA Quarterly Report March 2023

Providing a snapshot of the latest association activities and member benefits

Membership

- End of February, membership stands at 920 companies—the highest level since 2014.
- 101 new members so far, this fiscal year, toward a goal of 105 (fiscal year ends March 31).
- Overall retention rate is 92%.
- Successful Forming Our Future with over 250 attendees in Huntington Beach, CA. View event photos.
- Congrats to 2023 Chairman of the Board Jeff Aznavorian of Clips and Clamps. And special thanks to 2022 Chairman Doug Johnson of Marion Manufacturing and the 2022 executive board and board of advisors.
- **New member benefit!** Partnership with Systems X helps members take a proactive approach to win the unfair fight against cybercriminals. Members have access to a FREE network assessment from Systems X and a 15% discount on KnowBe4 Cybersecurity Training Products. More information: https://www.pma.org/membership/affinity.asp

Magazine

- *MetalForming* magazine is the leading industry publication. Last year, experienced 28% growth from 2021 and market share has doubled since 2019.
- *MetalForming* published a special automotive issue in February. Read the March issue Chair issue.
- April 25: *MetalForming* LIVE on the Shop Floor, a live virtual event addressing automation. Register now.

Workforce Development

- In January, PMA launched a new Press Brake Operation module in METALFORM EDU, featuring 12 courses. Learn more: www.pma.org/metalformedu
- In March, PMA launched a new Die Protection module in METALFORM EDU, featuring five courses.
- PMA welcomes Mary Pramik to the staff as workforce development manager (mpramik@pma.org). Mary has a deep background in workforce development and will help grow METALFORM EDU and the scholarship program, while supporting PMA's technical team and the educational foundation.

Advocacy

- A summary of PMA's 2022 advocacy successes is available at www.pma.org/advocacy.
- Top areas of focus for 2023, as identified by a member survey, are workforce recruitment/training, taxes and raw material prices. Also, will lobby on OSHA and other regulations, health care, energy and trade.
- D.C. fly-in will be held March 28-29. A small PMA group is attending due to Capitol restrictions.

Key Upcoming Events

May 23-24, 2023
HR & Training Professionals Roundtable
Cleveland, OH and Virtual

June 28-29, 2023
District Leadership Conference
Cleveland, OH and Virtual

Visit www.pma.org/calendar for all upcoming PMA events, seminars, webinars, roundtables, district meetings and more!

Questions about PMA membership? Contact Diana Novak.

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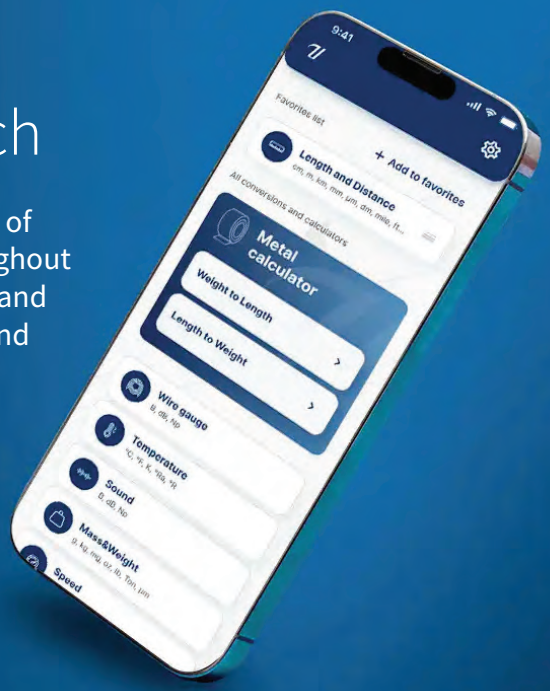

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Ulbrich's Economic Update is prepared monthly by Charles Finnegan for the exclusive use of Ulbrich Stainless Steels & Special Metals, Inc. This issue and previous Economic Updates are archived on Ulbrich's website: **www.ulbrich.com/blog**

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