constructsteel

Monthly update for the construction industry
May 2022

Construction market trends

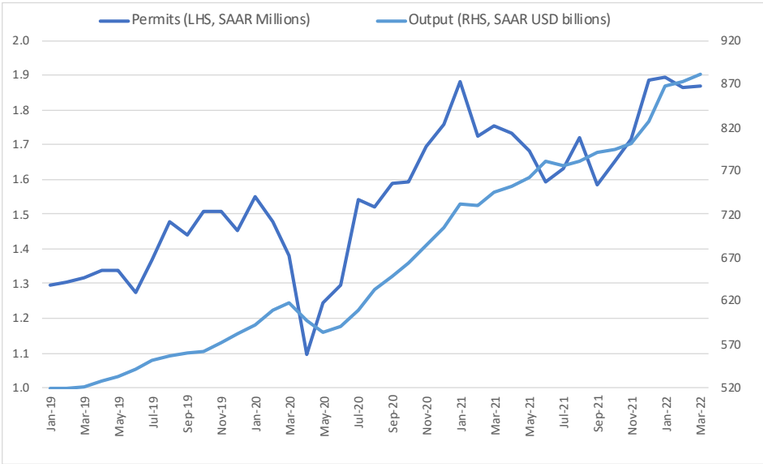
United States

Low supply underpins residential output but rising interest rates and material costs to weigh on affordabilitly; private non-residential output slowing.

Private residential output up 1.0% m-o-m in March (18.4% y-o-y); building permits up 0.3% m-o-m (6.6% y-o-y). Private non-residential output down -1.2% m-o-m in March (8.5% y-o-y). Architecture Billings Index (ABI) surges to 58 in March from 51.3 in February (>50, expansion) as business conditions at architectural firms remained robust.

Private residential permits vs output

Source: US Census, American Institute of Architects



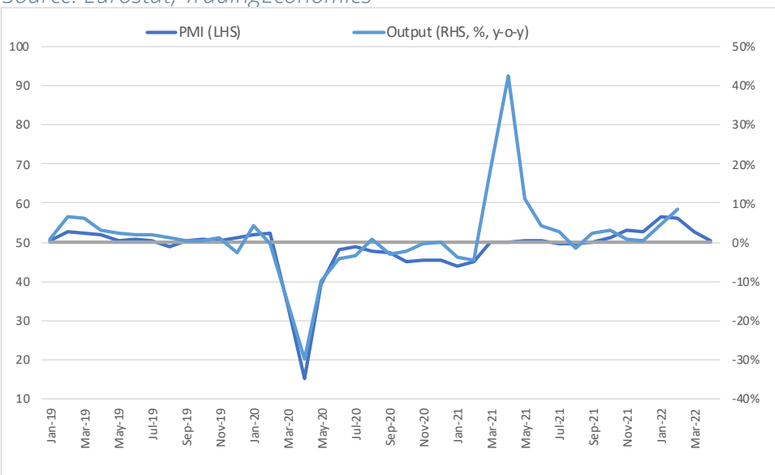
Europe

Eurozone construction shows strong growth beginning 2022 but growing uncertainties means that a slowdown is anticipated.

Eurozone construction up 1.9% m-o-m in February (8.3% y-o-y); Buildings up 2.0% m-o-m (7.8% y-o-y); Civil works up 1.4% m-o-m (11.7% y-o-y). The IHS Markit Eurozone Construction PMI dropped to 50.4 in April from 52.8 in March (> 50, expansion) amid a reduction in new order inflows.

Eurozone construction output vs PMI

Source: Eurostat, TradingEconomics



Knowledge partner:
McKinsey & Company

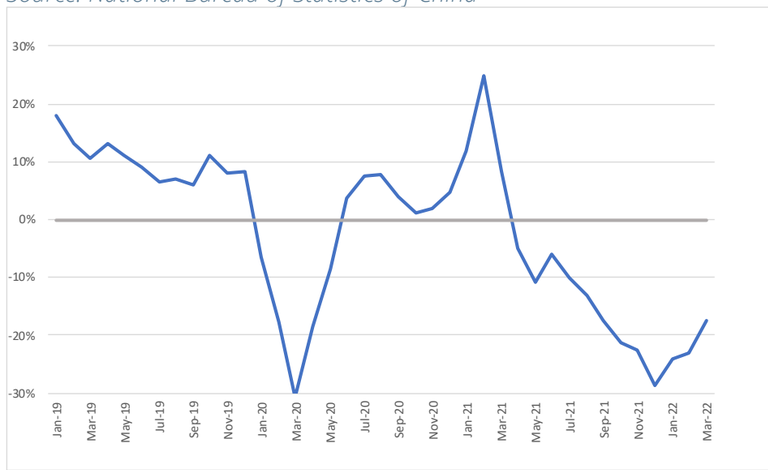
China

Government rolls out measures to support infrastructure and the property sector.

3 month moving average y-o-y decline in floor space started eased to -17.5% in March; floor space sold was down -13.8% y-o-y but road transport infrastructure up 3.6% y-o-y, year to date in March.

Floor space started (3 month moving average, %, y-o-y)

Source: National Bureau of Statistics of China



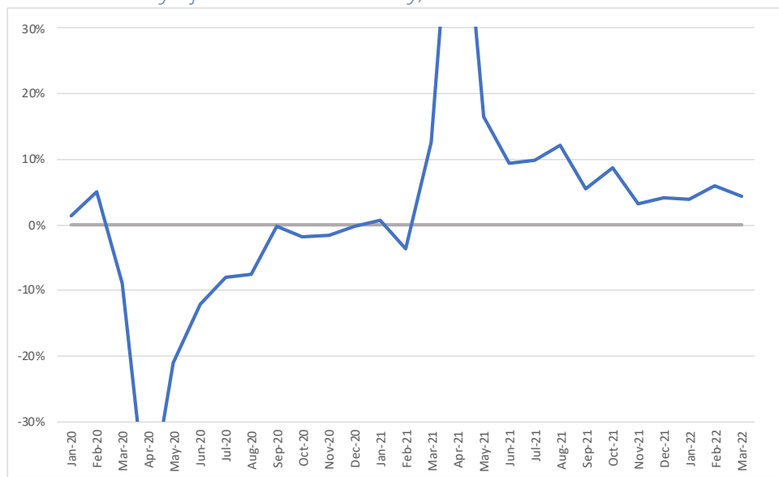
India

Gradual pickup in activity continues.

Weighted average of eight core industries output slowed to 4.3% y-o-y in March from 6% y-o-y in February; production of steel up 3.7%; cement up 8.8% y-o-y.

Weighted average of eight core industries industrial production (%, y-o-y)

Source: Ministry of Commerce & Industy, India



Special topic:
Shaping steel for the 21st century

It's easy to get excited about steel. It's one of the most useful, versatile and dynamic materials, which can transform into products that truly matter to all of us - houses, buildings, sports stadiums, BBQs, automotive and so much more.

As our Managing Director and CEO, Mark Vassella says: "If steel is not 'in' something, it's probably in the machine that was used to make it - and that's what makes our team at BlueScope so passionate about innovating with this great material. We're collaborating to create what's coming next for our industry, redefining and expanding the role that steel can play in our communities."

BlueScope is incredibly proud to be involved in so many exciting initiatives that will improve the use of steel around the world and we're now going to share three examples that highlight the positive impact it's having:

1. A 'living' sustainability centre - inspiring better building practices
2. Grassroots education in China - encouraging China's brightest students to consider careers in steel.
3. Project Reframe - changing the way Australians build.

1. A 'living laboratory' for improving building materials, design and operation

Tasked with shaping the buildings of tomorrow, the Sustainable Buildings Research Centre (SBRC) had to quite literally 'live' its own brief. Located on the University of Wollongong's Innovation Campus, the building was designed and built with a range of industrial partners, including BlueScope. The SBRC not only embodies sustainable design, it is a 'living laboratory' that aims to improve building materials, design and operation. A place where researchers and students develop, prototype and test sustainable building technologies and tools for residential and commercial applications.

Already a 'Green Star 6-star' building, the challenging brief was made tougher by the decision to seek certification with arguably the world's most demanding sustainability rating, the Living Building Challenge (LBC), which encourages buildings to be net zero energy and water, to connect more readily with the natural environment, and provide comfortable and restorative places to live and work.

As a 'living laboratory', the SRBC's 'high-bay' roof is divided into two discrete sections using COLORBOND® steel in the colour Surfmist® and COLORBOND® Coolmax® steel, enabling their performance as cool roof materials to be better understood and compared. These materials were chosen for their high solar reflectance (low solar absorptance) and high thermal emittance, resulting in the potential to help improve the thermal performance of a building*.

The 'energy' category of the LBC assesses embodied carbon footprint, so the use of steel throughout the project was carefully scrutinised. The architects specified slender, high-strength structural steel for the building's frame and lightweight steel cladding for roofing and some upper-level walls. The building also met the high standards demanded by the waste requirements of the LBC, with BlueScope materials being manufactured locally and incorporating recycled content. BlueScope is also committed to responsible and sustainable sourcing practices that create, protect and build long term environmental, social and economic value – all key sustainability and responsibility measures.

The SBRC has now become a hub for a range of building-related collaborative research programs between staff, students and BlueScope. Within the ARC Research Hub for Australian Steel Manufacturing (2014-2020), the use of light gauge structural frames in mid-rise apartment buildings was extensively examined for the benefits they offer in cost, speed of construction and performance, while physical features embedded into the SBRC supported the examination of building facades that actively contribute to more efficient heating and cooling of these building types.

More recently, within the ARC Research Hub for Australian Steel Innovation (2021-2026), an extensive program of investigation is underway to better understand the complex interactions of heat and moisture with the building fabrics commonly in use. And although Australia's varied climates differ substantially from those found across the world (making much of the overseas research inapplicable), the SBRC's expertise in modelling the vastly different conditions within Australia, from Hobart to Darwin, is vital in developing solutions that work well in Australia. This important research aims to improve the way Australian dwellings function in synergy with their prevailing climates in order to provide healthy, comfortable and energy efficient buildings.

These highly successful research programs of academic and industry collaboration have and will continue to shape Australian building practices for the better. As a finished build, the SRBC not only stands as a testimony to what can be achieved with steel, but also provides great insight into how steel can deliver more in the future.

**'Results will depend on roof colour, level and location of insulation, type and location of building shape and function'.*

2. Encouraging China's brightest students to consider careers in steel

In China, BlueScope provides important support and funding to university students across a whole range of engineering studies. This plays a vital role in increasing awareness and knowledge of the positive impact steel has on the world, helping to inspire some of China's best students to consider the incredible opportunities that a career in the steel industry can have.

Historically, this has involved working with several Australian colleges and universities, hosting student visits to our facilities from educational establishments such as Sydney University, SCEGGS, and TAFE New South Wales. However, due to recent travel restrictions caused by COVID-19, visits to sites such as our state-of-the-art Suzhou coating line have not been possible, so our BlueScope team in China has cleverly developed an interactive online portal that now makes virtual visits possible.

The East China University of Science and Technology took advantage of this exciting new opportunity, hosting a virtual visit of Coated China via the cloud platform by a group of MBA students in the petrochemical industry in October 2021. The live video exchange was able to give them a unique insight and understanding of BlueScope's activities and aims for the future in China. The discussion covered several important challenges, such as how to maintain our position in the industry, how to successfully continue to embrace multiculturalism, and how to encourage and develop collaborative work between Chinese and foreign employees.

Further important contributions to the education sector are being made by Butler (a BlueScope company). One of the leading suppliers in the pre-engineered building industry, Butler has partnered with Shanghai city Science and Technology School since 2010, funding their popular CAD Skills Competition. Nearly 70% of the students majoring in engineering have participated in the competition since its inception. It has proved a great way for Butler to help the school to identify outstanding talent, and it has

helped the school to achieve some excellent results in both the city and national competitions.

Each year, Butler also sends professional technical experts to the school to give lectures to the students, sharing the latest knowledge and smart solutions for steel and steel structures. Such teaching helps give students a good understanding of modern management techniques and some real-life practical knowledge from professionals in the steel industry.

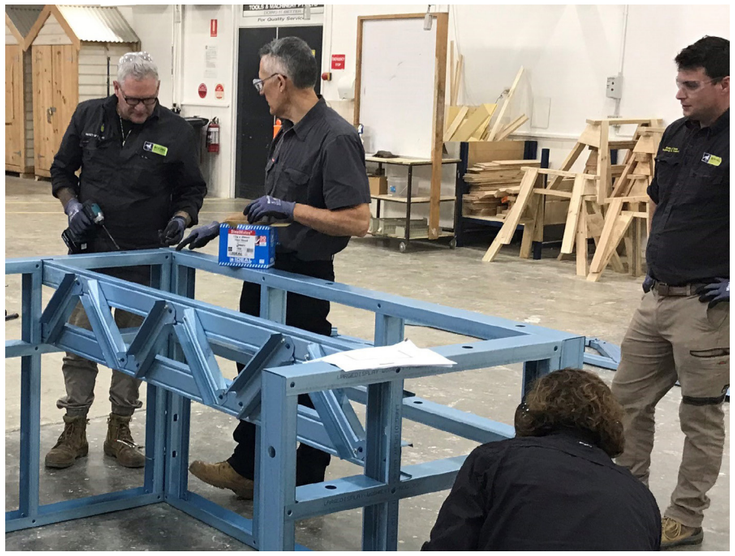
Another example comes from the West Region of China, where Butler has had a long-term partnership with Xi'an Eurasia University since 2011. Each year, Butler provides training and lectures to civil engineering students, whilst identifying the outstanding students who will be invited to join Butler after their graduation. The relationship between Butler and the University is a strong one - the bilateral leadership team visits and communication happen regularly, ensuring the ongoing partnership is a win-win for both the University and Butler.

For BlueScope in China, it's all about attracting the best possible talent and providing a solid foundation for building a better, brighter future with steel.

3. Changing the way Australians build

Light gauge steel (LGS) framing for both commercial and residential applications has been available for over 30 years in Australia and has enjoyed loyal support and great success from early adopters.

However, as a mainstream alternative to timber, LGS-adoption faces some significant hurdles, particularly in terms of the tradespeople who deliver the builds who have been



brought up in an industry that has used timber as the default framing material. That said, builders across Australia who are facing ever tightening margin challenges can see the potential savings of LGS (which is efficient to work with and fast to install) and are increasingly open to the potential benefits that it can bring.

Nevertheless, to make the switch, these builders need us to deliver not just the material, but also a step change in how tradespeople are trained so that steel becomes part of the core modules taught in carpentry-training institutions. BlueScope has therefore worked with government, industry bodies and training institutions across the country, with the target of ensuring that every newly qualified carpenter earning their Certificate III in Australia enters the workforce with not just an understanding of how buildings go together, but with hands-on experience of working with LGS.

BlueScope has also supported the upskilling of teachers in the Registered Training Organisations that provide these new carpenters with their training. At the same time, we've worked with training providers to upskill more experienced carpenters and builders in working with LGS. We've also worked with associated bodies, such as the electrical trades industry body, NECA, to assist with adoption of LGS. And we've worked with key industry bodies to drive upskilling of certifiers and building surveyors in compliance and best practice. It has been and continues to be an enormous undertaking, but the amazing effort demonstrates the work required to provide industry-wide understanding, skills and experience to build with LGS.

The opportunities to educate and inspire professionals who design, specify, create and build with steel are all around us. And at BlueScope, we're proud and delighted to be involved in so many of them. The future of steel is very exciting, and we are all committed to working hard to grow the value of this incredible material that plays such an important role in our lives.

BlueScope is one of the largest global producers of metal coated and painted steel building products.

Technical trends:
Infrastructure for a net-zero economy: Transformation ahead
McKinsey & Co., Operations – April 06, 2022

Eliminating greenhouse-gas emissions would entail major changes to the world's stock of infrastructure assets. New McKinsey analysis measures the shifts that could take place during this transition.

As the global transition to net-zero emissions gains momentum, the infrastructure sector will experience large changes, ranging from the buildout of renewable-power capacity and electricity grids to the decarbonisation of existing assets around the world. Recent McKinsey research shows that, in a scenario where the world achieves net-zero emissions in 2050, organisations would need to pour $3.5 trillion more into low-emissions capital stock annually than they do today. At the same time, some existing high-emissions infrastructure and equipment would need to be decommissioned or would be under-utilised. The convergence of these trends would result in a transformation of the world's built environment. Here is a look at what changes might lie ahead and what they could mean for infrastructure investors and owners worldwide.

An economy-wide transformation

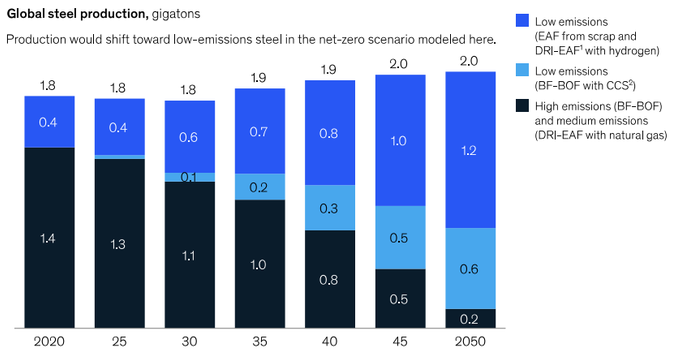
To stabilise the climate and limit rising physical risks from hazards such as extreme heat and more frequent storms, science tells us that it is necessary to stop increasing the concentration of greenhouse gases (GHGs) in the atmosphere—that is, to reduce net GHG emissions to zero. Since substantial GHG emissions now come from each of seven energy and land-use systems, every system would need to greatly reduce its emissions for this net-zero goal to be reached. Power and industry, two asset-heavy systems, together generate about 60 percent of global CO_2 emissions.

Across all seven systems, the combustion of fossil fuels—coal, gas, and oil—accounts for more than 80 percent of CO_2 emissions, based on current accounting methodologies.

Thus, the transition to net-zero emissions would entail shifts in the production of many goods and services that underpin these energy and land-use systems. For example, under the Net Zero 2050 scenario from the Network for Greening the Financial System (NGFS), McKinsey analysis suggests that oil and gas production volumes would be 55 percent and 70 percent lower, respectively, by 2050 than they are today. Low-emissions steel, which makes up about one-quarter of today's output, would account for almost all of the world's steel production by 2050 (Exhibit 1). Production of electric power in 2050 would be more than double what it is today as other sectors use more electricity and developing countries add generation capacity to meet their populations' energy needs (Exhibit 2). Other industries, such as those that manage carbon with carbon capture and storage (CCS) technologies, could also grow.

To achieve the production shifts envisioned under the NGFS Net Zero 2050 scenario, organisations would retire or transform some existing physical assets and acquire new ones. McKinsey analysis suggests that about $275 trillion in cumulative spending on physical assets, or approximately $9.2 trillion per year, would be needed between 2021 and 2050 across the sectors that we studied. This total includes $3.5 trillion more spending on physical assets than today, and the additional amount would all go into low-emissions assets (Exhibit 3). Moreover, about $1 trillion of the capital that is now being spent on high-emissions assets, such as coal-fired power plants, would be reallocated to low-emissions assets. (When we account for increases in spending that are expected to take place as incomes and populations grow, as well as for currently legislated transition policies, we find that the required increase in spending would be lower, though still about $1 trillion.)

A net-zero transition in the steel sector could result in cost increases and require increased capital spending to decarbonize production.

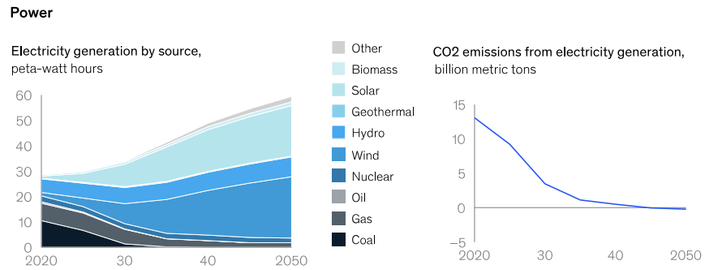


Overall, spending would undergo a profound shift: 65 percent of today's spending on physical assets for energy and land-use systems goes toward high-emissions assets, but over the next 30 years, an average of 70 percent of spending would be on low-emissions assets.

The outlook for sectors

Sectors are unevenly exposed in the net-zero transition. The sectors with the highest degree of exposure directly emit large quantities of greenhouse gases (for example, the coal and gas power sector) or sell products that emit greenhouse gases (such as the fossil-fuel sector or the automotive sector). Approximately 20 percent of global GDP is in these sectors. Another 10 percent of GDP is in sectors with high-emissions supply chains, such as construction. Here, we focus on three sectors—power, industry, and buildings—in which infrastructure and industrial assets will likely be affected by the net-zero transition, as McKinsey's analysis of the NGFS Net Zero 2050 scenario suggests.

The NGFS Net Zero 2050 scenario entails a transformation of energy and land-use systems.



Power

To decarbonise and meet growing demand for electricity, the global power sector would need to phase out fossil fuel–based generation and add capacity for low-emissions power. These changes would require substantial annual capital spending from 2021 to 2050, estimated at an annual average of $1 trillion for power generation, $820 billion for power grids, and $120 billion for energy storage (Exhibit 4). The possibility of asset stranding, which could be significant in the power sector, has prompted concerns about financial-sector risk and the need to build capabilities for quantifying and managing

[1] The scenario used in this analysis is the Net Zero 2050 scenario from the Network for Greening the Financial System (NGFS); some variables were downscaled to provide more sector granularity. This is a hypothetical scenario and not meant as a projection or prediction. McKinsey analysis covers the sectors accounting for 85 percent of global GHG emissions. For more information, see "The net-zero transition: What it would cost and what it could bring," McKinsey Global Institute, January 2022.

Spending on physical assets for energy and land-use systems in the NGFS Net Zero 2050 scenario would rise to about $9.2 trillion annually, or about $3.5 trillion more than today.

Annual spending on physical assets for energy and land-use systems[1] in the Net Zero 2050 scenario,[2] average 2021–50, $ trillion

it. McKinsey's analysis suggests that about $2.1 trillion of the sector's coal and gas power capital stock could be stranded by 2050 in the NGFS Net Zero 2050 scenario. Eighty percent of this amount is today's capacity.

Industry

Two heavy industrial sectors—steel and cement—together account for approximately 14 percent of global CO_2 emissions and 47 percent of the industry sector's CO_2 emissions. While technologies are still emerging, steel and cement production can broadly be decarbonised in three ways: by installing CCS equipment at existing plants, by shifting to low-emissions fuel and other inputs, or by building new low-emissions production capacity. These approaches would require additional capital spending (Exhibit 5). This capital spending would, in turn, lift unit production costs, which will be a key challenge for steel and cement producers. By 2050, the average cost to produce a metric ton of steel would be 30 percent higher than it is today; for cement, the comparable increase would be 45 percent in the scenario modelled here.

Buildings

In the NGFS Net Zero 2050 scenario, the buildings sector would decarbonise by improving energy efficiency—for example, through the use of insulation—and by replacing fossil fuel–powered heating and cooking equipment with low-emissions systems (Exhibit 6). The average annual spending on physical assets between 2020 and 2050 would be $1.7 trillion per year. The buildings sector's biggest adjustments during this transition would be managing the up-front capital costs for end consumers to retrofit equipment and aligning incentives among various stakeholders (such as building owners who invest capital and tenants who may see the benefits of reduced operating costs).

Managing the transition

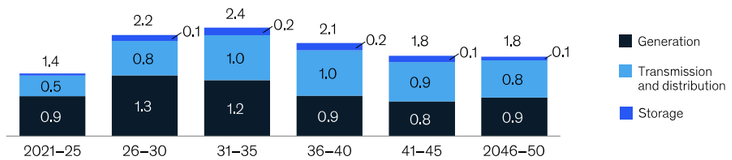
The transition to net-zero emissions would require economies and societies to make major adjustments. Infrastructure investors and owners can work with governments, businesses, and enabling institutions to support many of these adjustments through coordinated action, undertaken over extended planning and investment horizons. Three categories of action stand out. First, in the financial realm, institutions can catalyse capital reallocation by developing new financing structures, financial instruments, and markets; arranging collaborations across the public and private sectors; and managing risk to stranded assets. Second, organisations in the infrastructure value chain can manage demand shifts and cost increases by building awareness of climate risks and opportunities, lowering technology costs, nurturing industrial ecosystems, collaborating across value chains, and creating incentives for goods producers. Finally, infrastructure organisations in the private sector can help address socioeconomic impacts such as job losses, reskilling, and redeployment programs for affected workers, while governments might consider economic diversification programs, social support schemes, and other compensating mechanisms.

Working toward net-zero emissions will be a far-reaching global endeavour, and the infrastructure sector will have an integral role to play in transforming the world's capital stock. Although capital spending during the transition will be substantial, it is important not to view this spending only as a cost. Much of it could yield operating-cost savings through reduced fuel consumption, improved material and energy efficiency, and lower maintenance expenses. What's more, many investments would position organisations to tap into growing demand for low-emissions goods and services. For infrastructure owners and investors, the time is now to begin pursuing the opportunities that the net-zero transition will bring. This article is part of Global Infrastructure Initiative's Voices on Infrastructure.

This article is adapted from The net-zero transition: What it would cost, what it could bring, a McKinsey Global Institute report by Annabel Farr, Danielle Imperato, Mekala Krishnan, Tomas Nauclér, Daniel Pacthod, Dickon Pinner, Hamid Samandari, Sven Smit, Humayun Tai, Jonathan Woetzel, and Weige Wu.

In the power sector, the NGFS Net Zero 2050 scenario would bring investment opportunities and near-term unit cost increases.

Annual capital expenditures, 2021–50,[2] average over 5-year period, $ trillion



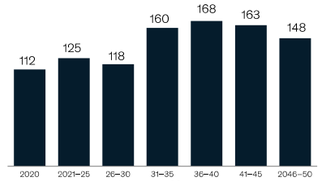
Average annual capital spending would rise in the NGFS Net Zero 2050 scenario compared to today, as generation capacity, transmission and distribution networks, and storage infrastructure are built out.

A net-zero transition in the steel and cement sectors could result in cost increases and require increased capital spending to decarbonize.

Steel

Spending would be required in the net-zero 2050 scenario modeled here to build new low emissions production capacity (eg, hydrogen-based DRI-EAF[1]) and install CCS.[2]

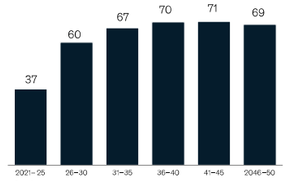
Annual capital expenditures, 2021–50[3]
Average over 5-year period, $ billion



Cement

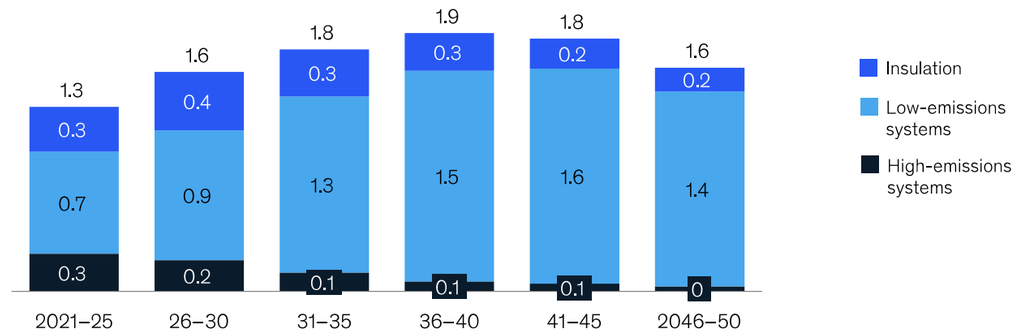
Capital spending would be required to build low-emissions production capacity and add CCS equipment to existing plants.

Annual capital expenditures, 2021–50[3]
Average over 5-year period, $ billion



A net-zero transition in the building sector would entail a shift toward low-emissions equipment.

Average spending on physical assets, 2021–50,[1] average over 5-year period, $ trillion



In the net-zero scenario modeled here, spending would shift toward heating and cooking systems that do not run on fossil fuels and toward building insulation.

Construction steel news headlines

construction market and regulations

USA: In a memorandum published by the White House, projects that are funded by the US$1.2 trillion infrastructure package are only permitted to use iron and steel produced in the US. Under the Infrastructure Investment and Jobs Act, the requirement dictates that all manufacturing processes for iron and steel must be completed in the US starting from 14 May. The clampdown on imported iron and steel comes after the United Nations COMTRADE database reported that imports into the US reached about US$38.9 billion last year, its highest level since tracking began in the early 1990s. Link

Europe: Europe faces a looming "critical shortfall" of key energy transition materials that could threaten the EU's green plans. Soaring need for materials such as copper, lithium and cobalt for use in a wide range of clean energy generation and storage technology applications threatens to leave the continent scrabbling to meet demand by tapping unreliable or carbon-intensive supply sources. Link

Europe: The persistent shortage of materials in Germany's petrochemicals-intensive construction industry has worsened considerably recently. During March, more than 37% of companies in the building construction sector – business and residential spaces – reported disruptions in their supply chains, up sharply from February's 23.5%. Overall inflation in Germany stood at 7.6% in March as energy prices shot up more than 40% during the month. Link

Asia: China is about to embark on a new infrastructure spending spree in a bid to fix an economy nearing breaking point because of Covid lockdowns. President Xi Jinping announced that efforts must be made to boost construction to increase domestic demand and promote growth. But Covid lockdowns have brought the world's second biggest economy "near breaking point". Tough restrictions in Shanghai and other major Chinese cities are just the latest blow while China was already feeling the impact of a real estate slump and a crackdown on private enterprise. Unemployment hit a 21-month high in March. Link

Global: The world's most expensive cities to build in have been revealed, with Europe and North America taking all of the top five places and making up the majority of the top ten. According to the latest International Construction Costs report, published by Arcadis, London ranked as the world's most expensive city followed by Geneva in Switzerland and Oslo in Norway. New York City in the US was fourth most expensive, with Denmark's capital city of Copenhagen rounding out the top five. Link

Latin America: Construction output in South America is due to grow 5% in 2022, reaching $546bn, up from $519bn 2021, according to economic analyst GlobalData. The rise will follow a dip of 13% last year, which was due to the impact of Covid-19. Argentina, Brazil and Peru's economies surpassed pre-pandemic output levels in 2021, and Mexico is due to reach pre-pandemic levels by 2025. Link

Building materials & construction technologies

USA: Construction technology firms, including high-profile companies such as Elon Musk's The Boring Co., have pulled in millions of USD over the past four months through venture capital funding. Link In the meantime, contech companies' revenue boomed amid pandemic and supply chain issues. Firms of all sizes have prospered since COVID-19 challenges pushed contractors toward wider tech adoption – industry leaders like Procore, Autodesk, Timble saw a double-digit revenue growth in 2021 compared to the 2020 numbers. Link

USA: California-based contech firm Procore has released a carbon calculator tool to help firms mitigate the massive cost construction incurs against the environment, according to a press release. Procore has partnered with construction nonprofit Building Transparency to establish an integration with the organization's Embodied Carbon in Construction Calculator. The calculator, co-conceived and developed by Skanska and C Change Labs, contains a database of materials and their embodied carbon amounts which allows the user to compare the impacts of alternative products for their builds. Link

USA: With consumers prioritizing environmental sustainability, Amazon and Target unveiled stores that aim to use less energy than they produce, the retailers announced last week. Target's first net zero energy store is located in Vista, California, and the new Amazon Fresh store, which is pursuing net zero carbon certification, is located in Seattle. The new Amazon Fresh Seattle location features a CO2-based refrigeration system, steel byproducts to reduce embodied carbon and electricity sourced from the company's renewable energy projects. Target's store has solar carports, an electric HVAC system, CO2 refrigeration and LED lighting. Link

USA: Housebuilder Alquist 3D is planning a 200-home development in the US state of Virginia that it says will be the world's largest 3D-printed construction project. Alquist 3D says the exterior of a three-bed, two-bath home can be created in about 22 hours, compared with up to three weeks in a standard construction schedule. It adds that costs are around 15% less, and require less lumber – one of the commodities hit by the US' present inflationary surge. Link

construction sector players

USA: Jacobs Engineering has set out new climate commitments in its updated Climate Action Plan – the company hopes to achieve net zero greenhouse gas emissions across the value chain by 2040, and to maintain carbon neutrality status and 100% low-carbon electricity for operations. The company recently became the first professional consultancy and one of the world's first companies with net-zero targets approved by the Science Based Targets initiative. Link

Mexico: Cemex Ventures – the corporate venture capital division of Cemex – has invested in a start-up company that specialises in carbon utilisation technologies for the cement industry. Canada-based Carbon Upcycling Technologies has developed a new way of converting industrial residues, such as fly ash, crushed glass, steel slag and graphite, into usable solid products. Link

USA: Bechtel, a global leader in engineering, construction, and project management, announced the formation of its new Manufacturing and Technology business to address growing customer and market demands for engineering, procurement, and construction services in the semiconductor, electric vehicle, synthetic materials, and data center sectors. Link

USA: Caterpillar has reported a 14% increase in first quarter sales to US$13.6 billion, driven by healthy growth in its resource, construction and energy/transport divisions. Sales at the construction division were up 12% year on year, led by a 28% rise in North America, +60% in Latin America and +18% in EAME. Lower demand in China led to a 21% reduction in revenues for Asia Pacific, although there was growth in most other Asian markets. Link Falling sales in China has seen Volvo Construction Equipment report a drop of 9% in overall global sales for the first quarter of 2022 compared to Q1 2021. Link

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