

# Supertrends 2023 Investing reimagined.

From societal trends to investor impact.



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# Supertrends 2023

## Investing reimagined.

From societal trends to investor impact.



# Supertrends – Investing reimagined

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**Nannette Hechler-Fayd'herbe**  
 Head of Global Economics & Research  
 Credit Suisse

The 2020s have already ushered in a lot of changes in our world, many of which we have captured in our Supertrends long-term equity investment themes. While these trends were just starting to emerge when we first launched the Supertrends in 2017, they are now growing and evolving into something much more impactful, hence this year's title, Investing reimagined.

Since inception, our Anxious societies Supertrend has focused in part on the multipolar world that has emerged after two decades of hyper-globalization. This evolution took a dramatic twist in early 2022, when the outbreak of war in Ukraine led to a sharp increase in tensions between the West vs. Russia and China. As a result, defense spending is on the rise, including for cybersecurity to protect vulnerable infrastructure.

Over the years, our Silver economy Supertrend has looked into the impacts of the aging population. As the incidence of many chronic diseases increases with age, we expected to see an increase in healthcare costs along with demand for life insurance products. The COVID-19 pandemic has further emphasized these trends, as the older cohorts were more vulnerable to a severe course of disease. We continue to believe that the growing number of seniors will lead to challenges that require innovative solutions in healthcare, facilities and insurance.

Our Infrastructure Supertrend has had a clear focus since the beginning on the infrastructure gap. In recent years, we have seen governments around the world begin to address this gap through significant infrastructure spending bills, including the Inflation Reduction Act in the USA, the NextGenerationEU plan, as well as China's decision to fast-track several of the 102 large infrastructure projects included in its 2021-25 development plans.

Artificial intelligence (AI) and virtual and augmented reality (VR and AR) have always been an important part of our Technology Supertrend. It is now really exciting to see real breakthroughs and uses for these technologies in our digital-first world. While chatbots have grabbed the spotlight, we expect to see AI deployed in everything from education and construction to food services, healthcare and retail. We also see a lot of potential for AR/VR, as the Metaverse and Web3 transform the internet into a fully immersive and seamless 3D environment.

Finally, our Millennials' values Supertrend has closely tracked the importance of the environment to the younger generations, who have helped bring everything from plant-based protein, electric vehicles and energy-saving technologies into the mainstream. As the urgency of the climate change crisis became clearer, we introduced the Climate change Supertrend in 2020. We are now witnessing an unprecedented push for the build-out of domestically produced renewable energy as Western governments seek energy security in the wake of the Ukraine war.

While the Supertrends could not escape the downtrend in financial markets in 2022, we retain our overall conviction across the Supertrends and their subthemes. We believe the Supertrends continue to offer value in terms of diversification and growth opportunities through their themes that transcend business cycles and will ultimately shape the future.

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# Supertrends – Creating impact

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**Daniel Rupli**

Head of Single Security Research  
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Higher inflation, increasing interest rates, recession fears, geopolitical challenges and the energy crisis made 2022 a very challenging year for global financial markets. While the Supertrends were also impacted, our diversification approach across all six Supertrends and their various subthemes helped to navigate the turbulent markets. Our more defensive Supertrends, as well as the long-term demographic trends within our Silver economy Supertrend, proved to be less volatile than the growth-oriented themes captured in the Millennials' values and Technology Supertrends. Our Infrastructure and Climate change Supertrends benefited as governments unveiled large-scale, long-term investments, which should provide a catalyst for many of our themes.

Looking to 2023, investors are still confronted with higher inflation, though the overall pressure has eased somewhat. Global central banks have reduced the pace of interest rate hikes, but the focus remains on reducing inflation and we do not expect any rate cuts before 2024. This puts investments with a multi-year horizon into the spotlight. With this year's, Supertrends update, we once again confirm our thematic framework based on long-term catalysts of change in terms of demographics, technology, societal concerns and climate change. We have further developed this framework by introducing a new subtheme in our Climate change Supertrend, and by merging related subthemes in other trends.

The challenging environment is reflected in our Anxious societies Supertrend. Geopolitical tensions and social instability have continued to make personal security concerns among the top worries for many individuals around the world. Now a sharp deterioration in the affordability of essential goods and services, from food, housing and heating to healthcare and education in response to last year's inflationary shock poses yet another challenge for private households. This continues to require public-private solutions, with innovative companies playing an essential role.

We also see technological developments as an opportunity to address some of the aforementioned challenges. While our Technology Supertrend remains unchanged with its five subthemes intact, new developments confirm why these themes remain spot on and should generate long-term growth. Innovative breakthroughs achieved in 2022, including artificial intelligence-based applications such as ChatGPT, should bring efficiency and productivity improvements in the services and industrial sectors. Furthermore, digitalization offers solutions to the many challenges that human society currently faces.

Sticking with technology brings us straight to the youngest cohorts, which we cover in our Millennials Supertrend. The powerful demographics of the Y and Z generations continue to strongly influence the strategy of governments and companies. As emerging markets, and China in particular, remain the big drivers of future consumption, we see the reopening of the Chinese economy as an important growth driver this year. Chinese middle-class youngsters combine a strong affinity for luxury goods with the emerging multi-touchpoint digital ecosystem, in our view.

The other side of the demographic tree brings us to the steadily growing elderly population. Seniors are set to be the one cohort with significant growth, expanding from some 760 million today to close to 2.5 billion by 2100 (according to the United Nations database) as the life expectancy of humans increases year by year. Innovative solutions in healthcare remain a growth driver to fight old age diseases, but trends in insurance, consumer goods and the property market should lead to significant opportunities for companies and ultimately for investors. We have restructured this Supertrend in three subthemes after combining the consumer and care and living angles under one new subtheme called Senior wants & needs.

Change is also afoot in our Infrastructure Supertrend, as various multi-year infrastructure spending bills were unveiled and/or expanded recently by governments around the world. Under the umbrella of the European Green Deal, the European Union (EU) will carry out different large-scale infrastructure programs, such as REPowerEU, which aims to secure sustainable and affordable energy, as well as an industrial strategy that requires investments into digitalization – trends reflected in our Smart and connected cities subtheme. The US government has committed to spend several hundred billion on infrastructure in its Inflation Reduction Act (IRA), including transportation infrastructure, as well as renewable energy-related investments. Additionally, China is fast-tracking several of the 102 large infrastructure projects included in its 2021-25 development plan. In response to these developments, we have streamlined our subthemes in the Infrastructure Supertrend by combining the Telecom infrastructure and Smart cities subthemes under a Smart and connected cities subtheme, as the technological developments are closely linked and the expansion of 5G telecom networks from a pure infrastructure perspective has somewhat matured.

The bulk of the aforementioned government spending will flow into the energy transition to reduce CO<sub>2</sub> emissions. We see the temporary setback in 2022 as a short detour on the path toward reaching net zero emissions by 2050. The geopolitical tensions across Europe further stressed why countries need to reduce their dependence on fossil fuels sooner rather than later. Indeed, Western governments' pursuit of energy security is leading to an unprecedented push for the build-out of domestically produced renewable (i.e., wind and solar) energy. The USA is leading the green spending charge with its IRA. The EU's new Green Deal Industrial Plan will complement its REPowerEU plan, while China is developing mega-sized renewable bases. Last but not least, we have introduced a new subtheme in our Climate change Supertrend this year: Metals of the future. Solar and wind farms and electric vehicles (EVs) require more minerals than the equivalent fossil fuel-based technologies. For example, a typical EV requires six times the mineral inputs compared to a combustion engine car, while an onshore wind farm requires nine times the mineral inputs of a gas-fired thermal power plant. The entire transition starts with these basic materials, and investors should thus consider the entire manufacturing process and not just the finished end-product, in our view.

We remain convinced that our Supertrends continue to offer an opportunity for investors with a multi-year investment horizon to diversify their asset allocation. The various building blocks of our thematic framework provide investors with a tailor-made approach that reflects their own preferences, or a broader and well-diversified investment approach that incorporates all six Supertrends and their 22 subthemes.





# Anxious societies

Society's anxieties have not diminished over the past year. An evolving and difficult geopolitical backdrop, which is amplifying political and social instability, has made personal security among the top concerns for many individuals around the world. The added challenge of last year's inflationary shock and the subsequent deterioration in the affordability of essential goods and services ranging from food, housing and heating to healthcare and education is weighing on private households. These problems continue to require public-private solutions with innovative companies playing a leading role.



**Reto Hess**  
Head of Single Security Research Equity,  
Industrials



## Ones to watch

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Companies providing solutions to lower the costs of basic needs, especially food, housing, healthcare, energy and education, as high inflation exacerbates existing affordability issues.



Companies with strong human capital management, including workforce development and a culture that supports diversity to attract and retain talent; companies that offer products to make the workflow more flexible, efficient and productive, or offer training and education (up- and re-skilling).



Companies that provide protection from violence, crime and cyberattacks, and provide resilience and protection for critical infrastructure; companies that enable pathogen detection, monitoring and containment.



## Affordability

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### Cost-of-living crisis

High inflation remains the key issue for most people in 2023. In 2022, inflation reached the highest level in decades in many countries, squeezing the purchasing power of many households. In a recent Ipsos survey, 69% of respondents said they expect the rate of inflation will continue to rise, while only 11% expect inflation to fall. A third of respondents believe their standard of living will decline.

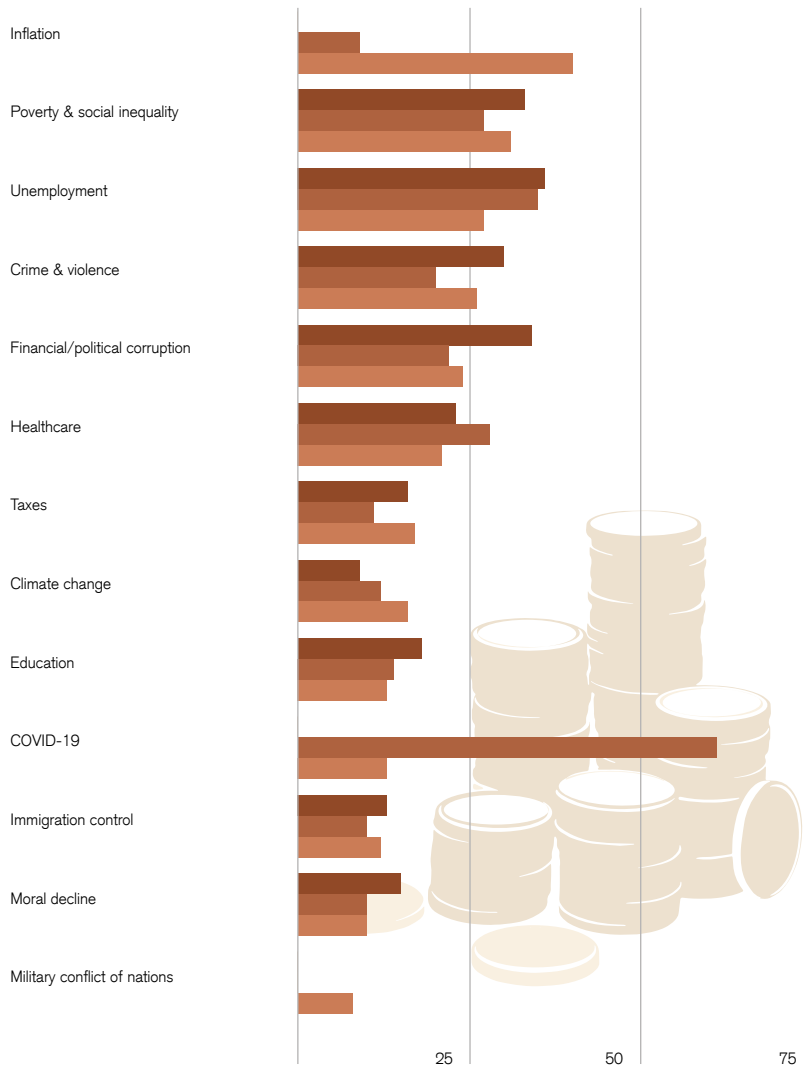
Food inflation remains one of the key concerns, though it has declined from a peak in March 2022, according to the Food and Agriculture Organization, and is now back at the pre-war level<sup>1</sup>. However, with global stock-to-use ratios at very low levels for staple foods, pricing may remain volatile. In Ukraine, one of the largest wheat exporters, the wheat sowing area could decline by 30%-40%, which could then reduce the harvest to a maximum of 15 million tons compared to 32.2 million tons in 2021<sup>2</sup>. In the USA, the United States Department of Agriculture (USDA) forecasts food prices will increase by 7.1% year-on-year (YoY) in 2023, which is still above the historical average, though lower than in 2022.

Elevated inflation poses a real burden for many households. In the USA, a quarter of parents in a survey by Pew Research in September/October 2022 said there were times in the preceding 12 months that they could not afford to buy food for their family's needs, or pay the rent/mortgage. The situation is more dire for low-income families: half of the respondents said they could not afford food or rent compared to 17% of middle-class families. In the UK, the after-housing costs income of non-pension households is expected to decline by 4% and 5% in 2022/2023 and 2023/2024, respectively, the latter being the largest decline since 1975, according to The Living Standards Outlook 2023 from the Resolution Foundation. Absolute poverty in the UK is expected to increase, with an additional 800,000 people falling into poverty before the cost-of-living crisis eventually eases in 2024, according to the Resolution Foundation report.



## Inflation is the main worry for people

(in %)



■ July 2017 ■ April 2020 ■ January 2023

Source: Ipsos Public Affairs, What Worries the World, January 2023 (interviews conducted between 22 Dec 2022 and 6 Jan 2023. International sample of 20,570 adults, Ipsos Online Panel system); Credit Suisse

As demonstrated in the previously mentioned surveys, rising prices, particularly for energy and food, have a disproportionate impact on low-income households because of their different consumption baskets (i.e., this group tends to spend a greater share of their income on essentials such as food, energy and shelter than middle- or high-income households). In addition, higher-income households typically buy higher priced goods and can cushion the impact of high inflation by trading down. Consequently, inequality has increased drastically in the UK, as the inflation difference between low- and high-income households in the chart shows.

As economic growth slows and inflation remains elevated, citizens continue to be frustrated and worried. Workers in some countries are going on strike for higher wages. The UK suffered its worst month in October 2022 in 11 years in terms of working days lost due to strikes<sup>3</sup>. To reassure citizens, governments are helping with direct support payments or subsidies. Canada, for example, has announced an Affordability Plan valued at CAD 12.1 billion to “make life more affordable for millions of Canadians.” However, support measures must be well considered. According to an OECD report, untargeted price subsidies or tax cuts (e.g., for high electricity or gas prices) can be introduced very quickly but are not targeted at the people that need them the most, which can result in fiscal concerns and feed future inflation.

As long as inflation remains high, consumers will increasingly become “budgeteers.” According to a Euromonitor report, more consumers planned to visit a discount store in 2022, while more shoppers bought private label and low-cost or second-hand goods. This opens up opportunities for companies that can offer cheaper alternatives. A French multinational retail and wholesale company said trading down accelerated in 2022, with consumers buying more private label products and promotions, but less fish or organic products.

Such an environment also provides opportunities for “buy now, pay later” (BNPL) offerings. The BNPL share of e-commerce payments was 2.9% of global transaction values in 2021 and is expected to increase to 5.3% by 2025, according to The Global Payments Report from FIS. However, the unregulated status of BNPL has come under fire. In the UK, where the BNPL sector quadrupled during the pandemic in 2020 to GBP 2.7 billion, the government intends to regulate the BNPL sector.

Innovation remains key to lowering costs in the long term. In the housing sector, where affordability remains a key issue, a manufacturer makes tiny house modules of steel, concrete and a lightweight insulation foam that are prefabricated and can fold together for transport. The house can then be unpacked and set up in less than one hour, with the price tag starting at around USD 50,000.

## Employment

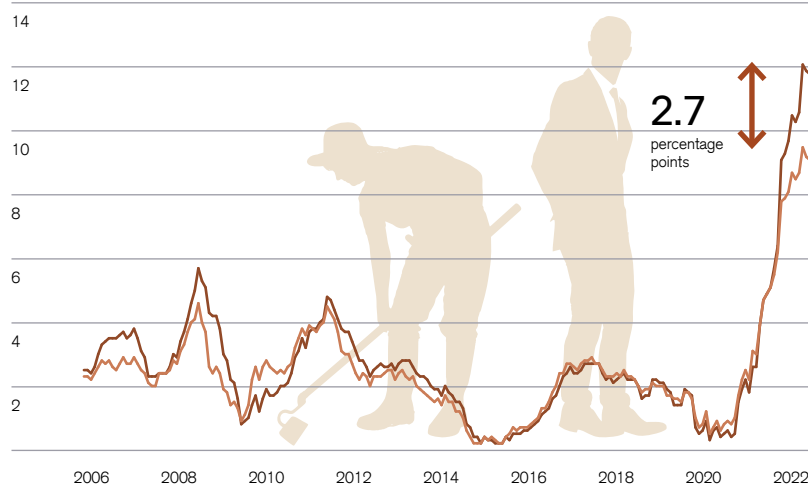
### Between home and the office

Labor shortages have been a major issue since the start of the pandemic. In the USA, labor force participation fell from the pre-pandemic level of 63.4% to a low of 60.2% in the early stages of the pandemic, and then climbed to 62.4% in January 2023. At the same time, the unemployment rate remains very low at just 3.4%. One reason is demographics: the median age in the USA rose by 3.4 years between 2000 and 2022, while the share of working-age people (15-64) fell to 64.9% in 2021. However, the increase in the mortality rate of working-age Americans is another factor, in part as a result of increased excess mortality due to the pandemic<sup>4</sup>. There has also been a decline in hours worked per worker, particularly for younger, well-educated men. Typically, they did not leave the labor force but instead found new and probably better paid and more flexible jobs, and thus decided to work less in order to seek more of a work-life balance<sup>5</sup>.

A Randstad survey conducted in October 2022 found that work-life balance is important for 94% of respondents, and 61% would not accept a job that would degrade their work-life-balance, up from 58% in 2021, with the youngest generation having the highest expectations for work-life balance. Employers' values and purpose remain important for 77% of employees, and their own job purpose for 57% of workers, according to Randstad.

### UK inflation rate for low- and high-income households

Annual % growth, January 2006 to December 2022



— Low-income — High-income

Source: Office for National Statistics, Credit Suisse

Last data point: December 2022

## Personal security

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Companies today need to offer a flexible and engaging working environment to attract young talent. In times of labor shortages and changing employee requirements (as well as the need to close the skill gap as we have highlighted in the past), human capital management (HCM) plays a key role. HCM is a focus for companies as it is part of the social pillar of ESG (environmental, social and governance) criteria. While governance was in the spotlight in the 1990s, and the environmental pillar has attracted more attention this century (in particular since the Paris Climate Agreement in 2015), we believe the social pillar including HCM is becoming more important for investors and companies. Education, human development and training are well-defined and measurable actions that could be used to measure the social engagement of a company<sup>6</sup>.

Progress in technology is constantly changing the way we work. Remote/hybrid work has become the standard, increasing from 21% before the pandemic to 54% in 2021 and 84% in 2022<sup>7</sup>. This provides opportunities for companies that make online collaboration more efficient and enjoyable. Progress in artificial intelligence (AI) technology should further boost working productivity. For example, one large US software company is integrating AI features into its collaborative tool that will enable AI-generated notes, tasks and action items.



### Protecting people and infrastructure

Despite the war in Ukraine, a military conflict involving many nations was never one of the main worries in the Ipsos survey (see chart on page 16), underpinning our view that people are most concerned about issues that impact their personal lives. Having said that, spending for defense is on the rise. Japan, for example, plans to double its defense spending from 1% to 2% of gross domestic product (GDP) through 2027<sup>8</sup>. Due to the already highly indebted government budgets in most countries, higher defense spending could result in lower spending in other areas, such as social welfare, which is a lifeline for many low-income households.

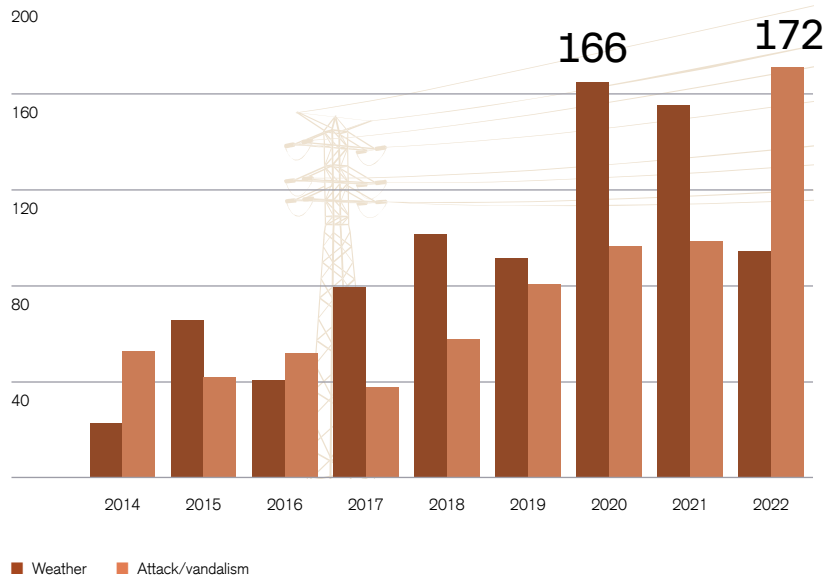
Cyberattacks remain an issue, and the costs of such events are increasing. According to Cybersecurity Ventures, the global annual cost of cybercrime is predicted to reach USD 8 trillion in 2023 and USD 10.5 trillion by 2025. Critical infrastructure remains vulnerable to cyberattacks and could have a huge impact on our daily lives. Power stations, for example, are increasingly coming under attack. Physical and computerized assaults on power grids reached a record level in 2022, increasing 74% YoY, according to the US Department of Energy (DOE).

Power systems are also impacted by extreme weather events. In the USA, the December 2022 winter storms caused widespread power outages impacting 1.6 million customers. It is worth noting that the economic impact of power outages has increased in recent years due to digitalization, an aging grid infrastructure and the increasing frequency of weather events and direct attacks.

The DOE estimates that power outages cost the US economy USD 150 billion annually, with consequences such as food and water shortages and pollution. As per the US Energy Information Administration (EIA), US electricity customers experienced, on average, over seven hours of electric power interruptions in 2021. There is an urgent need to increase the flexibility of the power system and enhance the security of the electricity supply to better cope with contingencies. The Biden administration recently allocated USD 13 billion in new financing opportunities for the expansion and modernization of the USA's electric grid.

## Lights out

US power infrastructure: Number of outages



Source: US Department of Energy, Credit Suisse  
Last data point: December 2022

Crime and violence are among the biggest concerns of citizens, according to Ipsos' What Worries the World survey. One of the main reasons is, in our view, the large number of firearms. In 2017, there were around 857 million civilian-owned firearms globally, of which only 12% were registered, according to the Small Arms Survey. In comparison, law enforcement organizations own 22.7 million firearms and the military another 133 million<sup>9</sup>. Firearms have become a big issue, particularly in the USA, where they recently became the number one cause of death for children. Mass shootings, defined as an incident where more than four people are killed, have steadily increased in the USA from around 273 in 2014 to 647 in 2022<sup>10</sup>.

About one-third of parents of primary and secondary students in the USA are worried a shooting could happen at their children's school, including 49% of low-income households, according to a 2022 survey by Pew Research Center<sup>11</sup>. Consequently, demand for safety and security is increasing, including manned security and more electronic surveillance. Many parents are opting for homeschooling due to fears about shootings in public places. While the number of homeschooling students increased by 63% during the pandemic, this figure has only declined by 17% since then in the 18 US states that disclose this data<sup>12</sup>.



# Infrastructure

Our Infrastructure Supertrend is well exposed to the multi-year spending bills that governments around the world have introduced as they seek to upgrade their infrastructure. Changes in energy supply chains in 2022 are likely to lead to a very different framework of how countries meet their energy needs, which will require new infrastructure to be built. We think investments in telecommunications infrastructure have entered a new phase of development, with applications moving closer to the end-user. As for transportation infrastructure, we identify the return of Chinese tourists and pent-up demand from COVID-19 lockdowns as key drivers.



**Pedro Iglesias De La Vega**  
Equity Research Analyst,  
Materials



## Ones to watch

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Companies building liquefied natural gas (LNG) capacity as the LNG infrastructure buildout continues to create opportunities in production, transformation and transport at both ends of the supply chain.



Companies offering the next phase of infrastructure development for smart and connected cities with more downstream applications that are closer to the end-user.



Companies building and operating electric vehicle (EV) charging stations in metropolitan areas, as the US Inflation Reduction Act is likely to accelerate the EV penetration rate, bringing forward timelines for the roll-out of charging stations; transportation infrastructure operators that benefit from pent-up demand following the COVID-19 lockdowns and the return of Chinese tourists.



## Energy and water

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### A transformational year

2022 proved to be a transformational year for energy markets, which had to adapt to a rapidly changing geopolitical landscape following the Russian invasion of Ukraine. European energy infrastructure, for instance, had to be adapted as Europe sought to reduce its dependence on Russian energy. The REPowerEU plan announced in 2022, which was added to the earlier “Fit for 55” plan, seeks to diversify away from Russian gas (155 billion cubic meters (bcm) at the end of FY 2021) by 2030. While green energy alternatives are likely to account for a bigger share of the energy supply, cheap US liquefied natural gas (LNG) looks set to replace much of Russia’s gas supply. This diversification entails a series of infrastructure investments in both US liquefaction terminals and gas pipeline capacity, as well as European regasification terminals and gas pipelines.

Meanwhile, Russia only shares one pipeline with China, the “Power of Siberia,” which has a capacity of 61 bcm per annum. This is significantly less than the pipeline imports from Russia to Europe. However, China is also very dependent on LNG infrastructure in the short to medium term. This is why we believe it is likely that Russia will seek to build more pipeline capacity to China. Doing so will likely take three to five years, at which point we expect China to be in a strong position to dictate prices due to LNG import capacity and the accelerated buildout of renewable energy infrastructure currently taking place there. In comparison, Russian oil, which is much more flexible than gas in terms of transportation, has already changed destination from Western nations to Eastern ones, mainly India and China.

Over the next seven years, the increased demand for LNG will require significant infrastructure investments along the entire LNG value chain. Indeed, to bring US gas to LNG liquefaction terminals, most of which are located on the US Gulf Coast, additional pipeline capacity is needed.

Currently, the USA operates around 104 million tons per annum (mtpa) of LNG liquefaction export capacity. Capacity is set to triple, as an additional 230 mtpa of capacity has been approved by the US Federal Energy Regulatory Commission (FERC). Moreover, projects with a capacity of 73 mtpa have been proposed to the FERC. In Europe, regasification terminals have a capacity of around 114 mtpa. However, this capacity is not equally distributed as the majority are currently located in Spain (38%) and France (20%), which requires the construction of new pipelines and terminals as Spain's connectivity to the rest of Europe is currently limited (only 3.6 mtpa across the Pyrenees). As there is a significant overlap in technological processes required for liquefaction (export) and gasification (import), the same companies tend to benefit from both sides of the trade.

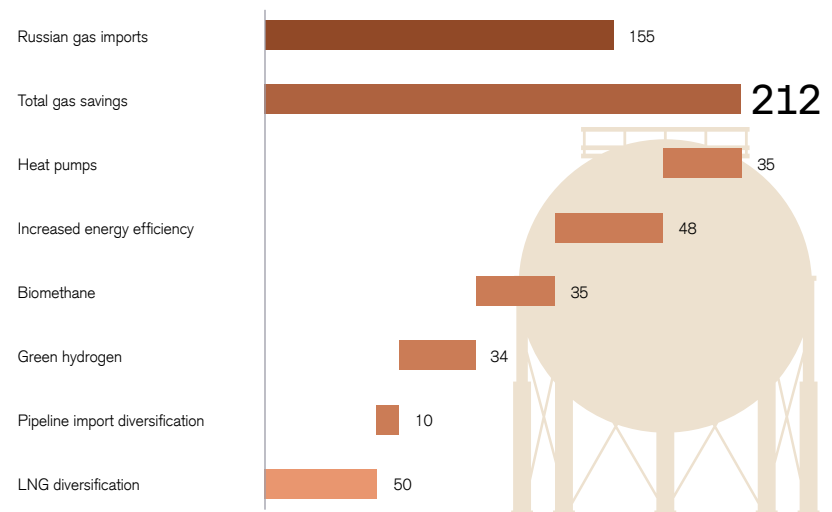
A significant part of the gas pipeline network buildout in Europe (i.e., regasification plants and new pipelines) is being planned with a view to using this infrastructure to import and transport green hydrogen once it becomes cost competitive versus gas. As a result, this newly established infrastructure is unlikely to be abandoned once Europe switches out of gas, which could happen as early as the mid-2030s. Germany, for instance, has only granted permission for the construction of new onshore regasification plants if they can be "hydrogen-ready" by 2030.

The renewable energy and smart grid infrastructure rollout has continued to be a theme across the globe, most prominently in China. We think this will be a strong tailwind for the "Metals of the future" subtheme of our Climate change Supertrend (see page 83).

As for water infrastructure, discussions are now focused on optimizing the source for the required quality standard, allowing lower-value water sources (e.g., seawater or wastewater) to be used for lower-value applications (e.g., washing or waste disposal). Currently a high proportion of high-value water, (i.e., drinking water) is used for low-value applications. Water treatment chemicals are key in separating water into different quality streams. China and India have put in place rules stating a minimum liquid discharge (MLD) and zero liquid discharge (ZLD) for industrial production plants, making these plants key drivers of demand for these technologies. Furthermore, the reshoring of semiconductor production plants intensifies the scarcity of water in certain areas, especially in the USA. These areas can thus benefit from such technologies.

### Race against time

REPowerEU – Replacing Russian gas by 2030 (in billion cubic meters)



Source: European Commission, Credit Suisse

Last data point: 31/12/2021

## Smart and connected cities

### Strengthening the network

While 5G will remain a key theme going forward, in our view, we believe global telecom wireless capital expenditure peaked in 2022. Though we expect it to stay at a relatively high level initially, it is likely to decline gradually. China is a case in point: 5G base station investments are largely completed, with China as the first country to complete coverage in 2022. We think this paves the way for the next phase of development, which is infrastructure closer to the end-user, enabling the delivery of services like rooftop infrastructure to densify signals and increase capacity in more highly used areas, or smart mobility solutions to make roads safer.

We think tower companies play a significant role in the development of both smart and connected cities. Companies are looking to harvest installed 5G infrastructure to build further infrastructure. In 2021, according to a wireless communication infrastructure company, the market size for 5G services would grow by 46% p.a. until 2028. Tower companies are already seeing increased demand for services in their sites, such as edged and distributed data centers, which can improve 5G use cases or ancillary services such as energy storage to support other activities on site. Chinese telecom operators, meanwhile, are reporting that their industrial digitalization businesses are an increasing source of growth, with average growth of over 50% in 2022 in those segments, as more services leverage installed 5G capacity.

An additional service that is part of this next phase of development is private networks. They seek to pioneer the private network concept with ultra-connectivity of moving parts within a given section of a city (e.g., a port). Deploying a 5G private network infrastructure in a “Smart Port” enables a secure connection to monitor goods in real time or provide physical surveillance with security drones, which ultimately increases efficiency and productivity. Moreover, the amount of data generated can then be used by artificial intelligence and machine learning models to enhance the human decision-making process, further supporting data infrastructure needs.

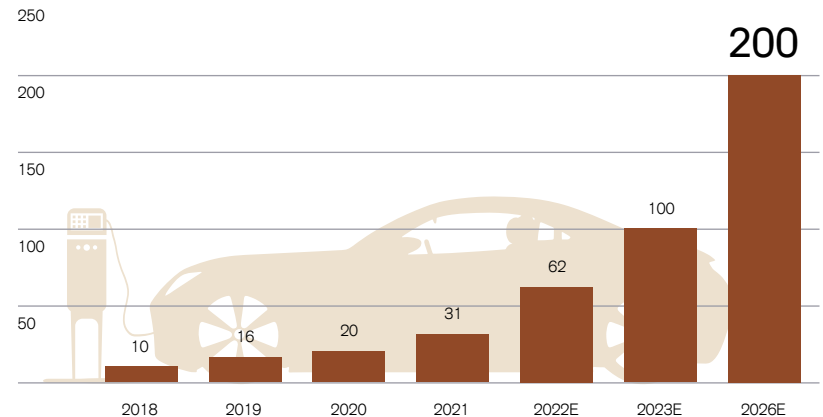
While independent data centers are likely to benefit from this next phase of service infrastructure development, a growing market share of the data is now being processed by big tech companies

in-house, while services are offered externally. We think edge computing capability deployment by these companies is likely to be a key factor in winning market share as this new kind of data becomes more important.

The US Inflation Reduction Act (IRA), which was passed in 2022, promises to accelerate the trend of smarter cities, as tax incentives are granted in areas like EVs, solar panels and energy-efficient home improvements. Indeed, EV charging investment ramped up in 2022. Bloomberg New Energy Finance (BNEF) estimates that cumulative investments in EV chargers could cross the USD 100 billion mark in 2023 after ten years of investments, while the next USD 100 billion of investments could be deployed by 2026. There are currently 12 million active EV plug points in the world. While most of them are home chargers, public chargers are likely to surpass private ones going forward. As in the EV market, China and Europe have the most charging stations, but the USA is catching up, with the IRA an important tailwind.

### Ramping up

Cumulative spending on EV charging hardware, installation and maintenance, (in USD bn)



Source: BloombergNEF, Credit Suisse

Note: 2022, 2023 and 2026 figures are estimates

Last data point: 2021



# Transport

## On the road again

As the world learned to live with COVID-19, pandemic-era travel restrictions were gradually eased in 2022. However, China maintained its zero-COVID policy for most of 2022, which had a sizable impact on global tourism. Chinese tourists, who were among the top spenders prior to the pandemic, remained largely absent from travel destinations. Yet the sudden end of China's zero-COVID policy in December 2022 will likely emerge as a key driver of global tourism in 2023, in our view. Indeed, we will likely see a substantial increase in domestic passenger travel, as well as a pronounced pick-up in travel activity in the regions that Chinese tourists favor, including Singapore, South Korea, Japan and Thailand. Chinese tourists tend to favor these regions due to their proximity to home, but, in our view, also due to geopolitical tensions further away, which may lead tourists to avoid certain countries. We expect to see additional pent-up demand after more than two years of pandemic restrictions.

We believe this additional demand may well push global tourism beyond pre-pandemic levels in the coming years, which could have a positive impact on tourism-related infrastructure plans. Increasing tourist volumes may create an incentive for governments to fast-track infrastructure spending plans around certain tourism bottlenecks, resulting in a greater need for innovative and sustainable infrastructure, and requiring regular maintenance of existing infrastructure. Toll road operators, for instance, were negatively affected by the pandemic as traffic slumped, but witnessed a strong recovery in 2022 as travel restrictions were lifted. Indeed, traffic volumes have by now returned to pre-pandemic levels. We expect this positive trend to continue as pent-up demand creates a tailwind. Moreover, we expect the sector to be structurally resilient in the face of a possible recession.

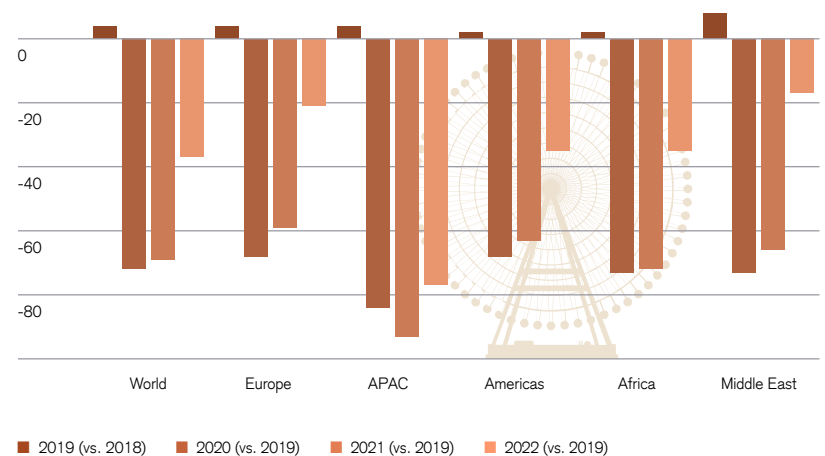
High freight rates, which haunted the transportation sector in 2021, lingered at the start of 2022, but have since normalized. Moreover, supply chain issues have eased and labor availability has improved. As for the railroad sector, the past decade has been marked by significant margin gains but negative volume growth. However, we expect increased regulatory pressure and limited additional efficiency gains to shift the story back to volume growth. This shift will likely

herald the next phase of infrastructure investments to accommodate this additional volume, as opposed to efficiencies gained in terms of infrastructure over the previous decade.

While transportation infrastructure has been beleaguered by operational issues over the last two years, policy makers have paved the way for a multi-year boom in transportation infrastructure that could support construction and materials companies. In the USA, the Biden administration signed the IRA in August 2022, which includes around USD 500 billion in new spending and tax breaks across sectors, including transportation infrastructure. This comes on top of a USD 1.2 trillion infrastructure bill that was passed in 2021, which is only now trickling down into ground projects. Meanwhile, the European Union is making good progress with its NextGenerationEU plan, which earmarks EUR 750 billion to support European economies with infrastructure investments through 2023. Additionally, China is fast-tracking several of the 102 large infrastructure projects included in its 2021-25 development plan.

## Guess who's back?

International tourist arrivals, world and regions (in %)



Source: UNWTO, Credit Suisse

Last data point: 17/01/2023



# Technology

Despite the sharp correction in equity markets in 2022 – IT and communication services being among the hardest hit sectors – digitalization and business transformation using IT tools continues to grow at a rapid pace. Real breakthroughs were achieved in 2022, for example the use of artificial intelligence-based applications to improve efficiency and productivity in both services as well as the industrial sector. More broadly speaking, digitalization offers solutions for the many challenges in our everyday lives, and remains a key enabler to address global problems, including climate change.



**Achille Monnet**  
Equity Research Analyst,  
Information Technology








**Seraina Hold**  
Equity Research Analyst,  
Communication Services



## Ones to watch

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-  Companies that enable the use of quantum computing for specific solutions in areas such as power consumption reduction and material structure improvements.
-  Cloud software, IT services and platform companies that enable the use of artificial intelligence (AI) applications.
-  Companies exposed to the virtual and augmented reality (VR/AR) application market. Firms that increase efficiencies through the application of VR/AR used for the digital twin or Metaverse markets.
-  Companies focused on industrial automation solutions and manufacturers of collaborative robots.
-  Companies in the healthcare sector that use digital technology and big data analytics including AI/machine learning to improve execution in diagnostics, therapeutics, sequencing, care delivery and medical devices.



## Digitalization

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### **Evolving toward a digital-first world**

In its Digital Strategy 2022-25 plan, the United Nations (UN) outlined how the COVID-19 pandemic demonstrated the power of digital technology. For example, the UN highlighted the potential of 3D-printing to rapidly produce vital personal protective equipment, and explained how digital finance supported critical electronic cash transfer programs. These are interesting examples of how quickly digitalization is developing. In fact, despite geopolitical tensions, a difficult economic environment and the end of COVID-19 restrictions, digital technology continues to be a key source of innovation that enables society to tackle multiple challenges like climate change, as well as facilitating efficiency gains.

It is telling that despite rising inflation and interest rates, digital activity (e.g., the number of digital payments, app downloads or cloud-based workloads within enterprises) still gained share in terms of daily time consumption and transaction volumes vs. traditional value creation in non-IT sectors in 2022. The number of internet users worldwide continues to rise and is expected to reach 5.16 billion in 2023, according to the International Telecommunication Union (ITU) and GSMA Intelligence. Turning to artificial intelligence (AI), the ChatGPT bot made rapid inroads in 2022, gaining more than 100 million users in just two months – much faster than well-known apps like Instagram or TikTok that needed 2.5 years and nine months, respectively, to reach that same point. We believe ChatGPT could disrupt content creation and the software programming market, and may revolutionize how we think about efficiency gains in knowledge work, such as analytics, programming, processing and editing.

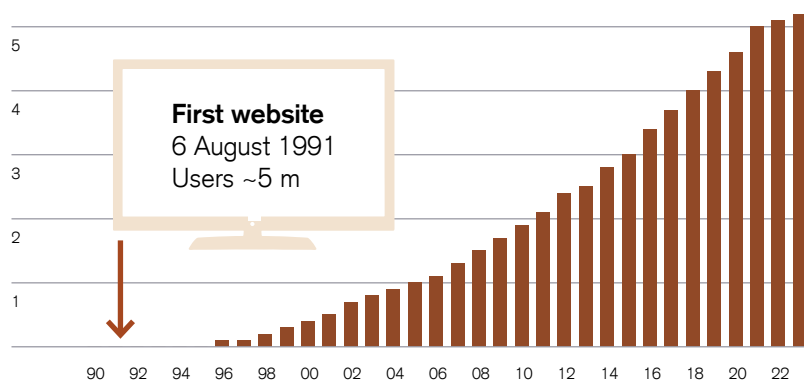
# Artificial intelligence

Established digital ecosystems like e-commerce or digital payments also continue to gain traction. According to Activate Consulting, half of online shoppers increased or maintained their online spending across essential categories in 2022. In the USA, e-commerce is expected to reach USD 1.77 trillion by 2026, with a compound annual growth rate (CAGR) of 12% between 2022 and 2026, according to Activate Consulting.

The cloud platform service industry offers access to various quantum computers with which enterprises can work on innovative projects to solve specific challenges. For example, a large automobile company is using quantum computing at a well-known cloud provider for pre-production vehicle configuration and automated quality assessment. Another example of the technology's potential is in the production of ammonia, which accounts for 3% of global power consumption: quantum computing could reduce it by more than 50%, according to McKinsey & Company.

## A widening web

Internet users (in bn)



Source: ITU GSMA Intelligence, Credit Suisse

Last data point: 2022

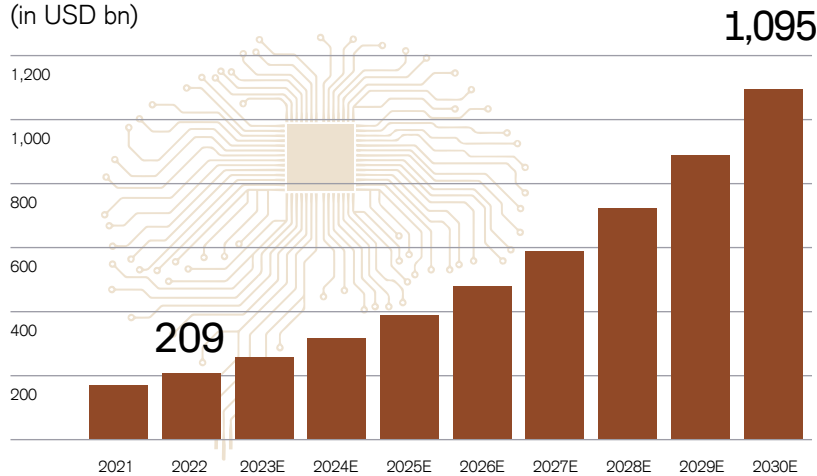
## Beyond the chatbots

AI refers to the simulation of human intelligence in machines that are programmed to think and act like humans. These intelligent machines can be trained to perform a wide variety of tasks across sectors and drive many efficiencies. However, there is also a significant ethical and philosophical debate regarding AI as it raises questions about the nature of intelligence, the relationship between humans and machines and the potential consequences for human capital. Much like the productivity gains arising from the Industrial Revolution, AI innovations also have their downside: with few global regulatory standards, their development is still largely unregulated. Nevertheless, industry adoption is rising dramatically with a recent MIT survey indicating that nine out of ten organizations expect AI to give them a competitive edge. Furthermore, IBM's Global AI Adoption Index 2022 shows that a lot more companies are starting to explore AI usage for their business cases.

The success of AI applications such as ChatGPT will further drive adoption. ChatGPT is made up of 175 billion parameters, which enable it to write long legal contracts, program special IT service applications or generate a social media marketing strategy in a very short time. While ethical concerns around this technology are legitimate, the overall benefit that AI brings is too large to dismiss. Indeed, PWC estimates suggest that AI technology could generate USD 15.7 trillion of revenue by 2030, boosting the gross domestic product (GDP) of local economies by up to 26%. Precedence Research expects that AI software could become a USD 1 trillion market in the same timeframe, up from USD 209 billion in 2022.

The wide-reaching implications of AI, and its benefits for productivity and profitability are significant – in particular for tech-forward developed countries. Indeed, Accenture estimates that by 2035, AI's impact would be most noticeable for the education (84%), accommodation & food services (74%), construction (71%), wholesale & retail (59%) and healthcare (55%) industries, with the laggards being utilities (9%) and information & communication (17%). In summary, AI innovation is much more than just a chatbot. The first beneficiaries of this trend from an investment perspective will be the suppliers of compute processing power and cloud infrastructure.

## AI software market size (in USD bn)



Source: Precedence Research, Credit Suisse

Last data point: 2022

## Virtual reality

### A new way of seeing the world

We continue to see a robust growth story for virtual and augmented reality (VR and AR, which together are called extended reality (XR)). In January 2023, a healthcare company reported its first successful surgery in Japan through its AR-based joint replacement and spine surgery platform. Since its launch in 2020, the platform has helped surgeons perform accurate surgeries by leveraging patient-specific, unique real-time data through its AR-glasses and smart tracking. In addition, an AI company focused on neurological disease diagnostics announced a partnership to leverage AR to help understand the baseline measures of cognition and the way it can potentially affect patient outcomes. Last year, two large US

tech companies announced a partnership to produce unique chips for AR glasses, which will be compatible for use with Metaverse apps. Another large US technology company is also reportedly continuing to invest in this space, and we might see its mixed-reality headset this year, with an advanced, lighter version to come in 2024/2025.

That said, 2022 was a very volatile year for technology companies, with their business models and growth thrown into question after rapid surges in their share prices over the course of 2021. For example, the area of XR did not show significant growth as cost pressures on big tech companies (e.g., ad market weakness for social media companies) essentially resulted in reduced attention on near-term incremental development. The current environment is particularly challenging for start-ups that now have a shorter leash to develop a product-market fit (i.e., a strong value proposition) and sustainable cash flows quickly.

However, we believe that the investment case for XR remains robust, as we still see companies maintaining their investments over the longer term. In its Technology Vision 2022 report, Accenture sets out how the Metaverse and Web3 will transform the internet into a persistent 3D environment in which moving from work to a social platform will be as simple as walking across the street. Activate Consulting believes that the Metaverse has just passed its peak hype cycle and should now see sustained development and investment. The commitment shown by media and technology companies in recent years is evidence that the Metaverse is not just a limited idea but a broad new paradigm that is likely to expand in coming years, and that XR will be critical for its development.

## Industry 4.0

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### Transformation time

Much of the developed world is faced with aging populations and weak labor pool growth due to low fertility rates, which will result in labor shortages going forward. The US labor pool growth has slowed from an annual rate of change of 3.3% in 1978 to less than 1% for most of the past decade, which means that productivity needs to improve at a higher rate in order to maintain the levels of GDP growth experienced in prior decades. Furthermore, rising interest rates and cost inflation have put pressure on companies to reduce costs and become more efficient, which should trigger more investment in automation. Co-bots, designed to work closely with humans, are expected to grow to a nearly USD 16.8 billion market by 2030, according to Verified Market Research.

The International Federation of Robotics (IFR) reported in its 2021 annual statistics that industrial robot installations reached an all-time high, growing by 31% YoY to more than half a million. The top five markets – China, Japan, the USA, South Korea and Germany – now account for 78% of global installations, with China alone accounting for 51% of the market. IFR forecasts industrial robots will grow in the mid-high single-digit range annually, on average, over the next few years, with high double-digit growth in service robotics mainly driven by demographic change that is weighing on labor markets around the world.

In times of growing geopolitical tensions and the shift to a multi-polar world, the reshoring trend is shining the spotlight on smarter supply chains. According to an ABB survey, 74% and 70% of US and European business leaders, respectively, are planning to reshore or nearshore operations to build their supply chain resilience in response to labor shortages, the need for a more sustainable global footprint and global uncertainty. The key enabler of these shifts is automation, with 62% of US businesses and 75% of European businesses surveyed planning investments in automation and robotics in the following three years. The combination of AI and intelligent automation enables self-optimizing, autonomous business processes and installations, resulting in value chains that continuously “tune” themselves. Such optimization will increasingly be done without the need for human intervention.

## Healthtech

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### Modernizing medicine – one algorithm at a time

As a result of cumulative advances in deep learning and processing power, coupled with a surge in digital data, AI – a once speculative and distant eventuality – has now diffused into many areas of the healthcare ecosystem and holds the promise to reinvigorate modern medicine from all angles.

In diagnostics, medical professionals are leveraging AI to analyze medical images (e.g., MRI scans and X-rays), which could improve the speed and accuracy of their diagnoses. Mirai, for instance, is a deep-learning tool which was trained on more than 200,000 mammograms. The algorithm can predict roughly half of all incidences of breast cancer up to five years before they occur, with a significantly higher accuracy than current tools to predict breast cancer risk.

AI also holds vast promise for revolutionizing the discovery and development of new drugs. A US technology giant reached a major milestone when it solved a decades-old scientific riddle (the “protein folding problem”) with the help of its AI-based program AlphaFold. AlphaFold can predict the 3D structures of almost every known protein from their amino-acid sequences. This marks a tremendous leap forward and is likely to catalyze research and development in many scientific fields. Understanding the shape that proteins fold into can, for instance, pave the way for a deeper understanding of nearly all diseases, and should enable quicker and more advanced drug discovery and development.

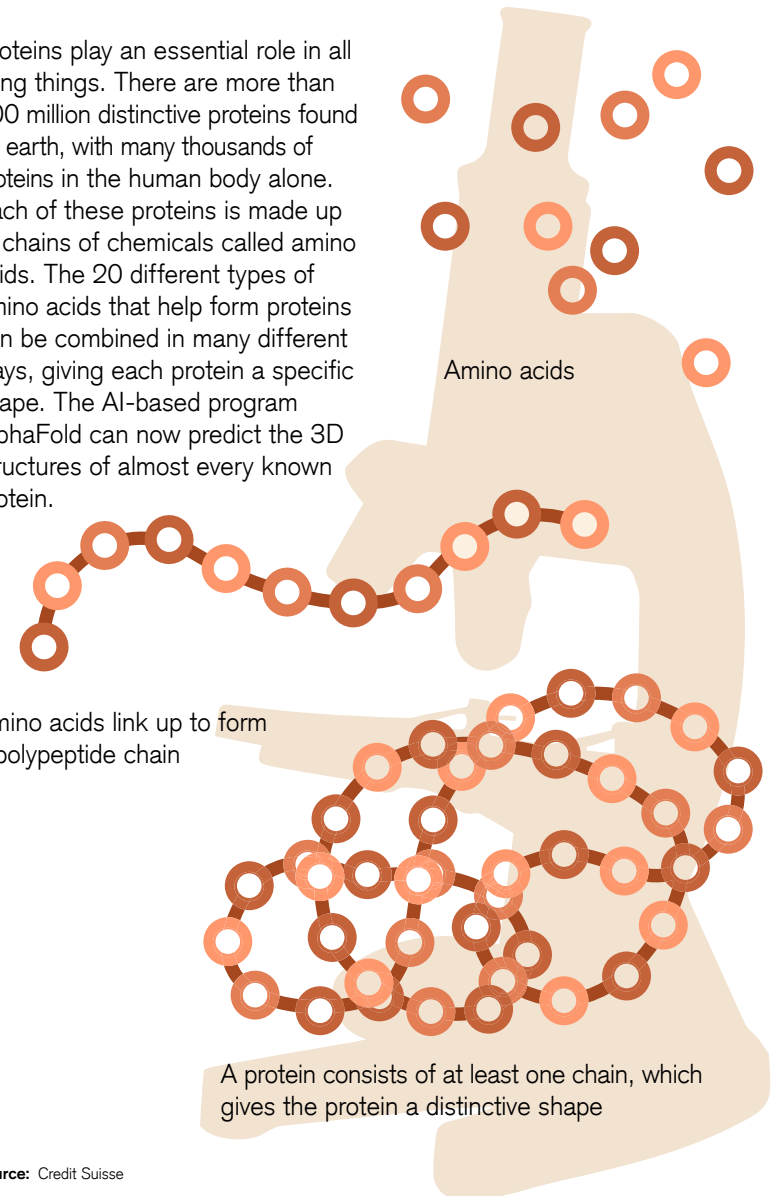
By streamlining processes, automating administrative tasks and improving efficiency and accuracy, AI is likely to improve healthcare and make it more cost effective. In fact, a recent study by Harvard researchers and McKinsey estimates that AI could save up to USD 360 billion in annual healthcare spending in the USA alone. An illustration of AI’s potential is DeepScribe, an ambient voice technology that listens to patient-physician interactions. The tool distills the medically relevant information from the conversation and prepares clinical notes, saving physicians an average of three hours a day.

## The structure of a protein

Proteins play an essential role in all living things. There are more than 200 million distinctive proteins found on earth, with many thousands of proteins in the human body alone. Each of these proteins is made up of chains of chemicals called amino acids. The 20 different types of amino acids that help form proteins can be combined in many different ways, giving each protein a specific shape. The AI-based program AlphaFold can now predict the 3D structures of almost every known protein.

Amino acids link up to form a polypeptide chain

A protein consists of at least one chain, which gives the protein a distinctive shape



Source: Credit Suisse



# Silver economy

While the peaking of China's population has generated headlines of late, it is not the only country facing this reality: populous countries in the Western world, including Japan, Italy, Germany and Spain, have also seen their populations peak. As the aging of societies continues, seniors (age 65+) are set to be the only cohort with significant growth, expanding from some 780 million today to close to 2.5 billion by 2100. This cohort's strong growth will undoubtedly lead to challenges that call for innovative solutions in healthcare, insurance, consumer goods and property markets. It is this demographic development that lies at the heart of our Silver economy Supertrend.



**Lorenzo Biasio**  
Senior Equity Analyst,  
Healthcare



**Samuel Traub**  
Equity Research Analyst,  
Banks & Insurance





## Ones to watch

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Biopharmaceutical, medical technology and life sciences companies that address conditions affecting the elderly through both conventional and innovative products, such as RNA therapies, radiopharmaceuticals, or cell and gene therapies.



Health and life insurance companies, private wealth advisors and asset managers with strong pricing capabilities.



Companies focusing on the discretionary needs of seniors across a variety of areas, notably tourism, beauty and luxury goods, but also in hearing, vision care and real estate operations.



## Therapeutics & devices

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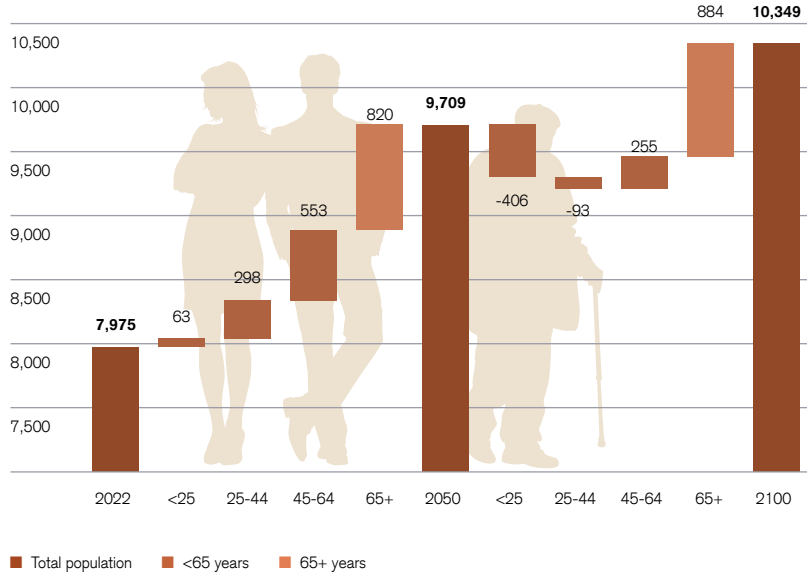
### The breakthrough era

Improvements in living standards and medical advances have raised global life expectancy by over 25 years since 1950. Remarkably, half of today's five-year-olds in the USA can expect to celebrate their 100th birthday, according to an estimate from the Stanford Center of Longevity. Given this significant demographic milestone, healthcare is the sector most impacted across the entire economy, in part because the incidence of chronic diseases increases with age, and many patients – if not most – have co-morbidities, i.e., several (chronic) diseases at the same time. However, genuine game-changing drugs for some of the most burdensome age-related diseases, such as cancer, remain elusive.

One rare example of progress is in the treatment of Alzheimer's Disease (AD), one of the most common age-related diseases, with an expected global prevalence of more than 100 million patients in 2050<sup>13</sup>. After USD 42 billion of private research and development expenditure in the field since 1995 yielded little pharmacologic progress<sup>14</sup>, the US Food & Drug Administration approved lecanemab at the beginning of 2023. The molecule targets amyloid beta, which is a key protein involved in the development of AD. In clinical studies, lecanemab was able to demonstrate a statistically significant slowing of patients' cognitive decline, effectively modifying the disease<sup>15</sup>. The approval and commercial availability of the drug is giving new hope to millions of people (and their families) who are suffering from this devastating disease. However, there remains much work to be done; despite the statistically significant effect of lecanemab on the rate of decline (i.e., the decline slowed), the treatment does not halt or reverse the disease.

## It's a big world

Global population development to 2100 (in m)



Source: United Nations, Population Division, Department of Economic and Social Affairs, World Population Prospects 2022, Medium Fertility Variant; Credit Suisse

Two decades after the human genome project, the potential for medical breakthroughs has rarely been more promising and scientific progress is happening at previously unimaginable speeds. One core technology remains genetic sequencing, which has become highly affordable thanks to technological advances.

While the first human genome ever sequenced carried a price tag of between USD 500 million and USD 1 billion, today's technology puts the USD 100 genome (i.e., the cost to decipher a person's entire genome) within reach. The National Human Genome Research Institute estimates that all genomic data generated through 2025 will amount to 40 exabytes of data, which compares to just 5 exabytes for all the words ever uttered by humans.

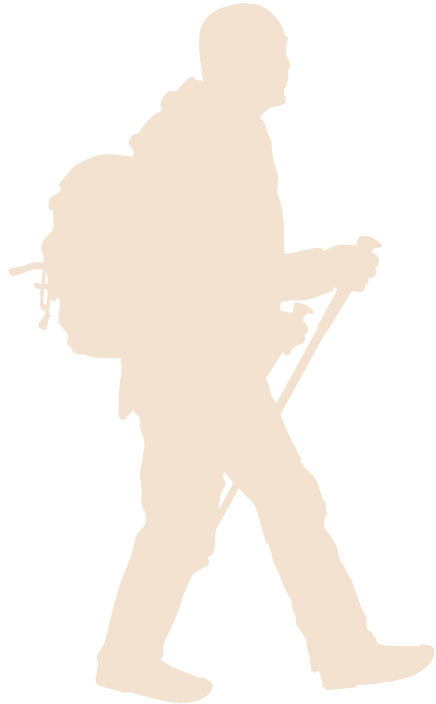
Such a vast trove of data allows for a much deeper and more granular understanding of human biology, paving the way for additional and novel ways of addressing disease. Coupled with the advent of new biotechnological tools, such as nucleic acid therapies, radiopharmaceuticals, or cell and gene therapy, the biopharmaceutical industry should be able to sustain its innovation trajectory and deliver life-changing medicines to patients and society.

The flip side of such innovation, which is helping a growing number of patients, is the cost element. Based on the historical trajectory, healthcare costs are expected to continue to rise at a rate of several hundred basis points above gross domestic product (GDP) growth. While the changing demographic composition goes hand-in-hand with a shift toward even higher spending on healthcare, there will be boundaries to that growth (i.e., budgets). As such, technologies that help mitigate costs are of particular relevance. When it comes to disease, often the most cost-efficient measure (with the most favorable outcome to patients) is prevention. Where prevention is not applicable or feasible, experience shows that earliest-possible diagnosis – enabled by technological leaps in liquid biopsies (a genetic sequencing application) or medical imaging assisted by artificial intelligence (AI) – can increase patient survival rates and reduce costs. Furthermore, groundbreaking curative treatments such as gene therapies, which are often relatively expensive, typically have a cost advantage over chronic care when a holistic view of a patient's lifetime care costs is considered. Finally, we believe it is a question of when – not if – e-prescriptions and deliveries from online pharmacies go mainstream.

## Health & life insurance

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Regardless of the therapeutic area or nature of the intervention, we believe the focus on value-creating innovation is critical, as it ensures negotiating leverage for pharmaceutical, biotech and medtech companies in a world of steepening healthcare costs. Within this subtheme, we thus focus on companies that have historically demonstrated strength in innovation and/or have a pipeline of creative ideas, pioneering concepts and use novel (bio)technological tools.



### **Pandemic raises awareness**

With the COVID-19 pandemic and its effect on mortality fading, the focus within our Health & life insurance subtheme returns to the basics: strong growth in the 65+ cohort of seniors is driving structural demand for health and life insurance. We would argue that in general, the awareness of personal risks around health and life insurance has also increased, not least given the fallout of the COVID-19 pandemic, which turned the spotlight on personal health risks.

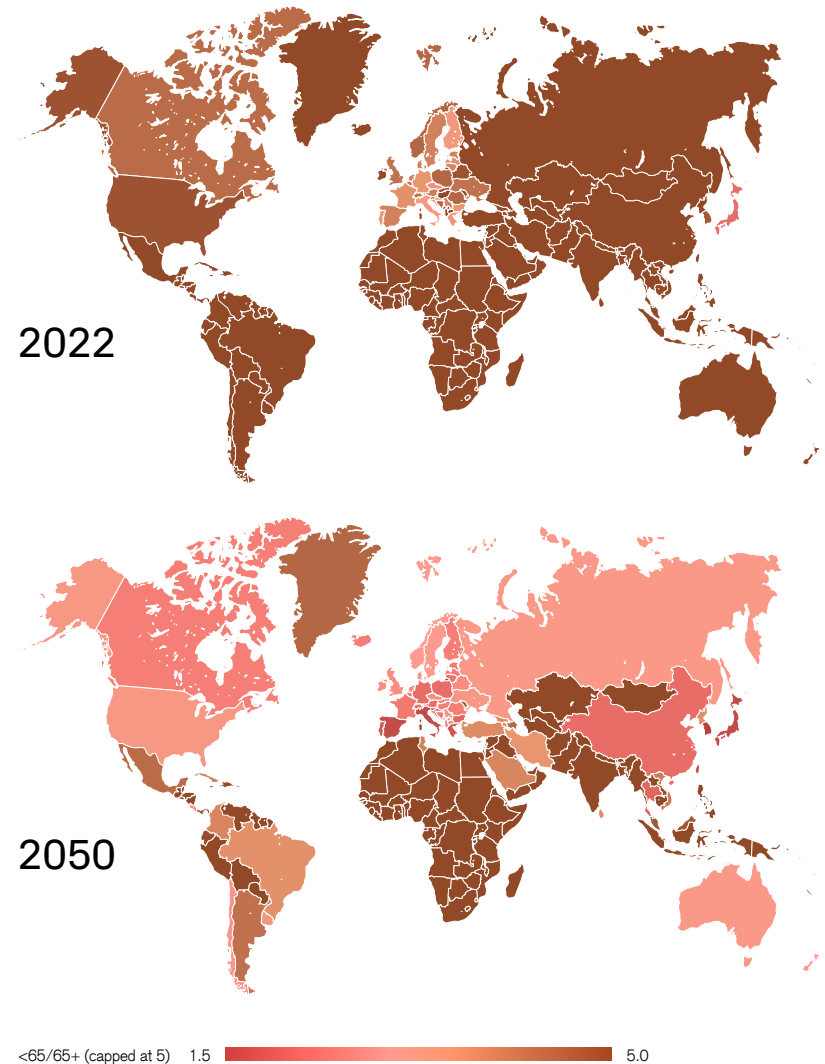
On the other hand, the insurance industry is facing a more challenging economic environment, especially given higher inflation and an uncertain growth outlook. This means that despite solid nominal growth, real premium growth for 2022 was likely slightly negative after a solid development in 2021<sup>16</sup>. Lower disposable income is one likely driver behind this.

State-sponsored pension funds and healthcare schemes continue to face pressure from increasing government debt, a fact that is evident in the latest government debt statistics: OECD data shows that from 2018 to 2021 (the latest available final data point), almost all major economies recorded increasing government debt, reaching on average 124% of GDP for OECD countries (2018: 109%) and 148% for the USA (2018: 137%), with COVID-19 support measures a key driver. While the data for 2021 indicates an overall drop in public debt to GDP ratios (mainly on account of higher nominal GDP growth), it seems prudent to assume that the overall trend of rising public debt ratios will continue amid a period of lower growth<sup>17</sup>. Public finances will thus likely remain under pressure. This reinforces our view that there is a growing need for private sector pension and health solutions.

For the health and life insurance sector, the economic environment offers both opportunities and challenges: First, higher interest rates are generally a tailwind for health & life insurers' earnings as higher rates increase the returns on their asset portfolio. However, given a rather long average duration, the benefit only accrues over time. Second, higher interest rates decrease the present value of their liabilities (which is positive), while the value of their bond portfolios tend to temporarily suffer due to lower unrealized gains/higher unrealized losses (which is negative). While unrealized gains and losses will pull-to-par (i.e. the bond price will move toward par value) over time, the combined effect of lower liabilities and lower bond valuations is generally neutral to positive in terms of solvency. In summary, we believe that the need for life and health insurance is still on the rise, and we see further scope for insurers to expand in underpenetrated markets and to benefit from higher interest rates.

### Outnumbered

Non-seniors (<65 years) to seniors (65+ years) ratio



**Source:** United Nations, Population Division, Department of Economic and Social Affairs, World Population Prospects 2022, Medium Fertility Variant, Credit Suisse

## Senior wants & needs

### Investing in themselves

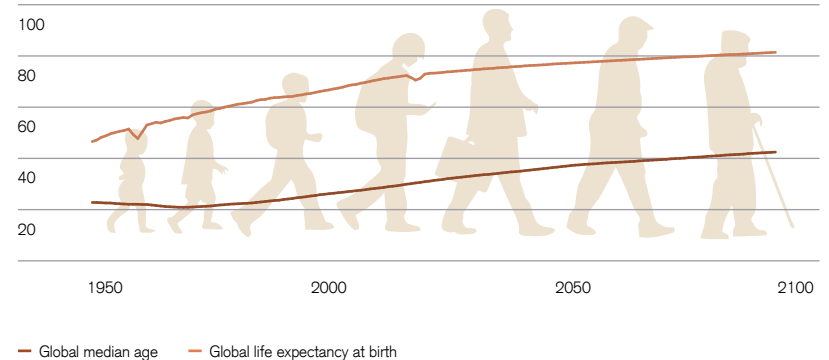
Despite the above-mentioned challenges with regard to the financing of future generations of seniors, we note that they are a powerful consumer group with high spending power today. This reflects the wealth they have accumulated coupled with inheritances received later in life, which itself is a function of their parents' increased longevity.

With the COVID-19 pandemic no longer the acute threat that it once was due to high levels of immunity, travel and the consumption of experiences are witnessing a rebound as evidenced by record flight and cruise bookings. The rebound, however, is fragile as many households are feeling the squeeze from the higher cost of living (see our Anxious societies Supertrend on page 13 for a more thorough discussion of these issues), while any economic downturn could impact travel activity yet again. As such, we continue to believe that “asset-light” businesses have an advantage because they tend to be more flexible and are not overly burdened by debt – an important advantage in an environment in which interest rates have doubled or even quadrupled in a short period of time.

Beyond travel, we see residual healthcare items falling under the Senior wants & needs subtheme, given the fact that they are usually covered out of pocket by a patient and as such represent (largely) discretionary items, for example hearing aids or teeth implants. With all these out-of-pocket expenditures, and considering the large share of future senior populations in emerging markets, we think it is important to understand the consumer preferences of this regional demographic group and the implications for global brands. While we – based on sources such as the Credit Suisse Emerging Markets Consumer survey and multinational corporations' presentations – acknowledge the sustained brand equity of developed markets' brands in emerging markets, we are aware that consumer behavior could change, which could create downside risks to incumbents.

Senior housing solutions round out this subtheme. The one-size-fits-all retirement home – a place of residence during the final years of a person's life – is increasingly a relic of the past. Today's senior cohorts often live a healthier and more active life than earlier generations, creating demand for modular assisted living solutions, where a person can age without moving. Such residences allow for the mixing and matching of wants (e.g., guided activities and other amenities), as well as needs (i.e., a nurse on premises for administering medicine in an otherwise independent living setting like a retirement village). Such versatile settings enable seniors to live independently for longer and thus maintain a more stimulating lifestyle, which, as is increasingly shown in clinical studies, prevents premature cognitive decline.

### Growing older (in years)



**Source:** United Nations, Department of Economic and Social Affairs, Population Division (2022).  
World Population Prospects 2022, Online Edition. Credit Suisse  
**Last data point:** 2022



# Millennials' values

The rise of Generation Y and Z and their core values are influencing both companies and governments. However, 2022 proved challenging for this Supertrend, which focuses on growth companies, the technology and consumer sectors and the Chinese middle class as a consumer group, as they all were negatively impacted by rising interest rates, ongoing COVID-19 restrictions in China and recession fears. A likely peak in inflation and the reopening of the Chinese economy should prove supportive for this Supertrend in 2023. In this update, we explore the structural drivers of digitalization, the growing luxury goods market, as well as innovations that can bring an affordable and nutritious diet to emerging markets.



**Julie Saussier**  
Senior Equity Analyst,  
Consumer Goods



## Ones to watch

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Global digital platforms that disrupt shopping, advertising, media and the financial industry.



Companies active in fun, health and leisure, with a strong presence in emerging markets (e.g., global brands and Chinese domestic brands).



Companies that reflect the green attitude of Millennials (e.g., sustainable food, clean energy and responsible consumption and production).



## Digital natives

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### No turning back

While internet companies' share prices plummeted in 2022 amid rising rates and the normalization of post-COVID-19 life, the structural drivers of digitalization remain in place. Yet the model continues to evolve and we explore what a channel-less or multi-touchpoint digital ecosystem would mean.

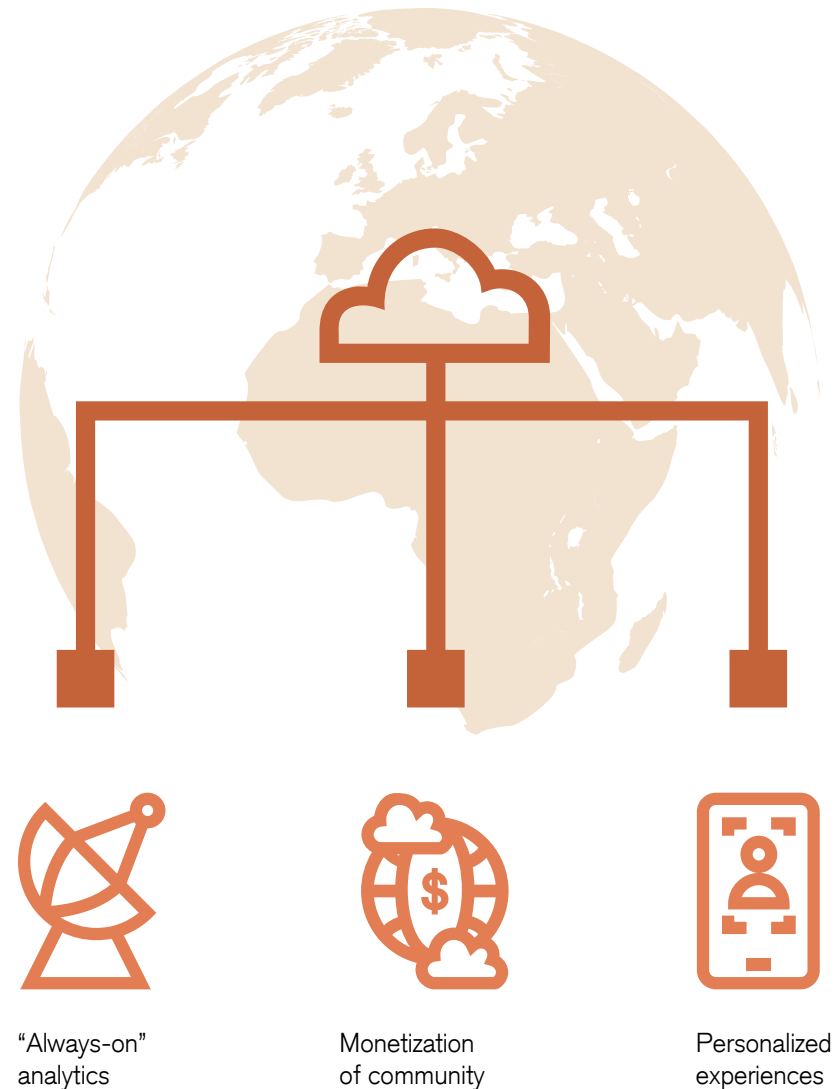
Digitalization made strong inroads during the COVID-19 years as users spent more time online and companies accelerated their digitalization solutions. There is no turning back now: the growth in daily time spent across digital platforms since the start of the pandemic remains unchanged. As a result, advertising and retail sales continue to move online. For example, online advertising penetration rates range from 15%-65% – depending on the total addressable advertising market used – and are growing. Some 20% of retail sales in the USA are via e-commerce, with 80% penetration in the first-mover categories such as books, music, videos and games. Those product categories that are more multi-faceted (e.g., clothing) are less penetrated, but the development of tools such as 3D modeling, virtual try-on via augmented reality (AR), or on-device artificial intelligence (e.g., using your smartphone to scan your face and try on makeup) should help close the gap in coming years. China continues to lead the market, with a total online sales penetration rate of some 40%.

While this transition will bring unique opportunities and challenges, evolution is built into retailers' DNA. During the last century, mom and pop shops evolved into bigger chains, including supermarkets, department stores and big box outlets. Over the past two decades, retailers have embraced the internet, launching website platforms from which they could sell their products. Today, they are evolving toward a channel-less, multi-touchpoint retail ecosystem. Companies are going beyond "simple" e-commerce by building experiences and interactions with their customers through different touchpoints. This experience is no longer limited to goods, but can include finance, healthcare or other fee-based services, which is paving the way for experience brands. For example, technology companies, such as advertising platforms, are transforming into consumer goods companies, offering in-app shopping that should increase conversion rates and, in turn, the value of their ad inventory. And consumer goods companies are evolving into technology companies by obtaining customer data and using it to make smarter decisions (e.g., predicting sales or optimizing pricing), creating their own digital content and monetizing their communities (e.g., ad solutions). As such, further development of the relationship between the company and the customer in a profitable way is of utmost importance. In that vein, companies are identifying super users/consumers (i.e., those whose spending far surpasses others) and offering them unique and personalized experiences. In the luxury goods sector, for example, initiatives include personal messaging, virtual stores, digital shopping assistants, virtual events and ultra-luxury travel and hospitality.

Millennials' digital medium of choice is short social videos hosted by influencers. The younger generations are also increasingly using digital video platforms as a search engine, which has pushed all the major social platforms to adopt short-form video products and to start monetizing them. Advertisers are now using this platform to trial innovative marketing approaches, such as interactive or shoppable ads.

## Digital growth: Not just for tech companies

Harnessing consumer data at scale in multi-touchpoint ecosystem



Source: Credit Suisse



## Fun, health and leisure

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### Gen Lux

Generational trends are a key driver of luxury goods consumption. According to the latest Bain-Altgamma Luxury Goods Worldwide Market Study, Generation Y and Z already accounted for all the market's growth in 2022. Moreover, the spending of Gen Z and the even younger Generation Alpha is set to grow three times faster than other generations through 2030, making up a third of the market. Millennials started to buy luxury goods earlier than previous generations, and Generation Z consumers are purchasing them another three to five years earlier than the Millennials, according to Bain. What is driving the demand for luxury goods among this cohort? The majority of Millennials live in emerging markets, and like their peers in developed markets, they are eager to acquire social status through the ownership of luxury goods. Another factor is that the young generations have at times acquired wealth through highly volatile cryptocurrencies which they can convert into luxury goods items with real value that can appreciate over time, in particular watches and jewelry that can be sold on resale platforms or at auctions. Another catalyst for the luxury goods market is influencers, who consume luxury goods and/or are sponsored by luxury goods companies.

The most successful luxury goods companies understand the importance of keeping their products exclusive; for those who succeed in acquiring these goods, it is a sign of success and belonging. Some brands also claim to be more than a luxury goods brand, but rather a cultural brand that can reach the global Generation Z. These brands affiliate themselves with music, stars or art. Consumers who belong to the community have privileged access to new types of activities, often enabled by technology, which is attractive to Millennials.

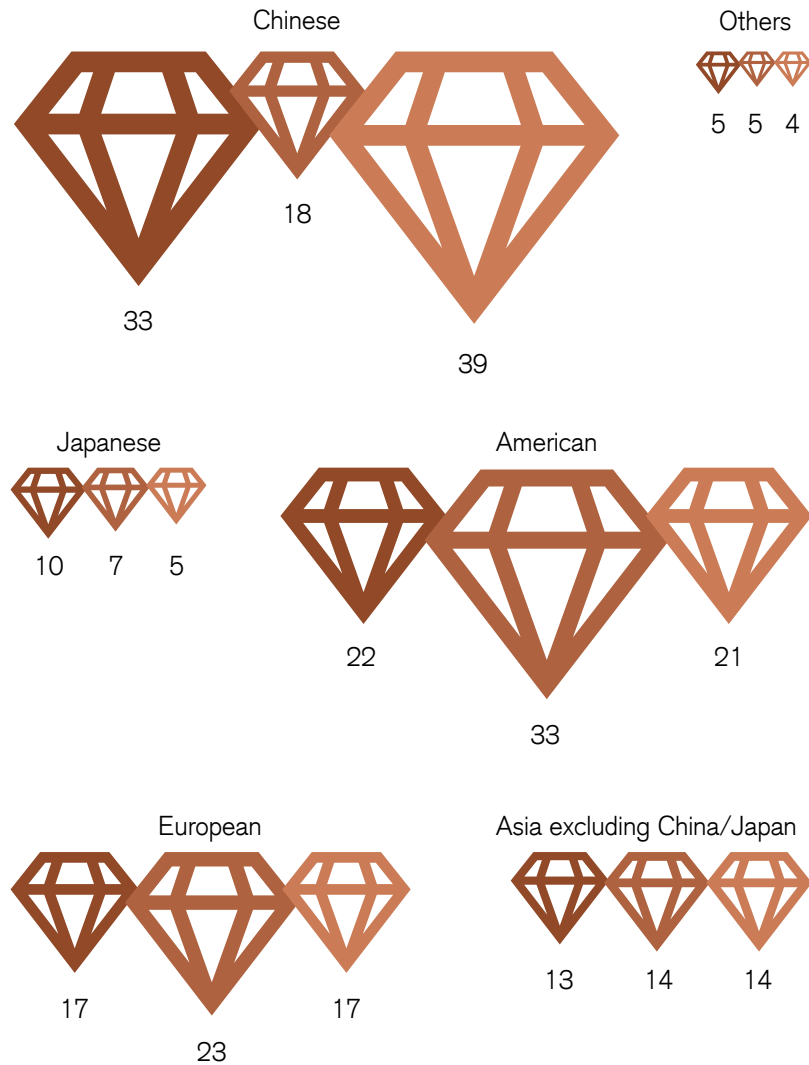
In terms of geography, the Chinese consumer represented 35% of luxury goods spending in the pre COVID-19 era, according to Bain. In recent years, however, this share declined to 18% due to China's COVID-19 restrictions and strong growth in the USA and Europe, according to Bain. We believe China's reopening will lead to a resurgence of spending by Chinese consumers, who accumulated savings during the pandemic lockdowns. Indeed, Bain estimates that Chinese consumers could represent 40% of global luxury goods spending by 2040.

Further support for luxury goods spending should come from growth in global wealth, which is expected to rise by a cumulated 36% by 2026, an increase of USD 169 trillion compared to 2021, led by North America, China and the younger generations, according to the Credit Suisse Research Institute's annual Global Wealth Report 2022.

## Green attitude

### Big spenders

Luxury goods spend by nationality (in %)



■ 2019 ■ 2022E ■ 2030E  
 Source: Bain & Company, Credit Suisse

### Affordable, nutritious food for all

In emerging markets, home to many of the Millennials, an estimated 814 million people go to bed hungry every night, while 3 billion cannot afford nutritious diets, according to the Food and Agriculture Organization (FAO). And food insecurity is on the rise: soaring inflation over the past year has spiraled into a food crisis for many people in emerging markets, with Africa, Asia and the Middle East the most vulnerable as food imports became too expensive.

The Ukraine conflict has also contributed to this food crisis, as surging prices for grains and energy have led to significant food inflation. Supply chains have been disrupted further, compounding the COVID-19 disruptions. The FAO estimates that the global number of undernourished people will further increase because of the war in Ukraine. Along with the human toll, this comes at a high economic cost: lower productivity of labor and lower educational achievement for those impacted during infancy.

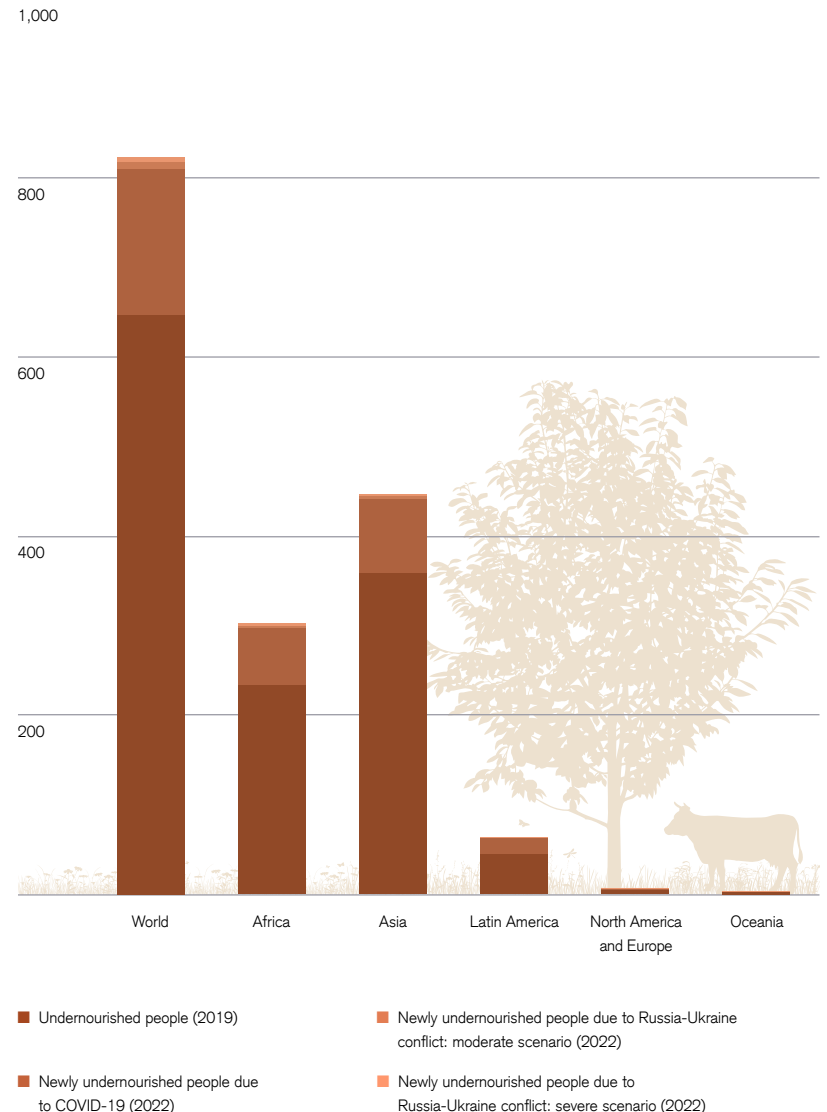
Our food system, which is responsible for 34% of greenhouse gas emissions and impacts land use, was already the focus of many Millennials, who have advocated for a more sustainable food chain to address climate change concerns. Progress has been slow to date to address the issue of undernourishment, and there is a pressing need to find affordable food solutions. While there will not be a single solution to this multifaceted crisis, innovative ingredients can help bring an affordable and nutritious diet to people in emerging markets. Moreover, a range of solutions to address the challenges of decarbonization and feeding the world more sustainably already exist, ranging from efficient food processes and reduced food waste to sustainable production and healthier diets through reduced meat consumption.

It is reassuring to hear consumer companies investing in innovative ingredients to bring an affordable, nutritious diet to consumers everywhere. Examples include the use of by-products from grain production that often end up as waste even though they are nutritious and can still be used in the production of cereals. Another example includes replacing expensive ingredients in food production with tasty and nutritious alternatives that are cheaper (e.g., egg-extensions that blend plant-based protein with eggs). In addition, daily food can be supplemented with key daily micronutrients and remain affordable. Ingredients companies also have a major role to play in developing innovative ingredients, as they can rapidly scale innovation and make it more cost effective. More expensive solutions include cultivated meat (i.e., growing animal cells in a laboratory setting), which made further regulatory progress in 2022. The latter innovation can help fulfill higher demand for protein from the growing population in emerging markets.

In a more challenging environment with inflation impacting companies' input costs and the price of their products, consumer demand will be affected at some point. Well-managed companies that can continue to invest in research and development should emerge stronger, as they can develop disruptive new products in contrast to firms that are losing market share and struggling to defend their business.

### A growing problem

Estimated number of undernourished people (in m)



Source: FAO, World Bank, Credit Suisse  
 Last data point: 2021



# Climate change

While the world seemingly got sidetracked in terms of its climate goals in 2022, when Europe reactivated its coal power plants to replace embargoed Russian oil and gas, it will likely only be a short detour on the path to net zero emissions by 2050. Western governments' pursuit of energy security is leading to an unprecedented push for the build-out of domestically produced renewable (i.e., wind and solar) energy. The USA is leading the green spending charge with its Inflation Reduction Act. In the European Union, the new Green Deal Industrial Plan will complement the REPowerEU plan, while China is developing mega-sized renewable centers.






**Daniel Rupli**  
Head of Single Security Research



**Jens Zimmermann**  
Equity Research Analyst,  
Energy & Utilities



## Ones to watch

-  Companies that are expanding their CO<sub>2</sub> free power generation capacities and offering electricity-storage technologies, and firms accelerating building efficiency to reduce energy consumption.
-  Energy companies leading the energy transition by moving away from traditional fossil-fuel business toward renewables. Firms involved in blue and green hydrogen capacity enhancements.
-  Companies providing technologies to improve sustainable food production (i.e., precision agriculture, vertical farming technology, gene editing, waste management and food waste reduction). Meat processors with low greenhouse gas emissions and plant-based food product providers.
-  Automotive companies with a strong commitment to improve their environmental footprint, such as electric vehicles, sustainable fuels, hydrogen or other technologies.
-  Firms focusing on sustainable metals and mining capabilities ensuring the supply chain adaption to lead the energy transition.



## Electricity efficiency

### Rolling out the green carpet

The COP 27 UN Climate Change Conference in 2022 provided a stark reminder that the deployment of renewable energy needs to accelerate in order to decouple CO<sub>2</sub> emissions from global gross domestic product (GDP) growth as the world's goal of reaching net zero emissions by 2050 looks increasingly beyond reach.

Accordingly, the International Energy Agency (IEA) has raised its projections for the required build-out of wind and solar capacity in its most recent World Energy Outlook (WEO) 2022. These forecasts reflect how much renewable capacity will be required if governments want to reach their pledged net zero targets. Compared to its previous 2021 forecasts, the IEA has increased its renewable capacity projections by 12% to 7,744 GW globally for 2030, and by 22% to 20,290 GW for 2050 (this compares to 3,278 GW in 2021). Based on these upward IEA revisions, solar power would have to grow almost fourfold in the European Union (EU) through 2030, more than sixfold in the USA and almost fivefold in China. Similarly, wind power would have to triple in the EU and in the USA until 2030 and more than double in China, according to the IEA.

The race is on between governments to attract wind and solar capacity investments. The USA took the lead when it passed the Inflation Reduction Act (IRA) in August 2022, which offers USD 369 billion for climate projects, including generous investment and production tax credits for wind and solar energy, as well as incentives for electric cars and home batteries. It could also support growth for virtual power plants (VPPs), which are networks of decentralized small solar panel devices and home batteries that are pooled together and exported to the electricity grid. Though still nascent in scale, investments in these VPPs could reach USD 110 billion between 2020 and 2025, according to research firm Wood Mackenzie.

## Green energy transition

The EU is concerned that renewable investments will increasingly shift to the USA due to the tax incentives within the IRA, which could jeopardize its climate goal of cutting CO<sub>2</sub> emissions by 55% through 2030 (from 1990 levels). In response, the EU has rolled out its Green Deal Industrial Plan, which will spend EUR 225 billion on renewable energy investments and will create a faster approval process for new green projects.

Meanwhile, China has set a specific goal for the share of renewables in power generation for the first time (33% by 2025), and the country's provincial governments are also increasingly offering green incentives for renewable capacity installations. Similarly, Saudi Arabia's Saudi Vision 2030 framework aims to eliminate oil from power generation and to generate 50% of its electricity from renewables and 50% from natural gas (north of Riyadh, the country is building one of the world's largest solar power plants with 1,500 MW to power 185,000 homes).

### Breakthroughs and barriers

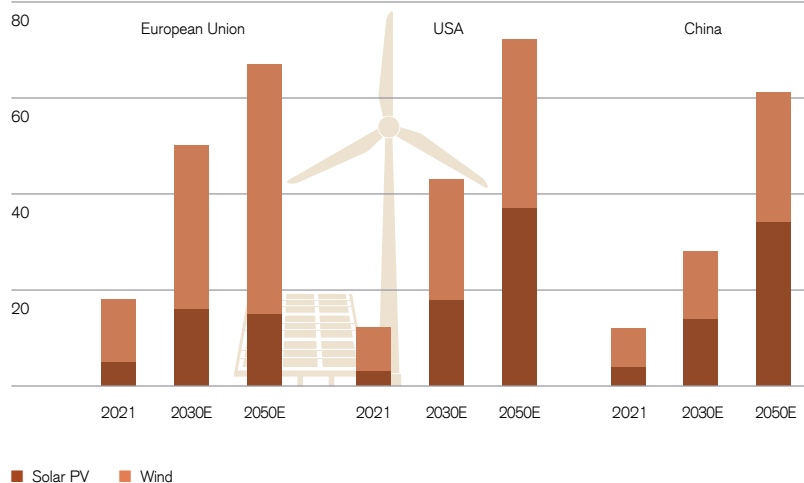
This subtheme was initially focused on the large European oil and gas companies as they have set ambitious net zero emission targets in their efforts to decarbonize their oil and gas production portfolios by diversifying into clean energy (wind, solar and green hydrogen). As the European oil majors continue to redirect capex from high carbon-emitting businesses toward lower carbon gas production along with wind, solar and green hydrogen energy, we have broadened the investment scope of this subtheme to include companies along the gas and green hydrogen value chains.

Gas is widely seen as a reliable and cleaner source for base load energy supply because it replaces "dirtier" coal and oil in power generation, and it remains the main heat source in energy-intensive industrial applications (such as steel production). However, the role of natural gas as a transition fuel is now being challenged by the global energy crisis and Russian supply cuts, leaving gas-consuming countries wondering at what price they can secure gas supplies in the future.

High gas prices have reduced coal-to-gas switching and have incentivized a faster build-out of renewable energy in the power sector, supported by the green policy push from the IRA in the USA and the Green Deal Industrial Plan in the EU, as discussed above. While higher gas prices could weigh on global gas demand, Europe's quest to replace Russian pipeline gas along with Asia's rising gas consumption should support demand growth for liquefied natural gas (LNG) in the medium term (the IEA's Announced Pledges Scenario projects 2.2% growth per year until 2030). How quickly cleaner alternatives can replace gas as a transition fuel will depend on the technological progress for green hydrogen (in industrial applications), nuclear energy (as base load power generation) and biogas (as a clean substitute for conventional gas).

### Sun and wind to the rescue

Share of power generated from wind and solar energy (in %)



■ Solar PV ■ Wind

Source: IEA WEO 2022 (Announced pledges scenario), Credit Suisse

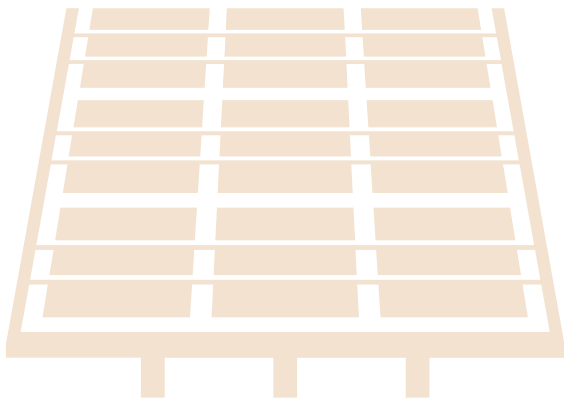
Last data point: 2021; 2030 and 2050 are forecasts

Investment incentives for hydrogen in the USA (tax credits in the IRA) and in the EU (support for hydrogen as an IPCEI – “Important Project of Common European Interest”) will scale up hydrogen supply and drive down production costs, which should solve hydrogen’s chicken-and-egg dilemma: as long as insufficient industry scale keeps production costs high, hydrogen demand cannot increase. By 2030, it is widely expected that green hydrogen could replace gas in industrial applications, such as long-distance shipping and primary steel production.

Nuclear fusion achieved a breakthrough in 2022, when US scientists produced more energy from a nuclear fusion reaction than it consumed for the first time since research began in 1950 (the net gain was 0.4 megajoule – about the energy needed to boil a kettle). The breakthrough used a process known as inertial confinement fusion, which uses lasers to fuse two or more elements (usually hydrogen) into one in a reaction that releases large amounts of low-carbon energy. Unlike nuclear fission, nuclear fusion does not produce long-lived radioactive waste.

Despite this important breakthrough, fusion power stations will not quickly replace gas-fired power plants as the technology will have to improve significantly to bring down costs. However, the future possibilities for commercializing fusion technology have significantly increased as investments are finally flowing to private fusion companies. While many of those companies aim to have a nuclear fusion power plant operating in the 2030s, nuclear scientists think it is more likely in the 2040s or the 2050s.

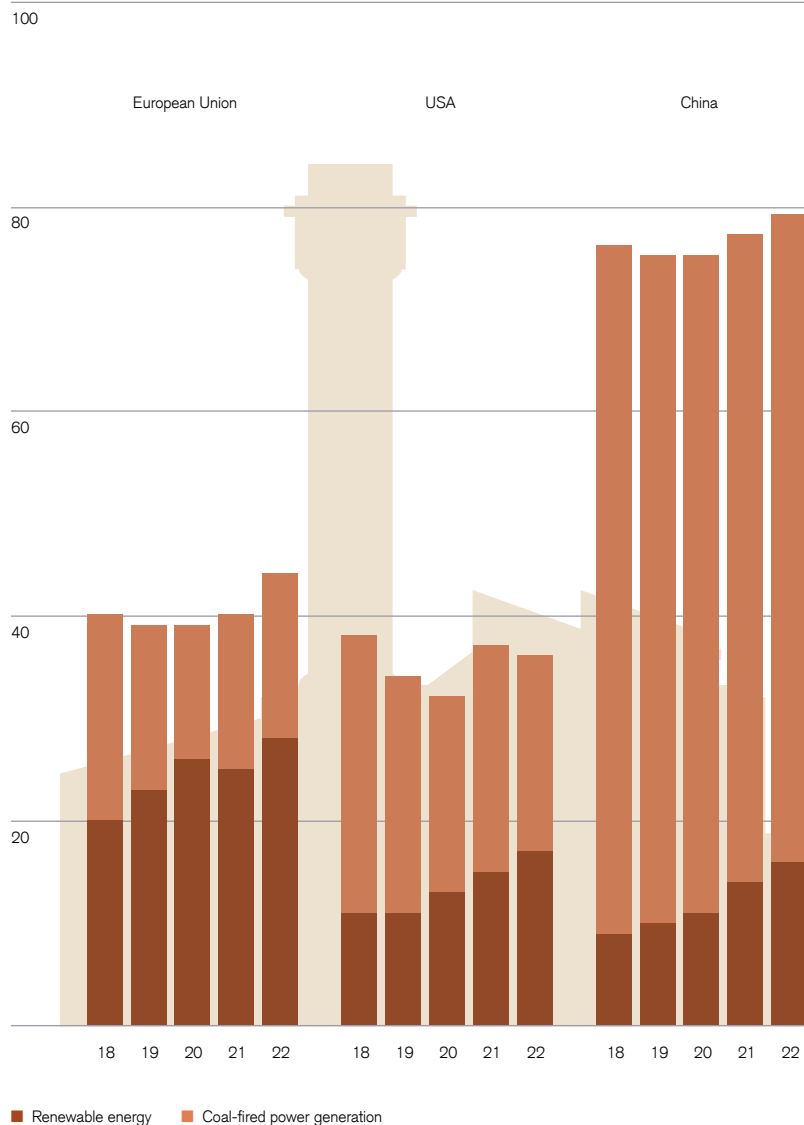
Biomethane (or biogas) is the non-fossil fuel variant of natural gas. It is produced by fermenting biomass from various types of raw materials, such as straw, food waste, sewage sludge or animal manure, and then purified by extracting the  $\text{CO}_2$ . Biomethane consists of the same molecule as natural gas, namely  $\text{CH}_4$  or methane, and can be transported in gas pipelines. If biomethane is liquefied, it becomes the non-fossil fuel variant of LNG, called bioLNG. The EU has doubled its biomethane production target to 35 billion cubic meters (bcm) in its REPowerEU Plan as it plans to permanently replace 155 bcm of Russian gas supplies by 2030. If biomethane and bioLNG can replace conventional  $\text{CO}_2$  emitting natural gas, it would support future gas demand and avoid the stranding of existing gas pipelines and LNG infrastructure during the energy transition.



## Agriculture and food

### Cleaning up energy

Share of renewables and coal in power generation (in %)



■ Renewable energy ■ Coal-fired power generation

Source: Ember, Credit Suisse

Last data point: 2022

### AI feeds the world

Global population growth combined with greenhouse gas (GHG) emissions in the farming industry remain a big challenge – and a huge opportunity. The three main greenhouse gases in the agriculture industry are methane (from animals), nitrous oxide (from fertilizers) and carbon dioxide (from fossil fuels used for farm vehicles). Going forward, farmers will need to get more yield from every square meter of land to feed the world's growing population. At the same time, they will need to reduce GHG emissions during the production process. In response to these challenges, farmers will increasingly turn to a range of innovative solutions, such as precision agriculture, data management and artificial intelligence (AI).

Self-learning data, for example, will ultimately result in better tracking (e.g., plant growth, weather effects and water measurement) and more efficient planting and harvesting. Advanced sensors and drones make the use of water and fertilizers more efficient. Satellites support the observation and maintenance of existing land use, while robotics can reduce manpower costs and ensure the most efficient planting around the clock.

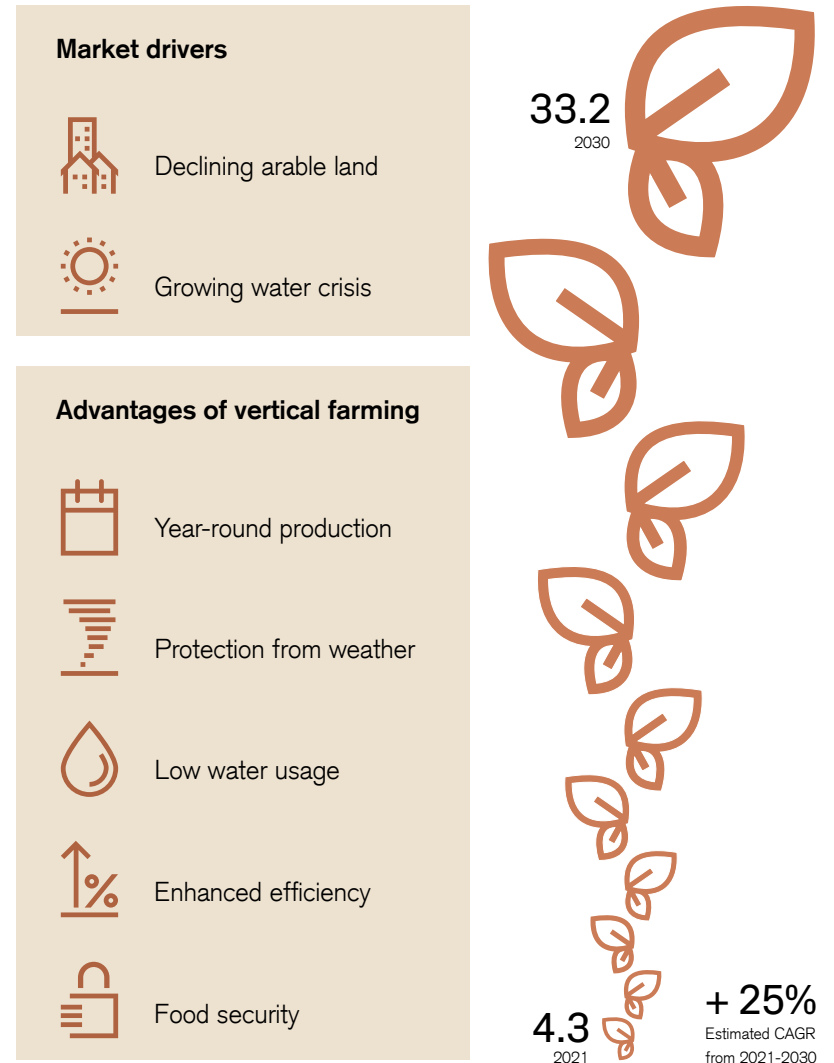
Relatedly, indoor or vertical farming can increase the yield per square meter of land in a more sustainable way by substantially reducing water consumption and the need for pesticides. On the flip side, more electricity will be needed to power the light systems and robots that will replace the sunlight and workers in the field. Accordingly, the initial investment is much higher than for traditional farming processes.



In 2020, the Abu Dhabi Investment Authority invested USD 100 million for vertical and indoor farming in one of the driest regions in the world. In 2022, the largest vertical indoor farm opened in Dubai with more than 330,000 square feet of green growing capacity. However, the market leader is the USA. According to Grand View Research Inc., the global vertical farming market is relatively small with an estimated value of around USD 4.3 billion in 2021, but projected annual growth rates of over 25% could lift the total market value to USD 33.2 billion by 2030.

### Growing up

Global vertical farming (in USD bn)



Source: Grand View Research (2022), Fortune Business Insights (2022), Credit Suisse

## Sustainable transport

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### All about EVs

Demand for electric vehicles (EV) remained strong in 2022 despite slowing economic growth, higher input costs from inflation and a spike in electricity prices. Global EV penetration hit an all-time high of 18.1% in December 2022, led by China with EV penetration of 27%, followed by Europe with 18% and the USA with 7%. In absolute terms, global EV sales gained +55% YoY in 2022 to 10.5 million new battery electric vehicles and plug-in hybrid vehicles delivered.

Looking forward, under the IEA's Net Zero Emissions by 2050 Scenario, global EV sales would reach more than 65 million units in 2030, representing a share of almost 60%, compared to an EV share of 33% under the IEA's Announced Pledges Scenario. In comparison, BloombergNEF sees EV adoption reaching 40% by 2030.

Besides EVs, our sustainable transport subtheme includes alternatives that can help decarbonize the transport sector, such as railways, hydrogen and biofuels. Biofuels, which can replace fossil fuels in road and air transport, are produced from biomass materials (mostly corn, sugar beets or cane) by fermenting the sugar.

In the transport industry today, the overall demand for biofuels represents only 6% of global oil demand, according to Credit Suisse estimates. While future passenger cars are expected to run on batteries (EVs) or possibly hydrogen (fuel cells), the decarbonization of the heavy transport, shipping and aviation industries will largely depend on biofuels. Currently, sustainable aviation fuels (SAF) account for just 1%-2% of overall fuel demand, which highlights the growth potential once production costs decline as costs for SAF are still more than twice as high as for jet fuel. Strong policy support from governments around the world, in particular from the USA – the leader in the production and consumption of biofuels – should continue to drive demand in coming years.

## Metals of the future

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### The foundation of the energy transition

We have added a new subtheme, Metals of the future, as the construction of solar and wind farms and EVs will require more minerals than the equivalent fossil fuel-based technologies. For example, a typical EV requires six times the mineral inputs compared to a combustion engine car, while an onshore wind farm requires nine times the mineral inputs of a gas-fired thermal power plant.

The required minerals depend on the green technology. For example, copper is the most important metal for all electricity-related technologies, including wind farms (in addition to zinc), solar technologies (in addition to silicon for solar panels) and electricity grids (in addition to aluminum). Batteries require huge amounts of lithium, nickel, cobalt, manganese and graphite. Magnets for wind turbine drives and EV motors need rare earth elements.

Demand for these crucial minerals is set to increase significantly if the world wants to decarbonize the power and transportation sectors to reach net zero emissions by 2050. Accordingly, the IEA forecasts that global demand for copper will grow from 5 million tons per year in 2021 to about 13 million tons per year by 2030. Demand for silicon and rare earth elements needs to increase around threefold through 2030, while lithium demand for battery storage systems should see the sharpest increase, rising almost twentyfold between 2021 and 2030, according to the IEA's World Energy Outlook.

Recycling the metals used in clean energy systems could become a source of secondary supply, helping to meet growing demand and reduce the social and environmental impacts from mineral mining. Solar panels present one such opportunity: around 95% of the components are recyclable, but only 10% of end-of-life solar panels are currently recycled, according to the IEA.

The production of the most crucial minerals for the energy transition is more concentrated than the supply of oil because the top three producers of lithium, cobalt and rare earth elements control over three-quarters of global output. In some cases, a single country controls around half of the worldwide production. For example, the Democratic Republic of the Congo accounted for 70% of the world's cobalt production, while China produced about 70% of rare earth elements in 2019, according to the IEA. This high level of concentration is further compounded by complex supply chains, which raises the risks of physical supply disruption and trade restrictions.

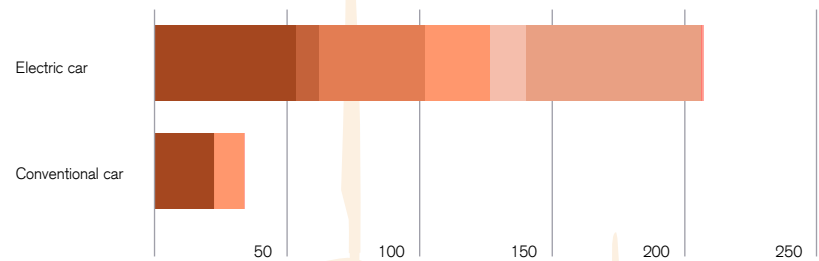
The security of mineral supplies will thus become an important aspect in the broader energy security debate, which is currently mostly focused on fossil fuel supplies from OPEC countries (Iran, Iraq and Venezuela). As metals are a crucial part of the clean energy supply chain, green subsidies try to incentivize the extraction of critical materials at home. Under the USA's IRA, for example, an EV is only eligible for the full tax credit if a certain percentage of the battery components and critical minerals have been extracted or processed in the USA, or in countries with a trade agreement with the USA. Similarly, resource-poor Germany is seeking trade agreements with the resource-rich South American countries of Argentina, Chile and Brazil to diversify the supply of its critical minerals across different countries and make its energy transition less dependent on China.

### In demand

Crucial minerals needed for clean technologies

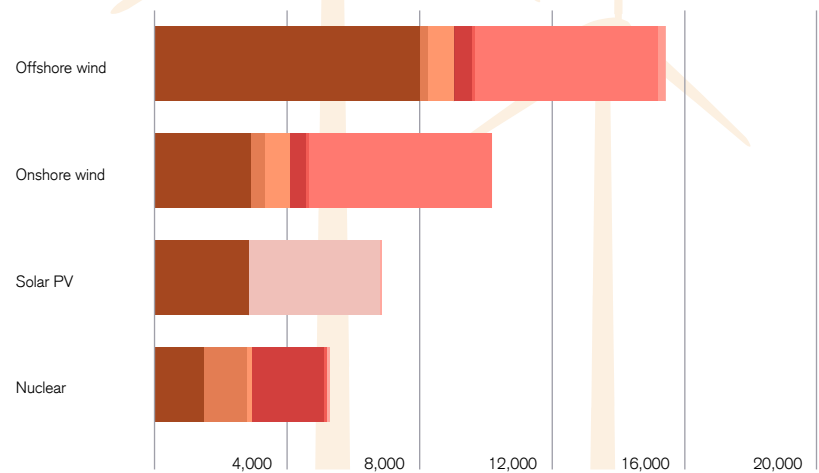
### Transport

(kg/vehicle)



### Power generation

(kg/MW)



Source: IEA, Credit Suisse

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## Anxious societies

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