EXECUTIVE SUMMARY

AMERICAS: THE U.S. ECONOMY SHRANK FOR A SECOND QUARTER IN A ROW, as businesses trimmed inventories, the housing market buckled under rising interest rates and high inflation dented consumer spending. GDP fell at an annual rate of 0.9% in the 2nd Qtr. Other June data showed: **Durable goods orders** rose 1.9%. The increase was seen across most categories, including motor vehicles and military aircraft. **Industrial output** dropped 0.2%, pulled down by a 0.5% drop in manufacturing output. **The U.S. trade deficit** narrowed sharply in June. Exports surged to a record high, a trend that could see trade continuing to contribute to GDP in the 3rd Qtr. **Import prices** increased 1.0% as bottlenecks in the global supply chain persisted. **Producer prices** climbed 1.1%. In the 12 months through June, the PPI increased 11.3%. Nearly 90% of the rise in goods prices was attributed a 10.0% jump in energy prices. **Consumer prices** grew +9.1%, its highest rate in 41 years. **Retail sales** rebounded strongly, as Americans spent more on gasoline and other goods amid soaring inflation. Retail sales increased 8.4% YOY and are 18% above their pre-pandemic trend. **Existing home sales** declined for the fifth straight month, falling 5.4%, and the median price hit another record, rising to $416k. **Manufacturing activity** slowed less than expected in July with signs that supply constraints are easing, and a gauge of prices paid for inputs by factories fell to a two-year low, suggesting inflation may have peaked. **The economy** added a robust 528,000 jobs in July, recouping the number of payrolls lost in the wake of the pandemic. **Consumer confidence** dropped to nearly a 1-1/2-year low in July. **Freight rates** are falling as shipping demand wavers. Shippers are trying to reset contracts to cut expenses, but costs remain several times higher than pre-pandemic. **The Federal Reserve** raised interest rates again by 0.75% and signaled more rises were likely to combat inflation that is running at a 40-year high.

OVERSEAS: EUROZONE BUSINESS ACTIVITY SLIPPED INTO REVERSE for the first time since early 2021. S&P Global's flash eurozone composite purchasing managers' index for July, which showed output and new orders both fell. **China's 2nd Qtr GDP** expanded at a 0.4% annual rate, its weakest growth rate in more than two years and a measure of the costs imposed by Beijing's zero-tolerance approach to COVID-19. **Chinese leaders** all but acknowledged that the country would miss its annual growth target (5.5%) this year.

STEEL: STEEL DYNAMICS PLANS TO CONSTRUCT A FLAT-ROLLED ALUMINUM MILL IN THE SOUTHEAST, utilizing recycled, low-carbon aluminum scrap, with capacity for 650,000 tonnes. Commercial production will begin in the 1st Qtr of 2025, in response to growing demand from the beverage can and automotive industries. **U.S. Steel** reported its best-ever quarterly adjusted earnings of $1.1bn. Average realized prices YOY rose across the board, e.g., flat-rolled +24% , mini mill +10% and tubular +67%.

AUTOMOTIVE: TESLA HAS INCREASED ITS CAPITAL SPENDING PLAN BY $1BN and now expects to spend between $6bn and $8bn this year and each of the next two years, as it looks to ramp up production at its new facilities in Texas and Berlin**.** Tesla posted $2.3bn 2nd Qtr profit, below its record profit of $3.3bn in the 1st Qtr. **The Energy Department** will loan a joint venture of GM and LG Energy Solution $2.5bn to help finance construction of new lithium-ion battery cell manufacturing facilities in Ohio, Tennessee and Michigan.

ENERGY: WHAT TO DO WITH NUCLEAR POWER IS ONCE MORE AT THE CENTER OF DISCUSSIONS, as Europe makes the transition to green energy. The EU Parliament voted in favor of EU rules designating investments in nuclear and certain gas projects as sustainable and green. The Biden administration will allow **solar panel parts** to be imported free of tariffs from Cambodia, Malaysia, Thailand and Vietnam, offering a cost reprieve to American renewable energy project developers after months of uncertainty.

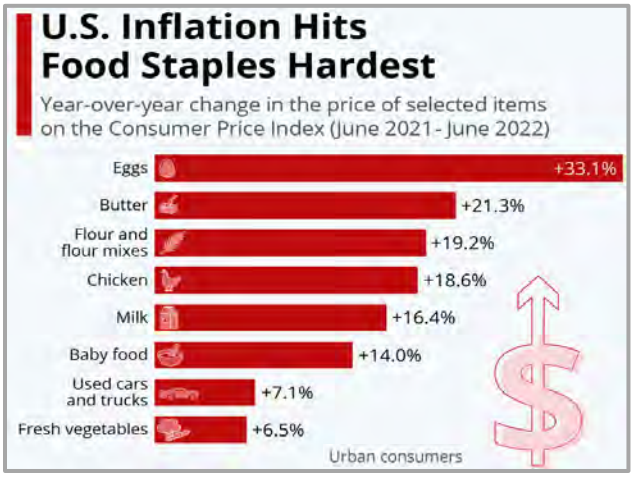
MEDICAL: CLEARANCE FOR DEXCOM'S G7 CONTINUOUS GLUCOSE MONITORING SYSTEM WILL BE DELAYED until late 2022. Software revisions are required after questions came up in the FDA's review. related to the management of the alerts and alarms in the system for the U.S. mobile application. **The U.S. medical device industry** hailed Congress's vote to appropriate $280bn to increase domestic production of chips, including a $2bn fund to ensure the production of older generation chips used in many medical devices.

AEROSPACE: MAJOR AEROSPACE COMPANIES ARE SOUNDING THE ALARM ON THEIR SUPPLY CHAINS as shortages ranging from raw materials to castings or semiconductor chips pressure earnings and crimp the industry's ability to capitalize on roaring travel demand. **Pratt & Whitney** posted a 16% sales gain in the 2nd Qtr, citing passenger return to air travel and a manufacturing boost.

COMMODITIES: POLYSILICON PRICES ARE RISING AS PLANT OUTAGES EXTEND A SHORTAGE of the material that is key to making solar panels. The average cost of the most expensive grade of polysilicon rose 1.9% by mid-July. Prices are at the highest level since late 2011 but may ease in August. **BHP, the world's largest resources company,** has warned of economic headwinds during the next year, signaling that the sharp fall in commodity prices is darkening the outlook for the world's biggest miners.

THE AMERICAS

- **The producer price index** climbed 1.1% in June after rising 0.9% in May. In the 12 months through June, the PPI increased 11.3%, but underlying producer inflation appeared to have peaked. Nearly 90% of the rise in goods prices was attributed a 10.0% jump in energy prices. There were strong increases in the prices of gasoline, diesel fuel, electric power and residential natural gas. Wholesale food prices edged up 0.1%. The cost of services rose 0.4%.
- **U.S. import prices** increased 1.0% in June as bottlenecks in the global supply chain persisted. Still, price pressue seems to have moderated. The eighth-straight monthly gain left the YOY increase at 11.2%. Prices for agricultural exports advanced 1.5%. Nonagricultural export prices gained 1.1%.
- **The U.S. trade deficit** narrowed sharply in June as exports surged to a record high, a trend that could see trade continuing to contribute to GDP in the 3rdQtr. The deficit fell 6.2% to $79.6bn. Exports of goods and services rose 1.7% to an all-time high of $260.8bn; imports slipped 0.3%.
- **Retail sales** rebounded strongly in June as Americans spent more on gasoline and other goods amid soaring inflation. Retail sales increased 8.4% YOY and are 18% above their pre-pandemic trend. Sales at service stations increased 3.6%. Gasoline prices surged, averaging above $5/gal. Prices at the pump have since declined.
- **Durable goods orders** rose 1.9% in June to a seasonally adjusted $272.6bn. The increase was seen across most categories, including motor vehicles and military aircraft. Excluding defense, orders were up a more modest 0.4%. A closely watched proxy for business investment—new orders for nondefense capital goods excluding aircraft—rose 0.5% to $73.9 bn in June compared with the previous month.
- **The U.S. economy** added a robust 528,000 jobs in July, recouping the number of payrolls lost in the wake of the pandemic. The unemployment rate also dropped to 3.5%, a half-century low. Construction firms, manufacturers and finance companies all added to payrolls. Average hourly earnings grew 5.2% from a year earlier.
- **U.S. worker pay and benefits** are rising this year at the fastest pace on record. Business and government employers spent 5.1% more on compensation for workers in the 2ndQtr YOY, eclipsing the 4.5% rate in the 1stQtr.
- **New orders for U.S.-manufactured goods** increased a solid 2.0% in June and business spending on equipment points to underlying strength in manufacturing. Orders for transportation equipment jumped 5.2%, which reflected a surge in orders for defense aircraft and parts.
- **U.S. inflation** reached 9.1% in June, its highest rate in 41 years. The CPI's pace for June eclipsed May's annual rate of 8.6%. Core prices increased 5.9% from a year ago, a slightly slower pace than May's 6%. Prices were up broadly across the economy, with gasoline far outpacing other categories with an 11.2% gain over the prior month. Gasoline prices have been on a downward path in recent weeks.



- **The Federal Reserve** raised interest rates again by 0.75 percentage point, which will lift the benchmark federal-funds rate to a range between 2.25% and 2.5%. The Fed signaled more rises were likely coming to combat inflation that is running at a 40-year high.

  Key Update: *The U.S. economy shrank for a second quarter in a row—a common definition of recession—as businesses trimmed their inventories, the housing market buckled under rising interest rates and high inflation took steam out of consumer spending. GDP fell at an inflation and seasonally adjusted annual rate of 0.9% in the 2nd Qtr.*
- **Industrial output** dropped 0.2% in June, pulled down by a 0.5% drop in manufacturing output. Primary metals, machinery and motor vehicles all fell more than 1%, while apparel and leather rose 2.5%. Utilities output declined 1.4%, while mining added 1.7%, boosted by oil and gas extraction as the war in Ukraine keeps crude prices high. Capacity utilization for the industrial sector edged 0.3 of a percentage point lower to 80%.
- **Consumer confidence** dropped to nearly a 1-1/2-year low in July amid persistent worries about higher inflation and rising interest rates, pointing to slower economic growth at the start of the 3rdQtr. The Conference Board survey showed consumers were less optimistic in their assessment of the labor market. That, combined with other data showing new home sales tumbled to their lowest level in just over two years in June, painted a picture of an economy vulnerable to a recession.

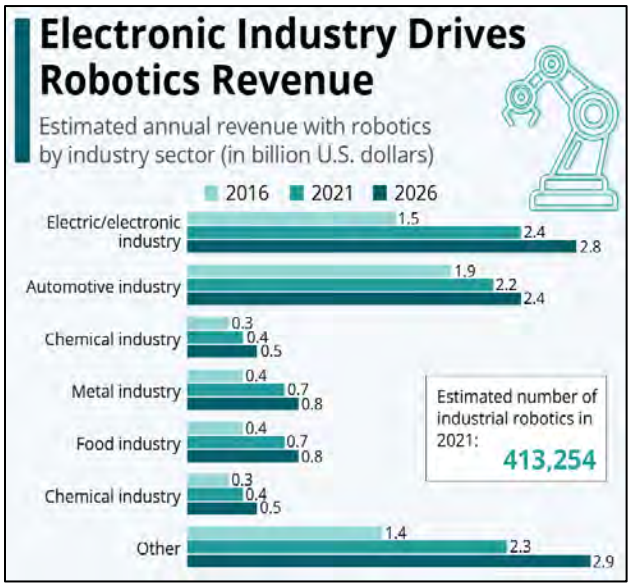
- **The median existing home price** hit another record in June, rising to $416,000, and sales declined for the fifth straight month. Sales of previously owned homes fell 5.4% and they were down 14.2% YOY. New home sales tumbled 8.1% to an annual rate of 590,000 units, the lowest level since April 2020. Housing starts fell 2% to an annual rate of 1.559mn units, the lowest level since September 2021.
- **Growth in the services sector** unexpectedly strengthened to a three-month high in July on firmer business activity and orders, easing concerns of a broader economic slowdown. The ISM's index rose to 56.7 from 55.3 a month earlier.
- **The leading economic indicators** fell 0.8% in July, a fourth consecutive monthly drop, suggesting economic growth is likely to slow further in the near-term as recession risks grow, the Conference Board reported.
- **U.S. manufacturing activity** slowed less than expected in July with signs that supply constraints are easing, and a gauge of prices paid for inputs by factories fell to a two-year low, suggesting inflation has probably peaked. The ISM index dipped to 52.8, the lowest reading since June of 2020. A separate measure of U.S. manufacturing produced by S&P Global (PMI) also pointed to slower growth due to weaker demand.

- **Construction spending** tumbled 1.1% in June as outlays on single-family homebuilding declined 3.1% amid rising mortgage rates. Investment in state and local government construction projects slipped 0.6%, while federal government spending increased 1.2%.
- **U.S. consumer spending** rose 1.1% in June and personal income rose by 0.6%. After taxes and adjusting for inflation, incomes fell by 0.3%. Gasoline prices hit a mid-June high point of $5.02/gal and have fallen 15% since. Energy prices overall surged 43.5% in June from a year earlier.
- **Freight rates** are falling as shipping demand has wavered, but costs remain several times higher than before the pandemic. Trucking spot rates fell 22% during the first six months, dipping below the contract rate in May for the first time in two years. By June, the average contract rate for the most commonly used type of trucking, dry van, was $2.93/mile, 17 cents higher than the spot market.
- **U.S. steel mills** shipped 7.910mn tons of steel in May, a 3.7% gain over April but a 1.0% drop vs. a year ago. Shipments YTD for five months were 38.366mn tons, a 1.1% improvement vs. a year ago.(See **Appendix: Steel**, page 8)
- **U.S. Steel** reported its best-ever quarterly adjusted earnings of $1.1bn. Total steel shipments of 4.18mn tons were flat compared to the previous year, while average realized prices YOY rose across the board: flat-rolled +24% to $1,339/ton, mini mill +10% to $1,331/ton, U.S. Steel Europe +34% to $1,217/ton, tubular +67% to $2,727/ton.
- **Foreign steel imports** into the U.S. in June totaled 2.810mn tons, including 2.204mn tons of finished steel. Through the first 6 months, total and finished steel imports are up 14.3% and 34.7% respectively. Finished steel import market share was estimated at 25% YTD.
- **Stainless steel** prices are dropping rapidly, driven by tumbling raw material surcharges, and buying has slowed. The July surcharge for grade 304 was driven by the $1.13/lb drop in nickel the prior month and a $.02/lb decline in ferrous scrap. End demand remains stable in the construction, automotive and appliance sectors, enabling mills to hold base prices firm. When LME nickel is falling, stainless buyers typically defer purchases until the next surcharge period takes effect. With nickel and other inputs in a sustained decline, ordering has slowed throughout the supply chain. June service center shipments of stainless were 152,800 tons, down 3% from June 2021, the first YOY drop since February 2021. Service center inventories in June were 545,000 tons, up 55% from a year ago. Surcharges will decline more than $.30/lb in August.

- **Kaiser Aluminum** declared force majeure at its Warrick rolling mill due to the limited availability of magnesium. US Mag, Warrick's largest magnesium supplier, declared force majeure last September but continued to supply approximately 50% of its contractual commitment until deliveries recently stopped.
- **Steel Dynamics,** a steel producer and recycler, plans to construct a flat-rolled aluminum mill in the Southeast, utilizing recycled, low-carbon aluminum scrap, with capacity for 650,000 tonnes. Commercial production will begin in the 1st Qtr of 2025, in response to growing demand from the beverage can and automotive industries. The $2.2bn project also includes two supporting satellite recycled aluminum slab centers.

Key Update: *The North American flat-rolled aluminum industry has a substantial, growing supply deficit estimated at over 2mn tonnes, which is currently being addressed through imports of higher-cost flat-rolled products that accounted for 25% of domestic consumption in 2021.*

- **Contract negotiations** between freight railroads and their labor unions has entered a new phase. The appointment of a Presidential Emergency Board pushes back potential disruptions in rail services. The panel has 60 days to broker a settlement between the carriers and unions representing around 115k workers. Members of one of the 12 unions have recently voted to authorize a strike, adding urgency to contract talks underway for nearly three years. Meanwhile, dockworkers at U.S. West Coast ports also are working without a contract, raising anxiety levels in supply chains.
- **Industrial robotics** are becoming more commonplace due to their efficiency and precision, especially in the manufacturing industry. The automotive industry is already well-known for its usage of robotics to further streamline and optimize car production. Sales to clients in this sector amounted to $2.2bn in 2021, and analysts expect this number to grow by 9% to $2.4bn in 2026. The electric and electronics industry actually overtook car producers as the most important client for industrial robotics manufacturers in terms of earnings in the last five years, with estimated revenue increasing by 60% from 2016 to 2021.



- **Tesla** has increased its capital spending plan by $1bn, the electric automaker said in a regulatory filing. The company now expects to spend between $6bn and $8bn this year and each of the next two years, up from its previous expenditure plan of $5bn-$7bn, as it looks to ramp up production at its new facilities in Texas and Berlin.

(See **Appendix: Automotive**, page 14)

Key Update: *Tesla reported its first sequential decline in quarterly profit in more than a year as it recovers from a shutdown at its Shanghai plant. Tesla posted $2.3bn 2nd Qtr profit, below its record profit of $3.3bn in the 1st Qtr.*

- **Norsk Hydro's subsidiary Hydro Rein** is partnering with renewable energy firms Equinor and Scatec to build a solar power project that will provide power to the world's biggest alumina refinery in Brazil. Hydro has signed a 20-year agreement with the companies that will have them cooperate in building the 531-megawatt plant in the Brazilian state of Rio Grande do Norte. Alunorte will receive about 60% of the electricity generated by the plant, with the balance to be sold on the domestic power market. The three firms are placing orders for equipment for the US$430mn project as well as preparing the land for construction.
- **The U.S. Postal Service (USPS)** plans to purchase at least 25,000 EVs out of its initial order of 50,000 next-generation delivery vehicles from Oshkosh Defense, as it works to replace an aging fleet. That's up from USPS' prior plan to buy at least 10,000 EVs, or about 20% of the first order. USPS also plans to buy more than 34,500 commercial off-the-shelf delivery vehicles over two years. In total, USPS says at least 40% of the 84,500 vehicles it will buy will be EVs.

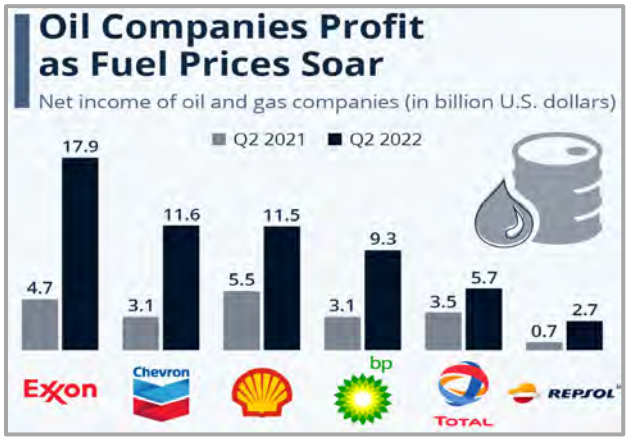
Key Update: *In April, 16 states, four environmental groups and the UAW filed lawsuits seeking to block USPS's plan to buy mostly gas-powered next-generation delivery vehicles, arguing the agency failed to comply with environmental regulations when it issued its Enviromental Impact Study.*

- **The U.S. Energy Department** will loan a joint venture of General Motors and LG Energy Solution $2.5bn to help finance construction of new lithium-ion battery cell manufacturing facilities. The conditional commitment for the loan to Ultium Cells LLC for facilities in Ohio, Tennessee, and Michigan is the first loan for a battery cell manufacturing project under ATVM loan program, which has not funded a new loan since 2010.
- **Major aerospace companies** are sounding the alarm on their supply chains as shortages ranging from raw materials to castings or semiconductor chips pressure earnings and crimp the industry's ability to capitalize on roaring travel demand. Airbus cut its full-year jet delivery forecast by 3% and slowed a planned increase in factory production. Boeing cut estimates for 737 MAX deliveries this year and warned that supply-chain constraints had capped its ability to ramp up production despite "significant" demand.
- **Pratt & Whitney** posted a 16% sales increase in the 2nd Qtr, citing passenger return to air travel and a manufacturing boost. Revenue passenger miles in the 2nd Qtr globally were nearly 70% of pre-pandemic levels. Pratt & Whitney, based in East Hartford, CT, posted revenue of $4.97bn.

(See **Appendix: Aerospace**, page 13)

- **NASA's first step in its return to the moon** will be in late August or early September with the launch of its Orion spacecraft to orbit around the moon. The much-anticipated flight won't have astronauts onboard. The flight will mark the first launch of the agency's massive Space Launch System rocket, a significant milestone in its Artemis campaign to return astronauts to the lunar surface for the first time since the last Apollo mission in 1972.

- **Boeing** reported a profit of $160mn for the 2nd Qtr, down from $567mn during the same period a year earlier. Production of the 737 MAX has reached 31 planes a month, up from 16 a year ago, as it deals with supply-chain challenges such as engine shortages that are also affecting rival Airbus. Boeing stepped up 737 deliveries in June.
- **The U.S. medical device industry** hailed Congress's vote to appropriate $280bn to increase domestic production of computer chips, including a special $2bn fund to ensure the production of older generation chips or so-called legacy chips used in many medical devices.
- **Dexcom's stock** fell following the announcement that clearance for the much-anticipated G7 continuous glucose monitoring system will be delayed until late 2022. Software revisions are required after questions came up in the FDA's review related to the management of the alerts and alarms in the system for the U.S. mobile application.
- **Amazon** is buying an operator of primary-care clinics, a significant expansion of a similar service it launched several years ago that underscores its sweeping ambitions in healthcare. The $3.9bn deal for 1LifeHealthcare which operates a primary-care practice under the name One Medical. The practice operates more than 180 medical offices in 25 U.S. markets and works with more than 8,000 companies to provide health benefits to employees.
  Key Update: *The 1LifeHealthcare deal adds momentum to the push by technology and retail giants to make inroads into the nation's $4 trillion healthcare economy.*
- **Abbott Laboratories** reported $2.3bn in COVID-19 testing-related sales for the 2nd Qtr, as total diognostic sales soared 33.1% to $4.32bn. Medical device sales were $3.76bn, a 2.5% gain YOY. Overall revenues were $11.26bn, up 10.1% from a year ago. With the threat of an economic slowdown looming, Abbott said it was well-positioned to navigate the challenges, pointing to the company's diversification and overall resilience of the healthcare industry in general.
- **3M Company** said it would spin off its healthcare business as a public company and sought bankruptcy protection for a subsidiary, Aearo Technologies, that once produced military earplugs that thousands of veterans now blame for damaging their hearing.
- **Some of the hottest weather on record** is lifting natural-gas prices, reversing June's plunge and reviving a key driver of inflation. Natural-gas futures had jumped 48% by late July to $8.007 per mn/Btu, more than twice the price of a year ago, adding cost pressure across the economy. Pricier natural gas adds not just to the cost of dialing down the thermostat but also for making fertilizer, steel, cement, plastic and glass. (See **Appendix: Energy**, page 10)
  Key Update: *Falling commodity prices have been encouraging hopes that inflation has peaked, but the heat wave, which has enveloped nearly the entire country and is forecast to linger possibly into August, threatens to send prices for key raw materials climbing anew.*
- **Big Oil companies** are seeing record profits. U.S. energy companies Exxon and Chevron have reported the biggest leaps in their profits. Gas prices in the U.S. have risen by more than $1 a gallon on average since 2021. These companies have been criticized for capitalizing on the fuel crisis following Russia's invasion of Ukraine.



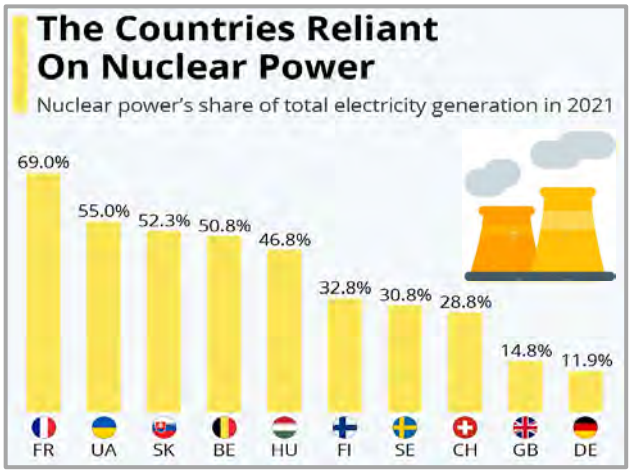
- **A worldwide shortage of fiber optic cable** has driven up prices and lengthened lead times. Europe, India and China are among the regions most affected by the crunch, with prices for fiber rising by up to 70% from record lows in March 2021, from $3.70 to $6.30 per fiber/km. Total cable consumption increased by 8.1% in the first half of the year compared with last year. China accounted for 46% of the total, with North America representing the fastest growing region, at 15% YOY. There has been a shortage of helium, a crucial component in the manufacture of fiber optic glass, in part caused by plant stoppages in Russia and the U.S., which has caused prices to increase by 135%.

EUROPE, AFRICA & THE MIDDLE EAST

- **Eurozone business activity** slipped into reverse for the first time since early 2021. Fears that the 19-country single currency zone is heading for a sharp downturn were reinforced by S&P Global's flash eurozone composite purchasing managers' index for July, which showed output and new orders both fell. The composite PMI, which measures activity at both services and manufacturing companies, fell to a 17-month low of 49.4, below the crucial 50 mark that separates growth from contraction.
- **Rolls-Royce** plans to test whether hydrogen can safely power a small aircraft in ground trials using two of its engines, as the UK engineering group steps up research into cutting-edge technologies. The first trial will be in the UK this year using its AE 2100 turboprop engine, which powers civil and military aircraft. The second will test the fuel on a Pearl 15, one of its business jet engines, in the U.S.

  Key Update: *Air traffic volumes and emission levels have rebounded as passengers have returned to the skies. Aviation consultancy IBA forecasts aircraft carbon emissions this year will be 36% higher than in 2021 and will match 2019's pre-pandemic levels by 2023.*
- **Airbus and more than a half-dozen airlines** signed letters of intent to discuss buying carbon removal credits to offset

emissions from air travel. The credits will be issued by Airbus' partner, 1PointFive, a subsidiary of Occidental Petroleum, which plans to build a direct air carbon capture and storage facility in Texas that will be able to remove up to 1mn tons of CO_2 annually. It is expected to be running by 2024. Airbus' partnership with 1PointFive includes buying 400k tons of carbon removal credits over a four-year period. (See **Appendix: Aerospace**, page 11)
- **European natural gas prices** surged 20% in two days after Russia deepened supply cuts to the Continent in Moscow's latest attempt to weaponize energy supplies. Futures contracts for delivery in August tied to TTF, the European benchmark wholesale gas price, jumped about 10% to €195/megawatt hour, the highest level since early March, a day after Russia warned of lighter flows in the largest pipeline supplying the region. Prices are more than five times higher than a year ago.
- **Volvo's share of pure electric and hybrid vehicles** rose sharply to 31% of total sales in the 2nd Qtr, even as overall unit sales fell by more than a quarter as a result of production and supply-chain woes.
- **What to do with nuclear power** is once more at the center of discussions, as Europe makes the transition to green energy. The EU Parliament voted in favor of EU rules that would determine investments in nuclear as sustainable and green. German Chancellor Scholz said his government could postpone the planned closure of its remaining nuclear reactors, as he criticized a decision by Russia to constrain gas flows to Germany—a move that could deal a severe blow to Europe's largest economy.

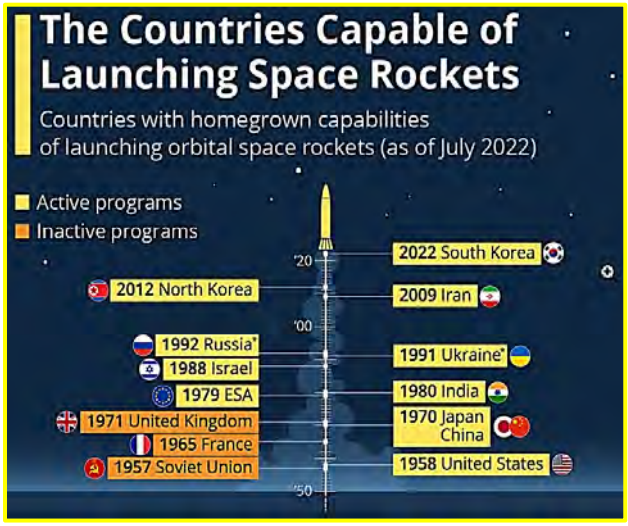


- **The French government** is planning to pay €9.7bn to nationalize EDF fully to bolster the nuclear power specialist's finances amid an energy crisis. The government has presented the buyout as a way of financially shoring up EDF as it embarks on a major plan to build six new nuclear reactors in France in the coming years.
- **Acerinox,** the Spanish parent company of North American Stainless (NAS), reported soaring earnings for the 1st Half on robust demand for stainless steel. Ebitda was a record €523mn, more than double YOY, on sales that grew 56% to €2.54mn. Apparent demand for stainless flat products in the U.S. increased 14% through May. U.S. imports of cold-rolled flat products increased in the 1st Half but "did not alter the dynamics of the market, despite being at historically high levels of 27% of the market".

  Key Update: *NAS has about 35% market share in the U.S. and the country represents 50% of Acerinox's global sales. NAS ran at full capacity with stainless prices mostly rising.*
- **ArcelorMittal** reported 2nd Qtr earnings of US$5.16bn, bolstered by sharply increased prices, but warned of threats from spiralling inflation, the war in Ukraine and China's COVID-19 restrictions. MT's steel shipments in the April-June quarter were down 9.9% from a year earlier, largely due to the impact of war in Ukraine, but sales rose as its average selling price soared by 30.8%. Now, steel prices are declining at a faster rate than those for raw materials.

ASIA/PACIFIC, JAPAN, AUSTRALIA & INDIA

- **China's 2ndQtr GDP** expanded at a 0.4% annual rate, its weakest growth rate in more than two years and a measure of the costs imposed on the world's second-largest economy by Beijing's zero-tolerance approach to COVID-19. On a quarter-to-quarter basis, China's economy shrank 2.6%. Official data show a modest recovery is now under way, sparked by the easing of public-health restrictions.
- **China is at risk of more frequent lock-downs** and mass testing as officials struggle to contain the spread of the highly transmissible BA.5 sub-variant. Forty-one Chinese cities are under full or partial lockdowns or district-based controls, covering 264mn people in regions that account for about 18.7% of the country's economic activity.
- **Chinese leaders** all but acknowledged that the country would miss its annual growth target (5.5%) this year, while signaling that they would stay the course on zero-tolerance COVID-prevention measures and take only cautious steps to support the struggling property market.
- **Total world crude steel production** was 158.1mn tonnes (Mt), a 5.9% decrease compared to June 2021. China produced 90.7 Mt, down 3.3% on June 2021. India's output of 10.0 Mt was up 6.3%. Japan produced 7.4 Mt, down 8.1%. The U.S. produced 6.9 Mt, down 4.2%. Russia is estimated to have produced 5.0 Mt, down 22.2% from a year ago.
- **Hyundai Motor Co,** factory robot builder ABB and Swedish fridge maker Electrolux see the semi-conductor chip shortage easing, a boost for manufacturers after a long struggle for components. Hyundai turned in its best quarterly profit in eight years as a weak won currency lifted the value of its earnings abroad. Demand stayed strong for its high-margin SUVs and the easing of a global chip shortage helped it resume overtime and weekend shifts at domestic plants. Hyundai now plans to step up vehicle production in the 2ndH. ABB, a big supplier to the automotive industry, said semiconductor chip bottlenecks were easing as it reported its 2ndQtr earnings.
- **BHP, the world's largest resources company,** warned of economic headwinds during the next year, signaling that the sharp fall in commodity prices is darkening the outlook for the world's biggest miners. Iron ore, the biggest source of income for BHP and Rio Tinto, recently dropped below $100/tonne for the first time this year, while copper plunged to a 20-month low below $7,000/tonne by mid-July. That slump has weighed on share prices across the sector with BHP and Rio Tinto both down by more than 20% from a June peak. (See **Appendix: Commodities**, page 15)
- **South Korea** joined the exclusive club of countries that have the capability of launching space rockets using homegrown technology. The Korea Space Launch Vehicle-II successfully took off from Goheung (southern South Korea) carrying smaller satellites as well as a 1.3 tonne dummy, demonstrating the ability to" payload" satellites above the one-tonne mark. Asian rocket programs are actually among the oldest active programs in the world, with the Chinese and Japanese programs dating back to 1970 and the Indian one to 1980. (See **Appendix: Aerospace**, page 13)



- **Samples taken from copper mine waste** in Australia's outback have shown more than 200 times cobalt's average presence in Earth's crust. Miners of cobalt, a key component in lithium-ion batteries that are used in smartphones and electric vehicles, are calling it a 'game changer' for Australia because the potential for new supply chains could reduce China's dominance of the sector. In 2021, China accounted for 72% of cobalt refining.
- **Polysilicon prices** are rising as plant outages extend a shortage of the material that is key to making solar panels. The average cost of the most expensive grade of polysilicon rose 1.9% to $43.50/kilogram by mid-July. Prices are at the highest level since late 2011 but should ease in August.
- **Oil prices** fell below $95/bbl in mid-July, wiping out all of the gains made since Russia invaded Ukraine less than five months ago. Continuing a six-week rout, recessionary jitters outweighed worries over energy supply shortages. Brent and West Texas Intermediate had traded above $130 as Western countries hit Russia with sanctions.

Key Update: *Oil has not been the only commodity to run out of steam in recent weeks. Many of the commodity surges that helped drive high levels of inflation have also slumped. Copper and iron have both fallen by about a third since their spring peaks.*

ECONOMIC UPDATE: APPENDIX TO THE AUGUST 2022 ISSUE

STAINLESS STEEL: A MONUMENT TO HUMAN STRENGTH

With a record 21 grand slam men's singles titles in tennis, the most in history, Rafael Nadal knows how to shine, both on the courts and off. **Unveiled at Roland Garros in 2021, a gleaming statue captures Nadal hitting his signature lefty forehand. It is constructed entirely of nickel- containing Type 316L stainless steel.** Standing 3m tall, 4.89m wide and 2m deep, it pays tribute to the Spanish player who has won 13 titles on the clay courts in Paris, scoring his first win there in 2005. The sculptor, Jordi Díez, is known for playing with the limits of figurative art. Looking beyond the traditional and studying new techniques, he came to love working with stainless steel. "As a material it is limitless. It really helps me express the inner energy of the person I am depicting. I wanted to depict Rafael as a synthesis of all his attributes, which I boiled down to one: strength. This sculpture is in fact a monument to human strength."

Getting up at 6:30am and working 10-to-12-hour days, the sculpture took nearly eight months to complete. **"Stainless steel has some special qualities I respect.** It's colorless. It's very light. When you work with it you feel like you are escaping reality. Then there's that magical moment when you finish the work and it takes you by surprise. That gives me strength." Says Nadal, "The statue is spectacular. It's a clean, modern statue and I'm very pleased. It's really difficult to build a statue with that material and be so real as this one is."

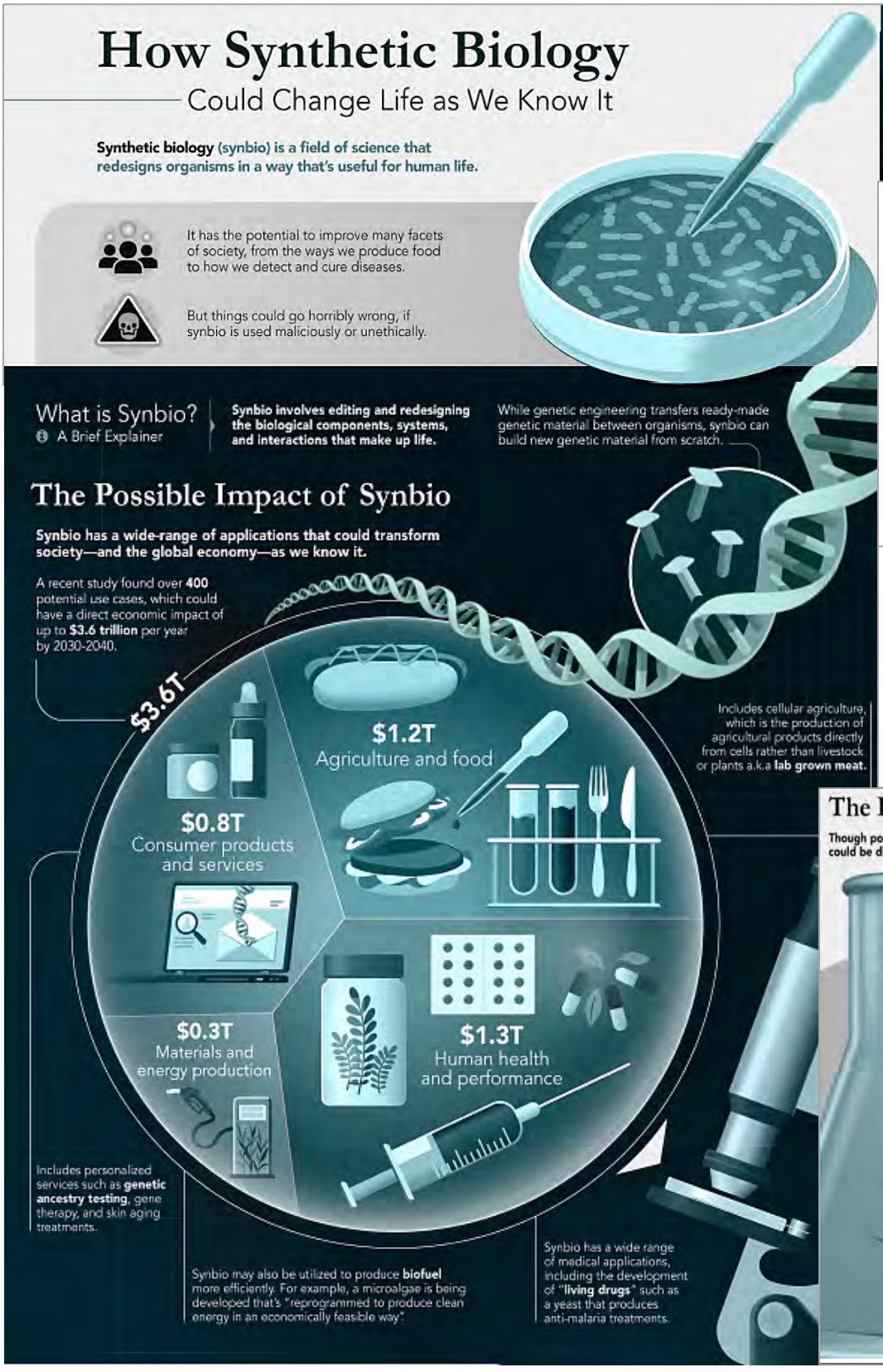
STEEL: TRADITIONAL BLAST FURNACES LEAVE STEELMAKERS FACING $518BN STRANDED-ASSET RISK

The steel industry may have to write down $518bn in assets over the coming years because it is still building traditional blast furnaces despite countries seeking to cut their carbon emissions. Countries have continued to announce new coal-based plants while at the same time setting tougher pledges to lower emissions, according to *Global Energy Monitor*, an independent non-governmental organization that tracks fossil fuel and renewable energy projects. **As a result, coal-powered blast furnaces could become unnecessary or inoperable, leaving the sector with stranded assets worth between $345bn and $518bn. The forecasts are much higher than previous estimates that put the stranded-asset risk at up to $70bn.** Much of the risk is in Asia, notably China and India, where 80% of the world's new coal-based steelmaking capacity is planned. The report says 345.3mn tonnes per year of such steel production is proposed or under construction. Decarbonizing production of steel, important for engineering and construction, is seen as essential to meeting climate targets. **The steel industry accounts for 7-9% of all direct emissions from fossil fuels, according to the World Steel Association**. Blast furnaces use coking coal to melt the metal in iron ore and remove oxygen. A byproduct of this chemical reaction is carbon dioxide, while large amounts of energy are also required to heat the furnaces above 1,000°C. Some of the biggest manufacturers have launched initiatives to reduce their carbon footprint by expanding the use of electric arc furnaces, which melt down scrap steel and emit a fraction of the carbon dioxide. Many companies are also developing hydrogen and carbon capture technologies but progress remains slow and will need billions of dollars of investment. The report goes on to warn that the shift from traditional blast furnaces to electric arc furnaces is "too slow" and "dangerously behind decarbonization targets" laid out in the International Energy Agency's net zero 2050 report. Currently 31% of steelmaking capacity uses electric arc furnaces but only 28% of capacity under construction will do so. By 2030, at least 37% of capacity should use EAF technology, and 53% by 2050, according to the IEA. "The path to decarbonizing the steel sector may be complicated, but some pieces are very clear," said Caitlin Swalec, research analyst at *Global Energy Monitor*.

STEEL: TATA STEEL UNVEILS GREEN STEEL WITH 30% CO_2 REDUCTION

Tata Steel Nederland launched Zeremis Carbon Lite, a green steel solution that reportedly offers a 30% reduction in CO_2 intensity compared to the European average, as part of its aim to eliminate CO_2 emissions by 2050. Tata Steel claims to have been working on solutions to reduce the CO_2 emissions of steel since 2018. **The company's Ijmuiden steelworks reportedly offers a CO_2 intensity for steel production that is 7% lower than the European average and almost 20% below the global average.** To reduce the emissions of steel production on a large scale, Tata Steel says it has committed to switching to green hydrogen-based steelmaking. The company is aiming to reduce CO_2 emissions by at least 30% by 2030 and to emit 75% less CO_2 by around 2035, with the ultimate goal of eliminating CO_2 emissions by 2050.

MEDICAL: SYNTHETIC BIOLOGY, THE $3.6 TRILLION SCIENCE CHANGING LIFE AS WE KNOW IT



Balancing Risk and Reward

Our choices today will dictate the future of synbio. In fact, about **70%** of the total potential impact is dependent on consumer and societal acceptance.

How Synthetic Biology Could Change Life as We Know it

Synthetic biology (synbio) is a field of science that redesigns organisms in an effort to enhance and support human life. According to one projection, this rapidly growing field of science is expected to reach $28.8 billion in global revenue by 2026. Although it has the potential to transform many aspects of society, things could go horribly wrong if synbio is used for malicious or unethical reasons. This infographic explores the opportunities and potential risks that this budding field of science has to offer.

What is Synthetic Biology?

We've covered the basics of synbio in previous work, but as a refresher, here's a quick explanation of what synbio is and how it works. Synbio is an area of scientific research that involves editing and redesigning different biological components and systems in various organisms. It's like genetic engineering but done at a more granular level—while genetic engineering transfers ready-made genetic material between organisms, synbio can build new genetic material from scratch.

The Opportunities of Synbio

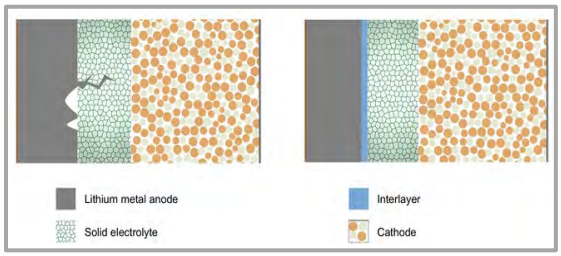
This field of science has a plethora of real-world applications that could transform our everyday lives. A study by McKinsey found over 400 potential uses for synbio, which were broken down into four main categories:

- Human health and performance
- Agriculture and food
- Consumer products and services
- Materials and energy production

If those potential uses become reality in the coming years, they could have a direct economic impact of up to $3.6 trillion per year by 2030-2040.

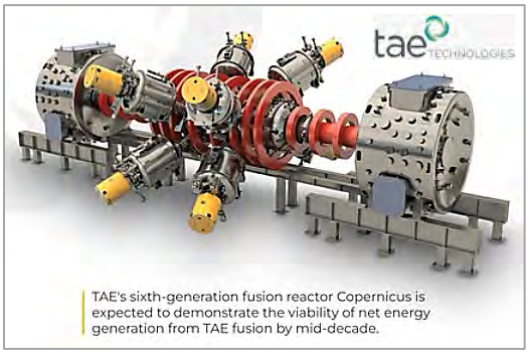
ENERGY/INNOVATION: RESEARCHERS MAKE SOLID-STATE BATTERIES CHARGE FASTER, LAST LONGER

An international team of researchers devised a novel strategy to make solid-state batteries last longer and charge faster. The researchers explain that as the technology stands today, solid-state batteries develop dendrites after repeated use which can make them short-circuit and useless. The root cause of this dendrite formation is the appearance of microscopic voids in one of the electrodes early on. **Adding a thin layer of certain metals to the electrolyte surface significantly delays dendrite formation, extending the battery's life and enabling it to be charged faster.** Solid-state batteries exchange the liquid electrolyte common in Li-ion devices for a solid ceramic electrolyte and swap graphite with metallic lithium. Ceramic electrolytes perform even better at higher temperatures, which is especially useful in tropical countries. Lithium is also lighter and stores more charge than graphite, which can significantly cut down the battery cost. Lithium forms filaments that grow into the solid electrolyte and short out the anode and cathode. To investigate this phenomenon, the team artificially induced dendrite formation by repeatedly charging hundreds of battery cells, slicing out thin sections of the lithium-electrolyte interface and peering at them under a scanning electron microscope. When they looked closely at these sections, the team realized that something was happening long before the dendrites formed – microscopic voids were developing in the lithium anode during discharge. The team also computed that the currents concentrated at the edges of these microscopic voids were about 10,000 times larger than the average currents across the battery cell, which was likely creating stress on the solid electrolyte and accelerating the dendrite formation. To ensure that voids don't form, the researchers introduced an ultrathin layer of a refractory metal between the lithium anode and solid electrolyte. The refractory metal layer shields the solid electrolyte from the stress and redistributes the current to an extent. Computational analyses clearly showed that the refractory metal layer delayed the growth of microscopic lithium voids. Applying extreme pressure that can push lithium against the solid electrolyte can prevent voids and delay dendrite formation, but that may not be practical for everyday applications. Other researchers have also proposed the idea of using metals like aluminum that alloy or mix well with lithium at the interface. But over time, this metal layer blends with lithium, becoming indistinguishable and does not prevent dendrite formation. **However, by using a metal like tungsten or molybdenum that doesn't alloy with lithium, the performance from the cell is even better.** The researchers say that the findings are a critical step forward in realizing practical and commercial solid-state batteries. This strategy can also be extended to other types of batteries that contain metals like sodium, zinc and magnesium.



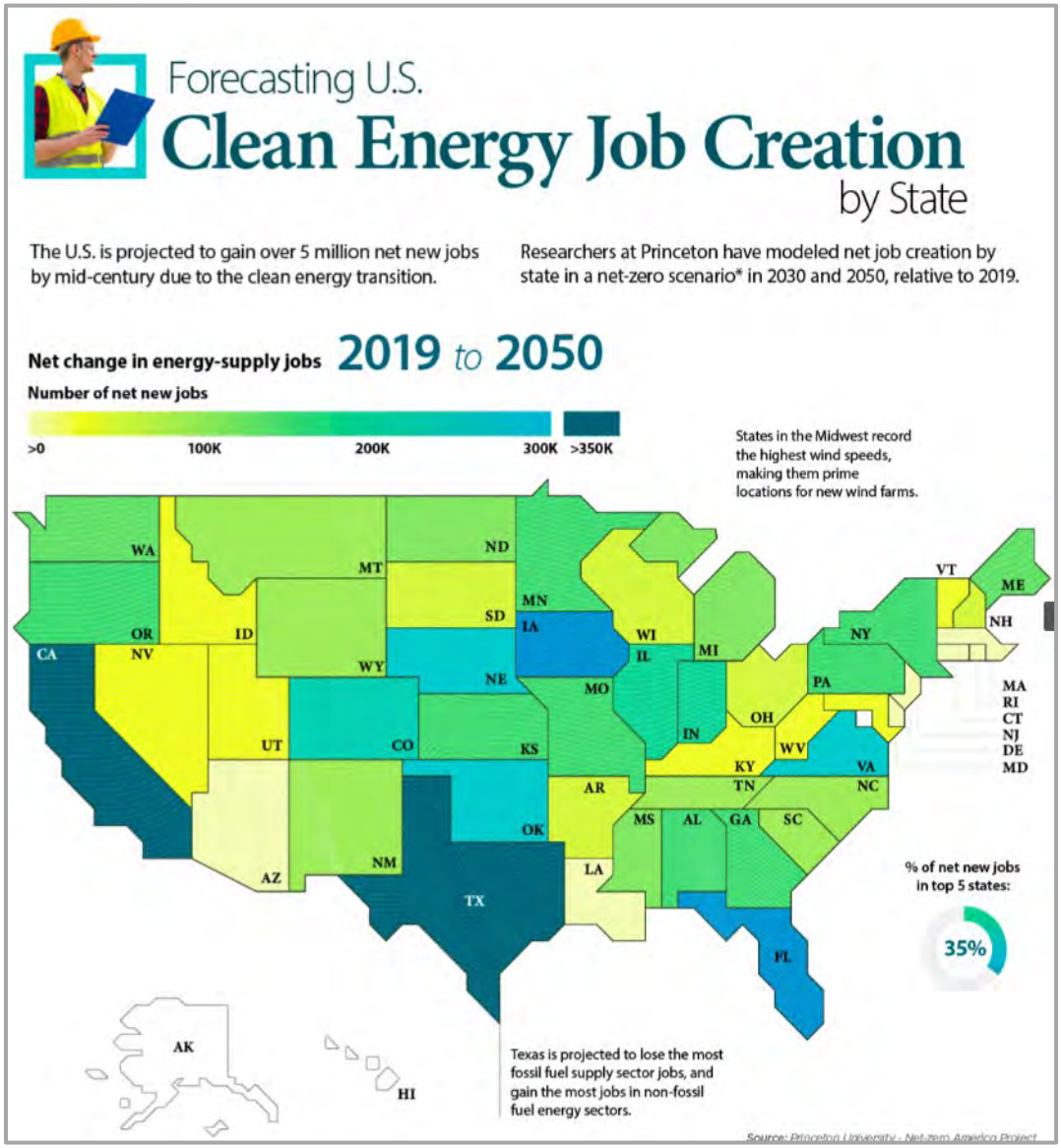
ENERGY: CHEVRON INVESTS IN NUCLEAR FUSION START-UP PURSUING 'PERFECT POWER'

Chevron has invested in Google-backed nuclear fusion start-up TAE Technologies in the latest sign of the fast-growing interest in the potential of the energy technology to deliver safe zero-emissions power. The U.S. oil company invested in TAE alongside Google and Japan's Sumitomo Corporation as it raised $250mn to fund the sixth-generation of its fusion research reactor in California. The prospect of combining atomic nuclei to generate power has excited scientists for more than 60 years but has only started to attract significant private investment in the past decade, as efforts to limit global warming by cutting emissions have gathered pace. **Private fusion companies have raised at least $2.8bn in the past 12 months, bringing the total private sector investment to date to $4.8bn**, according to the latest study published by the Fusion Industry Association. Founded in 1998, TAE, which employs about 400 people, is hoping to generate electricity by fusing a hydrogen proton with boron. While most scientists agree that combining the hydrogen isotopes deuterium and tritium is the most viable route to commercial power, TAE argues that its approach, if successful, would provide an even safer source of energy. The planet has abundant potential reserves of deuterium, tritium, hydrogen and boron, but while tritium is mildly radioactive, boron is not. It can also be easily mined, whereas tritium has to be extracted from lithium and then regenerated in the fusion reaction. Unlike nuclear fission when atoms are split, none of the fusion reactions produce significant radioactive waste, making all of the processes under development a potential source of safe, near limitless carbon-free electricity. Fusion companies say a small cup of the fuel could power a house for hundreds of years. But while scientists have been fusing atomic nuclei since the 1950s, no group has been able to generate more energy from a fusion reaction than the systems consume. TAE says the main aim of its sixth-generation reactor is to achieve that outcome, a milestone known as net energy gain, with a view to delivering commercial power by 2030, earlier than many of its competitors.



TAE's sixth-generation fusion reactor Copernicus is expected to demonstrate the viability of net energy generation from TAE fusion by mid-decade.

ENERGY: FORECASTING U.S. CLEAN ENERGY JOB CREATION BY STATE (2019-2050)



As the world is slowly moving towards a carbon-free future, job prospects within the renewable energy industry will see a boom in the coming years. Ranging from environmental scientists to renewable energy generation technicians and engineers, clean energy jobs are growing. Between the shuttering of coal plants and companies making efforts to use renewable sources of energy, the United States alone could see the creation of 5mn net new jobs within the energy-supply sector, all driven by clean energy. These jobs offer a more sustainable and high-paying alternative for the current and new workforce, especially in some of the country's highly fossil-fuel-dependent states. Based on analysis presented by Princeton University, the infographic visualizes the forecasted change in energy-supply jobs in every state from 2019 to 2030 and up until 2050, in a net-zero scenario. **Shift in Energy Supply Jobs by 2030 — Texas on the Forefront:** Between 2020 and 2021, jobs in the oil and gas sector saw a 9% decline in Texas, a reduction of more than 55,000 in the state. Despite this, Texas is still one of the largest oil and natural gas producers, employing the highest number of people. A rapid rise in employment in the clean energy industry will compensate for this decline in fossil fuel sector jobs. Texas fossil fuel unions have also signed onto the climate action plan and vowed to create more jobs in the clean energy sector. In the process, Texas will see nearly 135,000 net new energy-supply jobs by 2030, more than any other state. **Shift in Energy Supply Jobs by 2050 — Wisconsin Advances:** Wisconsin has stated its desire to transition to 100% clean energy by 2050, growing the state's economy by more than $21 billion. According to Princeton, Wisconsin could also introduce more than 46,000 net new energy-supply jobs by 2050, a tremendous leap over the state's 863 new jobs forecasted through 2030. The state of Wyoming has the second-highest change in energy supply jobs, going from 2,400 jobs by 2030 to nearly 62,000 by 2050. Meanwhile, California, Florida, and Texas will continue their commitment to being leaders and introducing more clean energy-supply jobs by 2050. The only states that will see a decline in clean energy jobs between their 2030 and 2050 totals are the Northeastern states of Connecticut, New Jersey, and Massachusetts. Most states have taken measures to create more sustainable and high-paying jobs without leaving the current workforce in the lurch. On average, U.S. states will see an increase of 105,000 energy-supply jobs by 2050. As the states and the country make this transition and federal and private investment in the renewable energy industry increases, it'll be interesting to keep track of how new clean energy jobs impact the economy.

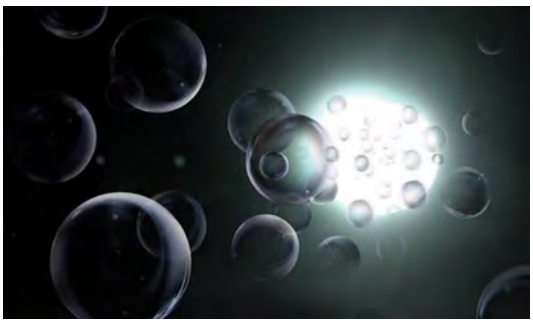
ENERGY: U.S. SOLAR DEVELOPERS CHEER SOLAR PANEL TARIFF REPRIEVE

The administration will allow solar panel parts to be imported free of tariffs from four Southeast Asian nations, offering a cost reprieve to American renewable energy project developers after months of uncertainty. The White House's move was part of a package of measures

designed to boost a transition to clean energy, including triggering the Defense Production Act to spur the domestic production of solar panel components. The temporary lifting of trade barriers for imported solar panel components from Cambodia, Malaysia, Thailand and Vietnam comes amid a heated debate in the administration on whether to ease tariffs on billions of dollars of Chinese goods to fight inflation. **The decision will "temporarily" allow U.S. solar developers to source modules and cells from the four Southeast Asian countries, "by providing that those components can be imported free of certain duties for 24 months,"** the White House said. The move effectively blunts the threat of a U.S. Commerce Department investigation that might lead to much higher tariffs on some imported solar panel components. The probe was supported by some domestic solar photovoltaic equipment producers, but strongly opposed by clean-energy developers and other industry supporters who said it was having a "chilling" effect on the sector and could derail the Biden administration's efforts to green the country's electricity grid. In May, energy consultancy Rystad Energy said up to 17.5 gigawatts of planned solar installations in 2022 — or almost two-thirds of the total — were in jeopardy because of the Commerce Department's investigation. Heather Zichal, head of the American Clean Power Association, said Biden's announcement would "rejuvenate" the U.S.'s domestic solar industry, which "Commerce's flawed inquiry has disrupted". The Department launched the anti-dumping investigation in March after a complaint from Auxin Solar, a small, California-based solar panel manufacturer, which argued Chinese manufacturers were dodging tariffs on their exports to the U.S. by completing the panels in Southeast Asia. Mamun Rashid, Auxin chief executive, said the White House's move interfered with the Commerce Department's quasi-judicial process. "By taking this unprecedented — and potentially illegal — action, he has opened the door wide for Chinese-funded special interests to defeat the fair application of U.S. trade law," Rashid said. Panels from Cambodia, Malaysia, Thailand and Vietnam accounted for 85% of all solar power capacity imported to the U.S. last year and 99% in the first two months of 2022, according to Rystad Energy. Analysts at ClearView Energy Partners, a Washington consultancy, said they still thought the Commerce Department was "likely" to rule in favor of the complaint, and they "would not be surprised to see litigation directed against the waiver".

INNOVATION/AEROSPACE: MIT SCIENTISTS DISCOVERED HOW TO FULLY REVERSE CLIMATE CHANGE?

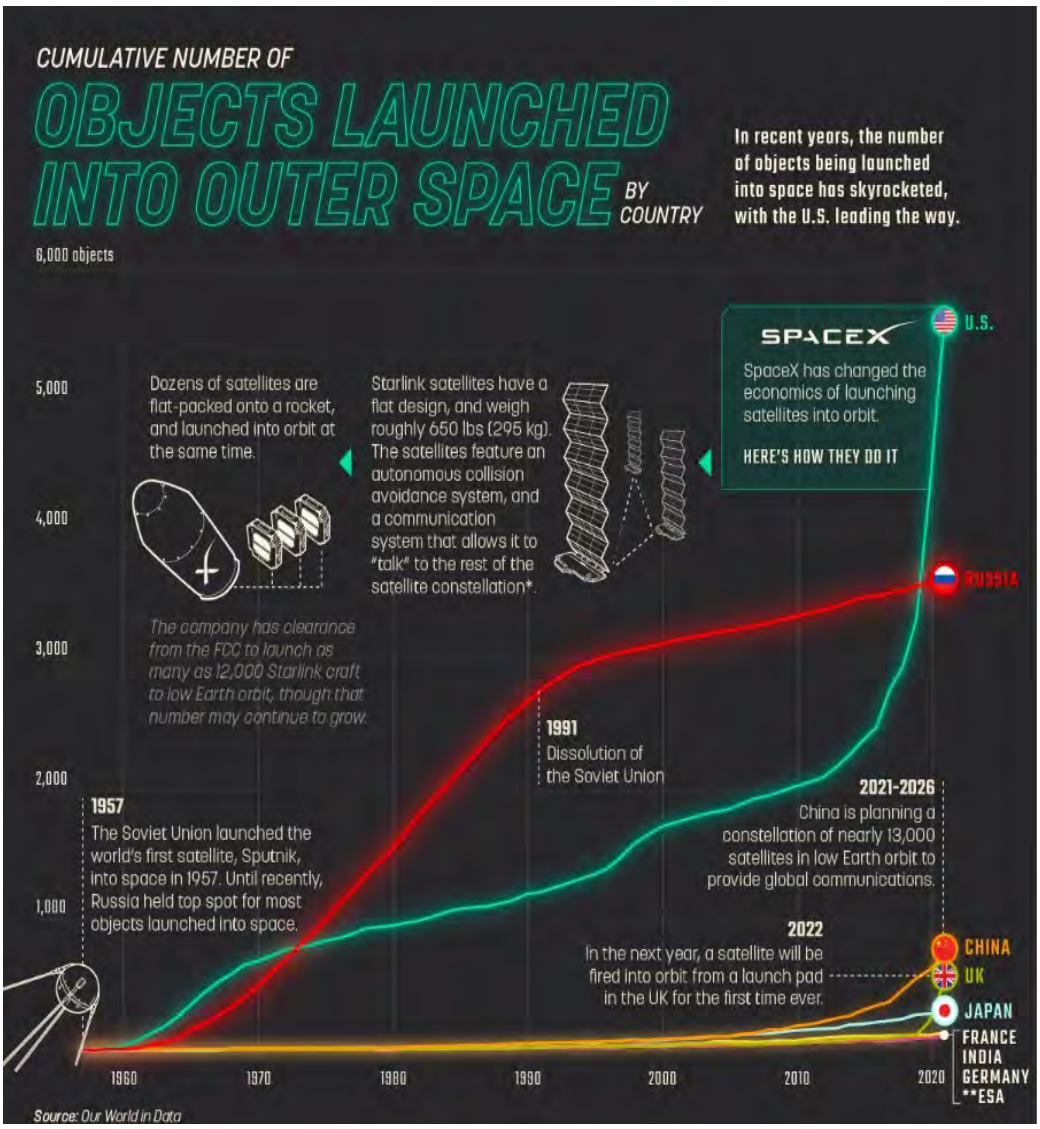
Scientists at MIT think they may have finally found a way to reverse climate change. Or, at the least, help ease it some. **The idea revolves heavily around the creation and deployment of several thin film-like silicon bubbles. The "space bubbles" as they refer to them, would be joined together like a raft. Once expanded in space it would be around the same size as Brazil.** The bubbles would then provide an extra buffer against the harmful solar radiation that comes from the Sun. The goal with these new "space bubbles" would be to ease up or even reverse climate change. The Earth has seen rising temperatures over the past several centuries. NASA has released a gif detailing how the global temperature has changed over the years. Now, we're seeing massive "mouths to hell" opening in the permafrost. There's also the fact that scientists just discovered yet another hole in the Earth's ozone layer. As such, finding ways to ease or reverse climate change continues to be a high priority for many. This



new plan is based on a concept first proposed by astronomer Roger Angel, who originally suggested using a "cloud" of small spacecraft to shield the Earth from the Sun's radiation. Researchers at MIT have taken that same basic concept and improved it by substituting inflatable silicon bubbles for the spacecraft that Angel originally proposed. Being able to reverse climate change would be a huge step in the right direction. Shielding the Earth from the Sun's radiation would only be one part of it. We'd still need to cut down on other things too. But how exactly would a "raft" of space bubbles shield Earth from the Sun's radiation? The basic idea requires sending the bubbles to the L1 Lagrangian Point. This is the location directly between the Earth and the Sun where gravity from both our star and our planet cancels out. As such, the space bubbles would theoretically be able to just float without much pull from either body. The researchers say we'd probably still need to put some kind of spacecraft out there to help keep things on track, but it could give us a good chance at reversing climate change or at least slowing down the changes. It is important to note that MIT does not view this as an alternative solution to our current adapt and mitigate efforts. Instead, it's a backup solution meant to help if things spin out of control.

AEROSPACE: WHICH COUNTRIES ARE DOMINATING SPACE?

This visual breaks down the amount of objects launched into space by country over time. Believe it or not, there is a lot of stuff in space. In fact, our atmosphere is filled with more than 11,000 objects that have been launched since the foray into space began. The Space Race started during the Cold War, and early on the Soviet Union dominated when it came to the amount of devices and objects launched into Earth's atmosphere. A few years ago, the U.S. took back that title with Musk's SpaceX helping to lead the charge.



What Gets Launched Into Space? Satellites, crewed spacecraft, probes and space station flight equipment. Probes and landers like the Mars Rover, for example, have helped scientists explore other planets. Satellites provide us with everyday necessities like cell phone service, far-reaching television signals, satellite imagery and GPS. As of late 2021, there were around 4,852 operational satellites in orbit—2,944 belonging to the United States. Here's a quick look at what the U.S. uses its satellites for: Commercial: 2,516; Military: 230; Government: 168 Civil: 30. However, many satellites in orbit are no longer functional. In fact, there is a lot of junk in space—according to NASA, there are over 27,000 pieces of space debris in orbit.

Rank	Country	Cumulative Number
#1	United States	5,534
#2	Russia	3,611
#3	China	731
#4	UK	515
#5	Japan	300
#6	France	130
#7	India	127
#8	Germany	114
#9	Canada	82
#10	Luxembourg	53

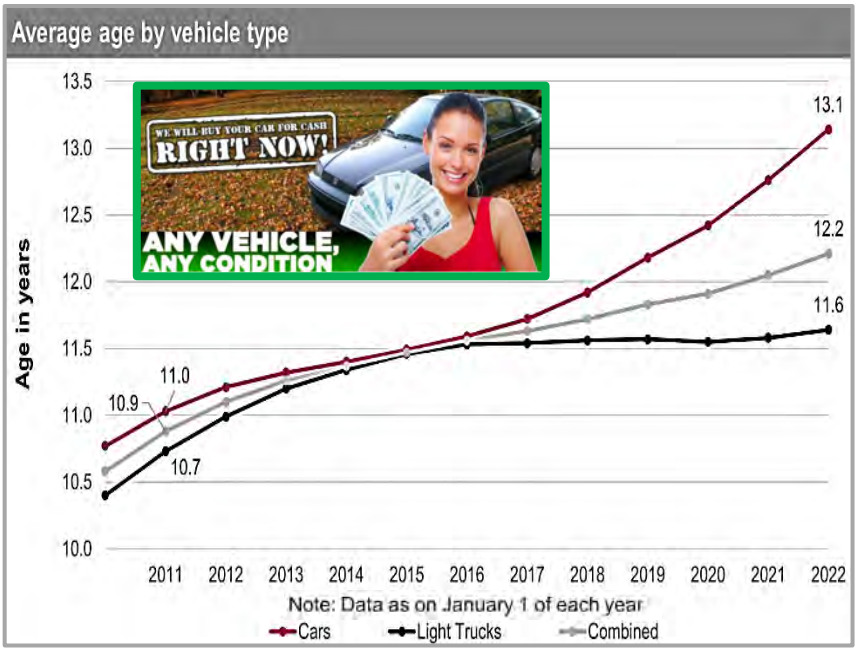
The Future of Space: With corporations beginning to take the lead in this new frontier, the landscape of space launches is changing. In 2019 Starlink, a constellation of satellites which provides 36 countries with internet access, was launched. With over 2,200 Starlink satellites in the sky and counting, SpaceX's ultimate goal is global internet coverage; China is planning a similar venture. Beyond useful satellites and scientific exploration, other potential space industries are emerging. As one example, the business of commercial space tourism is no longer a futuristic concept. In late 2021, famous billionaire and founder of Virgin Galactic, Richard Branson flew briefly into space on a private flight. Jeff Bezos, having founded Blue Origin, followed shortly after. Today, both Blue Origin and Virgin Galactic are licensed by the Federal Aviation Administration for passenger space travel. However, if you want to be launched into space, it will cost you around $250,000-$500,000.

AEROSPACE: MICROSOFT, ALASKA AIRLINES BACK CO2-TO-JET-FUEL TECHNOLOGY

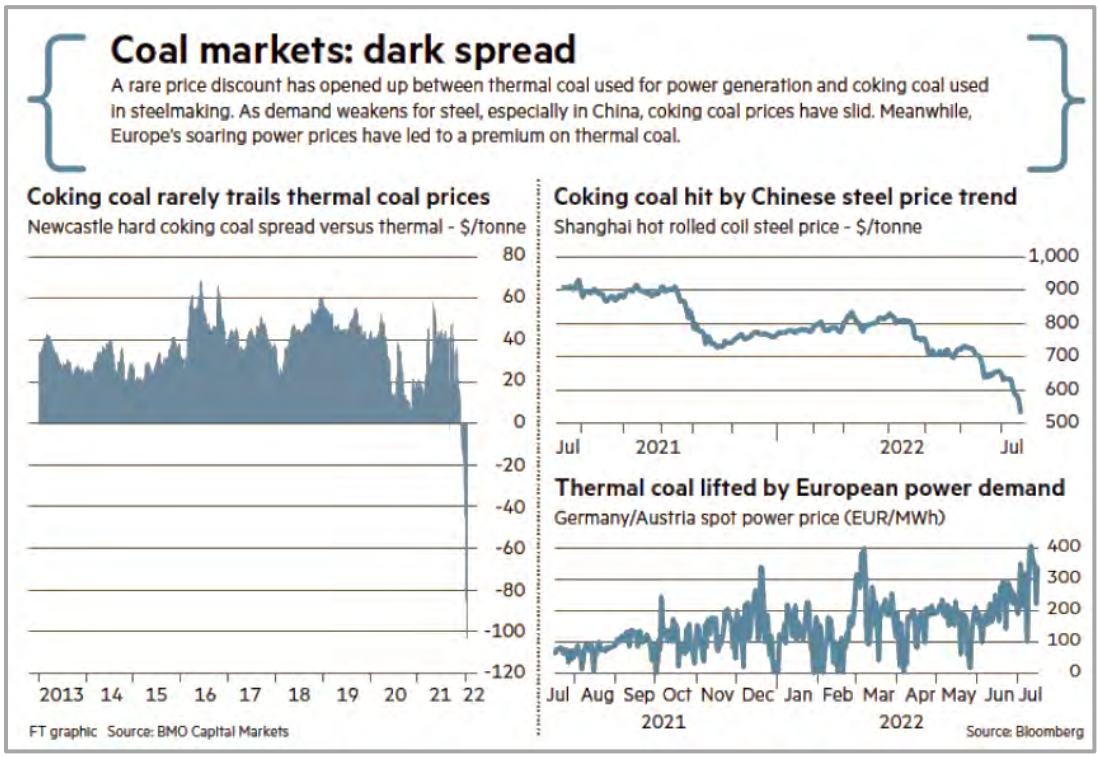
A California startup developing uses for captured carbon dioxide formed a partnership with Alaska Airlines and Microsoft to commercialize its CO2-based jet fuel. **Twelve, one of a growing crop of "carbon transformation" startups, has designed an electrochemical reactor that can split carbon dioxide into chemical compounds that can be turned into fuel known as e-fuel.** The company said the agreement will help it work toward using its fuel in a commercial flight and eventually provide fuel for some of Microsoft's business travel. Twelve says its fuel offers a more than 80% cut in greenhouse-gas emissions compared with conventional fuels, including the impact of manufacturing and shipping. E-fuels can be used in a regular jet engine but have to be blended with kerosene under industry standards. Low-carbon alternatives to jet fuel remain scarce and expensive. In 2020, Microsoft made a deal with Alaska Airlines and SkyNRG, a Netherlands-based maker of biofuel, to use biofuel on some of its frequent business-travel routes. Biofuel, which is produced from crops or organic waste, can offer an up to 80% cut in emissions compared with fossil-based jet fuel, but many analysts question whether there could ever be enough to power the world's flights as other industries compete for it. Carbon dioxide doesn't have that problem, Twelve Chief Executive Nicholas Flanders said. **"CO2 is widely available, it's part of the problem that we are trying to address, so that means we have way more feedstock available than we need to make all of the world's jet fuel," Flanders said.** "There's not enough biomass to go around." Barriers to scaling up e-fuels include high prices, the need for approval from standard setters, and the logistics of delivering the fuel. E-fuel prices ranged from $5.70 to $10.80 a gallon in 2021, compared with roughly $1.85 for kerosene jet fuel, according to estimates by BloombergNEF.

AUTOMOTIVE/STEEL SCRAP: AMERICAN VEHICLES ON THE ROAD HAVE NEVER BEEN OLDER

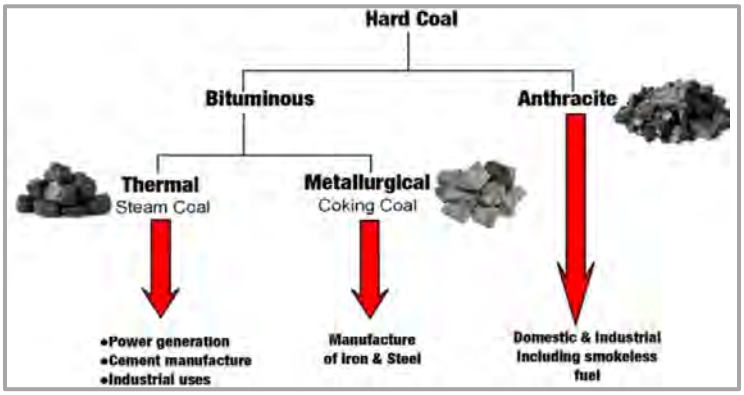
The average age of light vehicles in operation (VIO) in the U.S. rose to 12.2 years this year, increasing by nearly two months over the prior year, according to new research from S&P Global Mobility. This is the fifth straight year the average vehicle age in the U.S. has risen. This year's average age marks another all-time high for the average age even as the vehicle fleet recovered, growing by 3.5mn units in the past year. **The global microchip shortage, combined with associated supply chain and inventory challenges, are the primary factors pushing U.S. average vehicle age higher.** The question for auto shredders is, "Does it matter? There are about 300mn vehicles in the U.S. and a vehicle weighs about two tons. Half of that weight is steel. That means there are 300mn tons of future scrap driving around U.S. roads. Most studies report an annual vehicle scrappage rate of 5% or 15mn vehicles. The annual steel scrap reservoir is somewhere around 75mn tons. Fifteen-million tons of scrapped vehicles a year in a 75mn-ton market is 20%. So, vehicle age does matter. Obviously, the drop in the scrappage rate is what is behind the graying fleet of America's cars and trucks. The scrappage rate fell from 5.6% in 2020 to 4.2% in 2021, a difference of 15mn cars vs. 11mn cars scrapped. There is a lag between the scrapping of a car, getting it to an auto wrecker or pick-and-pull yard and then into a scrap yard and through a shredder. The trend seen in light vehicle aging is not going to explain what happened last month or what will happen next month, but it is a useful trend nonetheless. The flow of most obsolete scrap is very much elastic — reacting to the prices being paid — and how prime scrap is much more inelastic and flows as it is produced regardless of price. How would worn out autos be classified? Nobody is getting rid of their car because shred feed prices are up. While auto wreckers can sit on a mountain of old cars waiting for the right price, those car scrap yards are only going to get as many cars as there are people who have bought a new one. The aging vehicle fleet has been a trend dating back to when the average age was 9.5 years in 2005. It may be that what's at work here is more than a chip shortage or even the rising price of vehicles. The improving reliability of cars is another factor, coupled with fewer miles being driven (high gas prices, working from home).

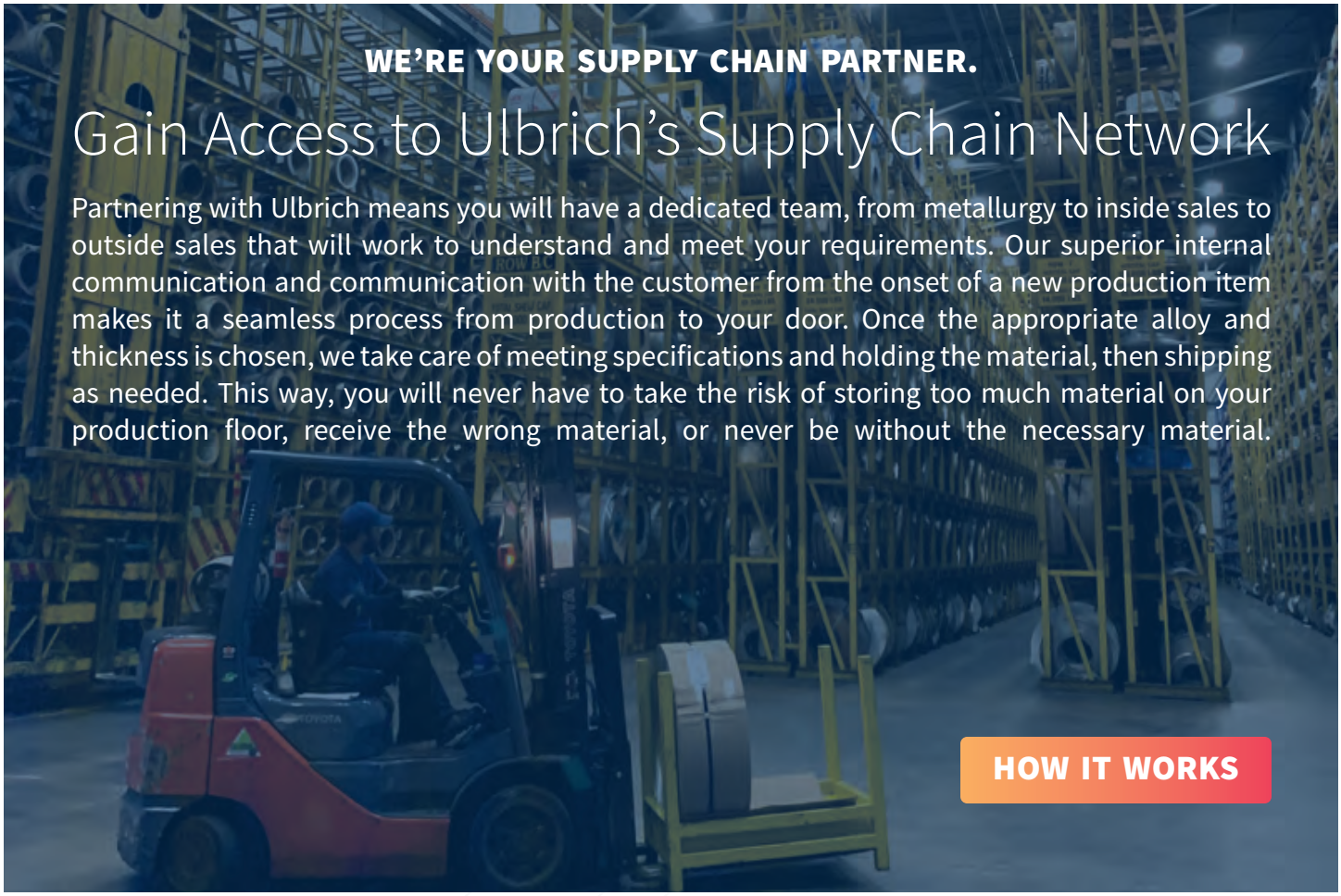


COMMODITIES/COAL: THE PRICE OF COKING COAL USED IN STEELMAKING HAS COLLAPSED



A rare price discount has opened up between thermal coal used for power generation and coking coal used in steelmaking. As demand weakens for steel, especially in China, coking coal prices have slid. Europe's soaring power prices have led to a premium on thermal coal. Though coal has a uniform color, it has varying qualities for different uses. This year the world has focused on the surging demand for thermal coal used to generate electricity as Russia's energy squeeze on Europe made prices soar. Meanwhile, **the price of coal used in steelmaking, metallurgical or coking coal, has collapsed. This has led to the rare situation of coking coal trading at a discount to its sibling thermal. The former's price reflects a lack of demand, the latter one of supply. This split in fortunes will not last.** Europe's travails over a lack of Russia gas has increased demand for thermal coal and driven its cost there up by over 40% in the second quarter. Not only has hard coking coal which is most sought after by steelmakers not kept pace, its price has fallen nearly as much in percentage terms. The gap between the two had expanded to $215/tonne this month (using Australian benchmark prices), points out BMO Capital Markets. That has not occurred in at least a decade. Blame the COVID-induced economic slowdown in China. Despite repeated false dawns, the country has not been able to completely quash the infection through its zero-tolerance policies of testing and quarantine. That has affected industrial production. Even without these lockdowns, China's property markets had already slowed. New housing starts are falling at the fastest pace since the global financial crisis. The declining pace of construction has a big impact on the domestic steel industry, as it accounts for about a third of demand. Floor space starts and completions in May fell at annual rates not seen since the global financial crisis of 2008-09. Less domestic steel demand has, in turn, hit both iron ore and coking coal prices. These are important inputs for steel. Some of the coking coal usually reserved for steel may switch uses. When coking coal begins going into power plants, the discount with thermal coal should begin to close. By then, Europe's economies may well have slowed as well. That would take some of the steam out of thermal coal too.





CONTACT US WITH ANY SPECIFIC NEEDS

Ulbrich Stainless Steels & Special Metals, Inc., has highly trained and experienced engineers, product managers, metallurgists, and sales executives available to assist you in all aspects of material selection and production of your stainless steel or special metals requirements.

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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**

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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