constructsteel

Monthly update for the construction industry

April 2021

constructsteel update:
Fire safety and combustible materials

An academic review by researchers from Johns Hopkins University found that the use of mass timber for high rise structures requires special consideration because of the combustible nature of the material.

When timber elements are not shielded from the fire by insulative protection/encapsulation, these elements contribute to the fuel load, altering the fire dynamics by increasing the duration and intensity of the fire.

An additional consideration is that the construction phase presents a higher fire risk. Fire protection measures such as sprinklers and encapsulation may be absent in the construction phase, leaving large quantities of exposed timber at risk of an accidental fire.

Read the full report here.

Firefighters battling a large fire in multi-story construction site in Fairfax Country, Washington, D.C., 2020
Image: Technical Report, Timber HIgh Rise Buildings and Fire Safety via WTOP

Construction market trends

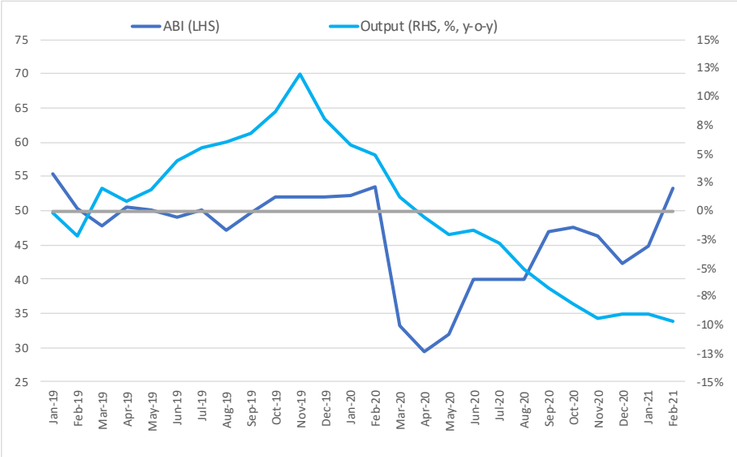
United States

Tentative signs of stabilisation in private non-residential construction. Residential construction output remains strong.

Private non-residential construction down -10% y-o-y in Feburary 2021. However, the Architectural Billings Index (ABI) reached 53.3 in February (>50, expansion) and exceeding 50 for the first time since February 2020.

Private non-residential output vs ABI

Source: McKinsey & Company



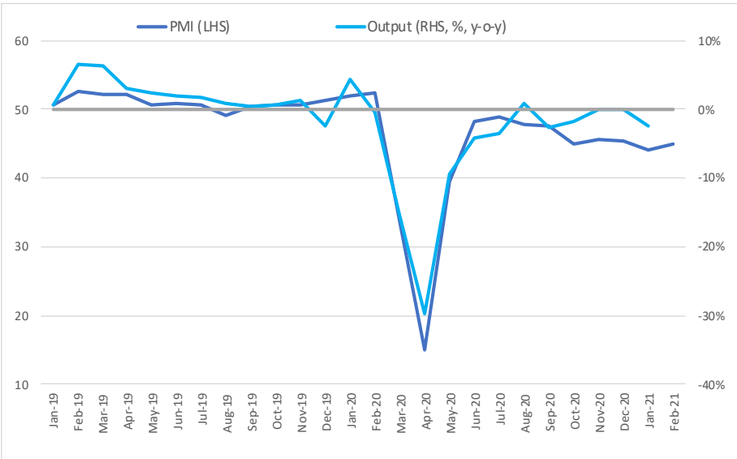
Europe

European construction sector output weak and to remain so till H1 2021

Eurozone construction output increased 1% m-o-m in January but was still down -2.3% y-o-y. The IHS Markit Eurozone Construction PMI stood at 45 in February (< 50, contraction).

Eurozone construction output vs PMI

Source: Eurostat



Knowledge partner:

McKinsey & Company

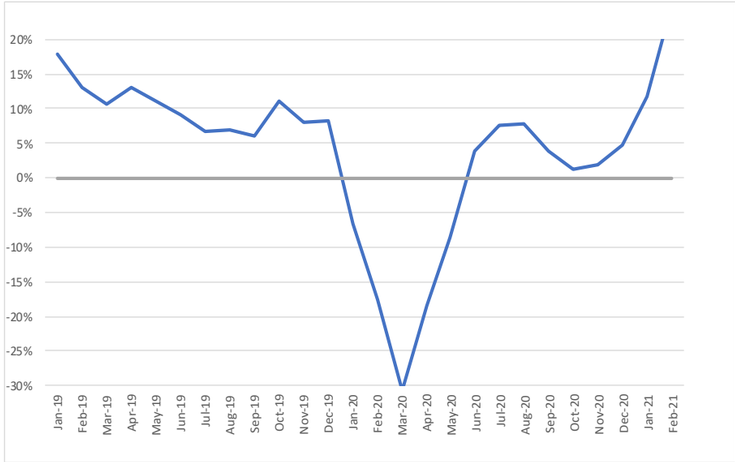
China

China's booming property sector fueled by strong credit but authorities introduce measures to slow credit growth.

The 3 month moving average y-o-y growth in newly started floor space increased 25% in February and floor space sold jumped 36%.

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

Source: McKinsey & Company



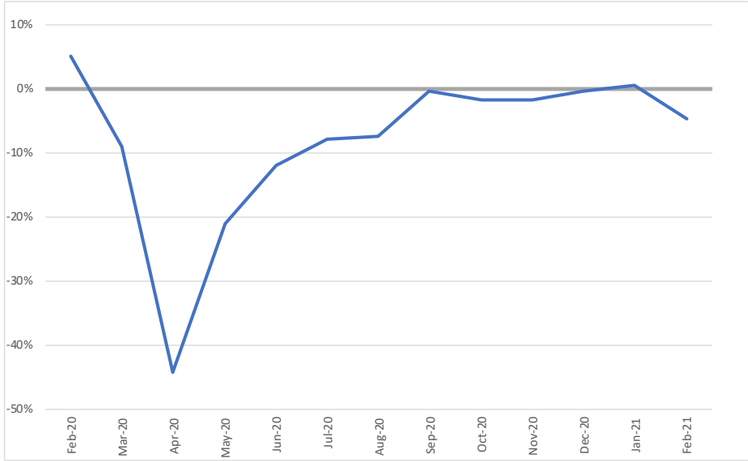
India

India's eight infrastructure sectors contracted by the sharpest rate in six months in February amid uncertainty due to the second wave of coronavirus infections

The weighted average of eight core industries output fell -4.6% y-o-y in February with contraction seen in all sub sectors of the index

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

Source: Ministry of Commerce & Industry, India



Sector Innovations:
InQuik revolutionises the future of bridge design
Steel Australia, Winter 2020

Images: Snowy Monaro Shire Parsonage Creek bridge replacement is the largest project InQuik has completed to date.

Established by Bruce Mullaney in 2015, and run by his sons Logan and Ben, InQuik's innovative system enables bridges of varying lengths to be built from modular components. These components are manufactured in the Hunter Region and Brisbane, and can then be assembled by local tradespeople trained by InQuik. Gaining rapid momentum over the last few years, InQuik is set to oversee construction of its 70th bridge, with many more projects on the horizon.

constructsteel thanks the Australian Steel Institute for providing the information on the InQuik system. This article has been reproduced in full from Steel Australia, Winter 2020.

A modular bridge construction methodology, the InQuik Bridge System was invented and developed by Bruce Mullaney, Logan Mullaney and Jim Howell in 2015.

The system is based on a standard reinforced concrete bridge methodology, which has been used around the world for more than 100 years. It is currently the most widely used bridge construction methodology in every country, especially due to advancements in pre-casting and tensioning cables.

The key idea behind the InQuik system is that a welded steel reinforcing cage is connected to a permanent steel formwork so that the construction load from the concrete is transferred to the internal reinforcing. thus, the structure is fully self-supporting and concrete can be poured on-site. This simple concept has numerous constructability and product quality advantages, and the structure has a minimum 100-year design life (achieved by using 40 mpa concrete, or 50 mpa in a b2 coastal environment), with minimal to no longterm maintenance requirements.

The maximum single span currently offered by InQuik is 18.5m. however, multi-span options are available, using the InQuik headstock to build bridges with no real limit on the total length achievable.

Revolutionising Bridge Design

As Bruce describes it, he and Jim never intentionally set out to revolutionise the engineering and construction of bridges. "My brother in-law Jim and I were developing a new fire-rated highrise housing system that used concrete suspended floors. When we looked at the drawings, we realised that the system could also be used as a bridge. And so our bridge journey began," said Bruce.

InQuik was keen to work with other local companies from the outset. According to Logan, "We looked to team up with Australian companies to get off the ground. That's one of the reasons why, in 2015, we partnered with SMEC —the originally state-owned company that built Snowy Hydro."

SMEC undertook the engineering and certification work for the system. "Our engineers analysed the concept behind the system using advanced finite element analysis programs and adjusted our designs to be compliant with the relevant national bridge codes," said Bruce.

As a result, the InQuik Bridge System was designed and certified by SMEC to comply with the requirements outlined in the Australian Standard AS 5100 Bridge Design, including SM1600 and HLP (Heavy Load Platform) 320 and 400 loadings, as required.

With design and certification finalised, the team moved onto manufacturing. Once again, InQuik looked to partner with a local company. It was not long before leading manufacturer and supplier of steel reinforcing, Australian Reinforcing Company (ARC) got involved. According to David Hardy (Regional Manager NSW, ARC), "We've been associated with InQuik right from the outset. While InQuik had the design and IP, they needed to partner with a company that could do the manufacturing for them."

It's little wonder ARC and InQuik were such a good fit: the two companies share many of the same values. Classifying itself as a 'true blue Australian company', in 1920, ARC became the first to produce steel fabricated mesh in Australia at their Sunshine site near Melbourne.

Over the years, ARC has supplied the steel built into many of Australia's most iconic structures, from the Sydney Harbour Bridge and Opera House, and the MCG and Marvel Stadium in Melbourne, through to Parliament House in Canberra.

"Today, all our steel products remain 100% Australian made with international quality assurance and in compliance with Australian Standards," said David.

Prototyping and gaining traction

The team then moved onto testing. "We tested our initial ideas by installing a demonstration bridge on our family farm," said Bruce. "This testing exercise was critical to the system's success, as we ended up completely changing the self-supporting method. We had a tight timeline for the demonstration bridge, as we had planned an opening event where state and federal politicians would cut a ribbon. It snowed while we were pouring concrete two days before the opening."

"Everyone who attended the event, including road authority engineers, highlighted that we had achieved something bigger than we realised, and this would change the future of bridge engineering. I didn't think much of it at the time, but the more I refine and develop our system, the more I can see how different the system is to conventional bridge construction, and the advantages it has to its predecessors."

The System first entered the Australian market in 2017. Since then, it has rapidly gained local market share as the product's ease of installation and structural advantages are converting customers to using it as their preferred option for new and replacement bridges.

Logan explained how quickly the System has gained traction within the market. "Our first bridge sale was part of the Snowy Hyrdo 2.0 project—that was the first commercial bridge we ever completed. It only took 12 hours to build, including pouring all the concrete. In 2017, in our first year, we built three bridges. The year after, we built eight bridges. In last 12 to 18 months, we've built over 50 bridges."

"It's really been quite humbling to see how rapidly the System has been adopted and how revolutionary the market perceives the idea," said Logan.

Increasing steel consumption

The InQuik System includes a variety of steel elements, from galvanised and zinc-alloy-coated steel, through to stainless steel and reinforcing bar. The steel consumption is approximately 70% pre-fabricated steel reinforcement, 25% coated steel product, and 5% stainless steel and ancillary steel elements.

The formwork is made from a coated steel product, which is left in lace for the life of the bridge. More conventional concrete construction uses temporary formwork, which is not typically made from steel and is reusable.

The use of permanent steel formwork increases steel consumption of the InQuik system by approximately 25% compared to conventional methods. Furthermore, in order to have sufficient steel for the structure to be selfsupporting, an additional 30% of reinforcing steel is required compared to conventional methods. Additional reinforcing is consumed for the integral InQuik bridge design and there are numerous stainless steel connectors, supports, and so on used in the concrete cover zone.

These steel elements mean the InQuik Bridge System consumes an additional 50% more steel compared to a conventional bridge of this type. Based on InQuik's forecasts, in Australia, the system is likely to consume between 20,000 and 150,000 metric tonnes of steel, each year, over the next five years.

ARC has already seen an uptick in the demand for their reinforcing solutions. As David explained, "Our input has definitely increased as the InQuik product has become more well-known. To begin with, we were manufacturing the InQuik bridges from our Newcastle facility. Now, we make the bridges at both our Newcastle and our Brisbane facilities. This has improved our capacity, and gives us a more economical reach on the northern New South Wales and Queensland coast from a transportation perspective."

"The InQuik Bridge System is a really good example of how Aussie companies can be successful when competing in the heavy manufacturing space. The InQuik System was invented, designed, engineered and manufactured, right here in Australia, using Australian steel. It demonstrates true innovation and shows that, even the most traditional materials and methods can be advanced," said David.

The InQuik advantage

The benefits afforded by the InQuik System are considerable, from faster and simpler installation, and reduced maintenance, through to improved quality control and workplace safety. The globally patented InQuik Bridge System is a steel-reinforced, concrete bridge where the concrete cover is guaranteed in the factory and the concrete is fully poured on-site. It is lightweight to install and there is no propping required. For the bridge construction, the components are simply placed in position on-site and filled with concrete. This rapid construction time means a bridge can be installed in a matter of days. The short installation time using factory-produced, pre-engineered and certified components also offers a greatly reduced construction risk.

The deck panels include a reinforcing truss in the girders, which has thick cords at the top and bottom, connected by steel webbing. As the girder is placed between supports, and it takes the construction load of the concrete, this puts the bottom cords into tension for both dead loads and live loads, and the top cords are put into compression. The truss therefore takes the entire dead load of the structure and the concrete sets and remains in a neutral state until it has a live load. As the concrete dead load is entirely supported by the steel, this means the full compressive and tensile strength of the concrete is retained for live loads, leading to better performance. This considerably reduces the concrete crack width under dead loads and live loads, which increases the overall durability and life of the bridge.

According to Logan, "The big difference is that we use pre-fabricated formwork, and the steel is broken down into modular components. Those components are then transported to site and filled with concrete while in position. Some of the big benefits afforded by this process are reduced crane usage and manual handling. The 'place and pour' methodology means that an InQuik bridge can be installed in two to three days, over a total project timeline of one to two weeks."

"Transportation is also easy. We can transport a whole bridge on one truck, reducing logistics considerably. One of our 12m units weighs about 5 tonnes. In comparison, if it was full of concrete, it would be closer to 35 tonnes."

"In addition, the InQuik System creates a much better quality of bridge because it is one single mass of concrete. A lot of pre-cast bridges are comprised of smaller elements tied together—it is not one monolithic structure. As a result, our bridges require little to no required maintenance," said Logan.

"The biggest differentiator with our system is that local, low-skilled people can construct the bridges. We've found that local councils are building our bridges with their own staff, or contracting them out to local residential builders or civil contractors," said Logan.

Global opportunities

Bridges are an integral part of society and economic growth, and will always be needed. Throughout the world, there is an enormous volume of aging infrastructure. In the United States, there are some 600,000 bridges on public roads. According to InQuik, approximately 40% of these bridges are past their original 50-year design life and roughly 10% are classed as structurally deficient. The InQuik System addresses nearly 80% of the US bridge replacement market. It is estimated that the current backlog requires an investment of US$123 billion, and would consume approximately 1.2 million metric tonnes of steel if built using the InQuik System. Similarly, in Europe, InQuik estimates that there are approximately one million road bridges, with around 50% past their design life. This means that in the coming years, some 500,000 bridges will need to be replaced or upgraded.

The InQuik Bridge System is a globally patented technology. InQuik's technology could enable governments, all across globe, to deliver largescale construction programs, with local low-skilled labour, while keeping funds in the local community, and delivering long-term infrastructure cost-effectively. The scope and scale of the international markets means that many millions of tonnes of steel could be consumed every year in supplying InQuik bridges across the world.

InQuik is also investigating how to apply their technology to other markets. "At the moment, we're focused on roadway bridges, but we also have designs for pedestrian crossings, rail crossings, as well as wharves and jetties. We're looking at expanding into multi-storey high-rise buildings and a range of other sectors," said Logan.

"We're a true family-owned Australian business. The fact that we're family owned plays a major role in how we run the business and treat our people. We're definitely not about profits before people. It's all about living the dream and enjoying the ride," said Logan.

InQuik took out the 2019 T.C. Graham Prize, which is awarded by the Association for Iron and Steel Technology (AIST) to recognise innovative applications of iron and steel. The purpose of the contest is to encourage, generate and potentially incubate ideas that may lead to the development of new markets for steel.

Bridges destroyed by New South Wales bushfires replaced 'InQuik' time

Bridges destroyed by bushfire are being replaced in record time and at a fraction of the cost by local tradies and suppliers, thanks to InQuik's world-first LEGO-like modular system. InQuik is currently helping local councils and workers to plan and construct 14 bridges in Clarence Valley, Eurobodalla, Oberon, Queanbeyan, and Shoalhaven, with more projects likely to follow.

According to Deputy Premier and Minister responsible for Disaster Recovery, John Barilaro, "Local contractors and council crews are trained up to assemble the bridges, which means councils can directly engage subbies, putting larger pay packets in their pockets with the added benefit of upskilling and delivering new business to local suppliers.

Around 80% of the bridge is concrete, which is sourced from the region where the bridge is being built while transporting the modular sections to the site creates work for freight companies, and geotechnical studies and site-specific engineering are also completed by locals where possible."

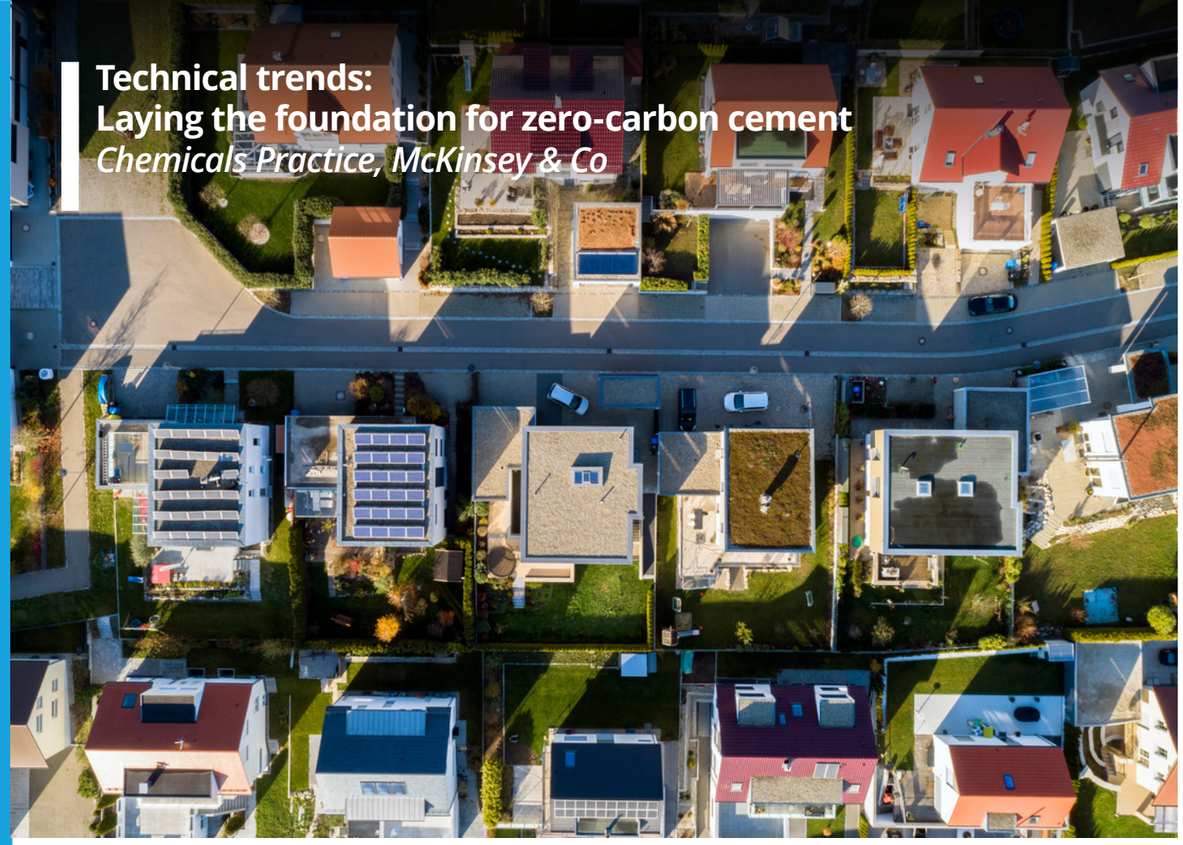
Barilaro said work to replace destroyed bridges was underway quickly, in one case within two days of an order being placed. "Work on two bridges that were on and near Armidale Road for Clarence Valley were fast-tracked thanks to Ballina and Hilltops councils, which asked InQuik to use the components already ordered for their own bridges to build the Clarence Valley bridge."


Manufacture and assembly of an InQuik Bridge System.


Manufacture and assembly of an InQuik Bridge System.


The first InQuik Bridge delivered by ARC.


One of ARC's assembly teams finishes an InQuik Bridge System.

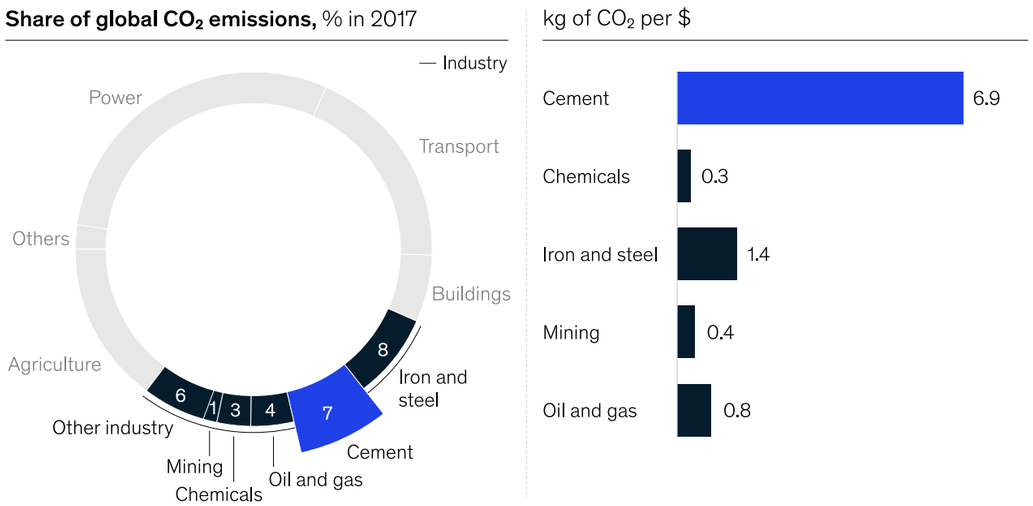


Technical trends: Laying the foundation for zero-carbon cement

Chemicals Practice, McKinsey & Co

As a key component of concrete, cement is an integral part of our everyday lives. In fact, it is the second-most consumed product globally after potable water, and it is used in almost everything we build—from houses and cityscapes to dikes and dams. At the same time, the cement industry alone is responsible for about a quarter of all industry CO_2 emissions, and it also generates the most CO_2 emissions per dollar of revenue (Exhibit 1). About two-thirds of those total emissions result from calcination, the chemical reaction that occurs when raw materials such as limestone are exposed to high temperatures.

Cement production is a major source of global CO_2 emissions and also generates the most emissions per revenue dollar.



Pressure for the cement industry to decarbonize has increased rapidly, not only from society but also investors and governments. In fact, governments are now increasingly asking for environmental impact assessments before deciding whether to commit funding. As public scrutiny of CO_2 emissions increases, the risk remains that cement players could be "shamed" similar to oil and gas or mining companies in the past.

Companies have several options to decarbonize cement. Optimistically, McKinsey analyses show that CO_2 emissions could be reduced by 75 percent by 2050 (Exhibit 2). However, only a small portion (around 20 percent) will come from operational advances, while the remainder will need to come from technological innovation and new growth horizons. Companies will also be required to develop a portfolio for a new growth horizon that leverages opportunities across the "sustainable construction" value chain.

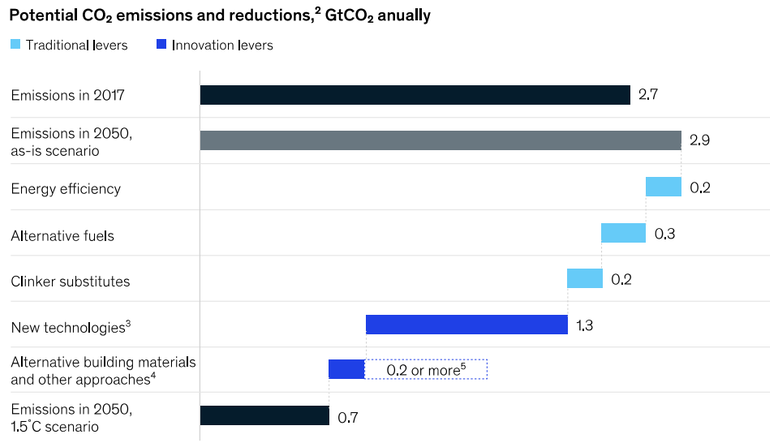
Operational advances, such as energy-efficiency measures, have already largely been implemented, and the emissions-reduction potential from alternative fuels and clinker substitution is limited by the decreasing availability of input materials. More innovative approaches, such as new technologies and alternative building materials, will therefore be indispensable to achieve carbon-reduction targets by 2050. That said, the most promising levers, in terms of emissions-reduction potential, are still in development and have only been piloted or implemented on a small scale.

As the development of technologies such as carbon capture, use, and storage (CCUS) and carbon-cured concrete could take up to ten years, investments should be made as soon as possible. McKinsey abatement cost curve (Exhibit 3) estimates the costs of several large-scale investments to reduce one ton of CO_2 (based on assumed future costs, CO_2 prices, and abatement volumes). A negative abatement cost—such as for clinker substitutes—implies a benefit to the producer rather than a reduction in cost.

Abatement costs indicate ranges, as the exact price of goods depend on regional and future availability. For example, as the steel and energy sectors step up their decarbonization efforts, the availability of clinker substitutes such as pulverized fuel ash (fly ash) and granulated slag will decrease. The same holds true for biomass, which is likely to experience rising demand from other industries.

With the abatement costs of certain levers higher than CO_2 prices, cement manufacturers are faced with a dilemma: there is pressure from the public and financial investors to abate quickly, even though there is no economic rationale to do so. Not only do the economics seem far from stellar, but the required investment needs to be directed toward cost-reduction measures for cement producers to maintain their value share in the broader construction industry. Innovation will be critical to achieving the cement industry's sustainability potential, with promising avenues already emerging. For example, one start-up uses a lower proportion of limestone in its cement, which results in fewer process and fuel emissions; this company's process also locks in additional CO_2, which is added before the concrete cures. Adding CO_2 makes the concrete stronger and reduces the amount of cement needed. Carbon-cured concrete could also use CO_2 captured during

The cement industry could cut three-quarters of its CO_2 emissions by 2050.[1]

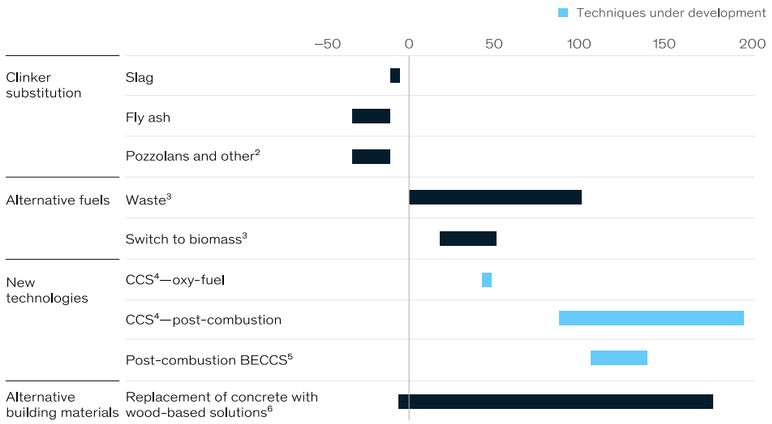


[1] Figures are global estimates for emissions potential, taking all potential levers into consideration.
[2] Effect might be smaller or larger depending on speed of shift.
[3] For example, carbon capture, use, and storage; carbon-cured concrete; 3-D printing.
[4] For example, cross-laminated timber, lean design, prefabricated/modular construction, building information modeling.
[5] Alternative building materials and other approaches will likely play an important role in decarbonizing the cement industry, but a great deal of uncertainty remains as to how much they will reduce emissions.

Source: "Getting the numbers right," Global Cement and Concrete Association, 2017, gccassociation.org; *Global Cement*, fifth edition, Freedonia Group, May 2019, freedoniagroup.com; *The Global Cement Report*, 13th edition, CemNet, cemnet.com; Umweltbundesamt (German Environment Agency); McKinsey 1.5-degree-pathway model; McKinsey Cement Demand Forecast Model

Decarbonizing cement requires large-scale investments in technologies, bringing down both fuel and process emissions.

Range of abatement cost[1] of various cement decarbonization levers, $/tCO$_2$



[1] Globally assumed cost, can vary locally.
[2] Limestone, kaoline, and other.
[3] Depending on availability, quality of material, and cost to dispose.
[4] Carbon capture and storage.
[5] Bioenergy with carbon capture and storage.
[6] Includes abatement coming from displacement from steel.

cement production. Today's methods could sequester up to 5 percent of the CO_2 produced during production, but newer technologies could sequester 25 to 30 percent. Products such as carbon-cured concrete, positioned differently, could earn a "green premium," potentially giving companies an edge among environmentally conscious buyers—and greater pricing power.

On the horizon are CCUS technologies. While frequently costly and perhaps (for now) more suitable for making higher-value products such as steel rather than cement, by 2050, they could more than halve emissions. A number of postcombustion carbon-capture pilots are underway, driven by the large cement players. Other companies are testing oxyfuel combustion, a promising but expensive technology that results in high concentrations of CO_2 in flue gas, which in turn allows for near-total carbon capture.

Ultimately, capitalizing on technology and innovation will require more investment, as well as a shift in mindset for companies that have become too comfortable with the status quo. Many cement players are not used to relying on partnerships, or to operating in the kinds of ecosystems that are second nature in other industries. With innovation timelines of five to ten years, these companies could soon find themselves playing catch-up.

Sustainability ultimately may be the catalyst that pushes the industry to seek growth via new business models, partnerships, and construction approaches. Cement-based concrete will remain the global construction material of choice, but "sustainable construction" value chains are likely to emerge on the regional and local levels, necessitating a reorientation of many corporate portfolios.

In the United Kingdom, for example, recycled material from construction and demolition waste is increasingly being used to replace aggregates in concrete. Cement makers have been slow to seize the opportunity, ceding the waste-recycling business to local construction companies. Meanwhile, in other markets, traditional cement may compete with an improved variety—energetically modified cement (EMC)—which releases less carbon and requires less energy to produce. EMC has already been used (in combination with traditional cement) for a variety of projects in Texas.

Other opportunities lie beyond cement and concrete. Alternative building materials and other approaches will likely play an important role in the decarbonization of the cement industry, though a great deal of uncertainty remains as to how much they will reduce emissions. For example, CLT is already used in a number of markets and has been buoyed by its reputation as a green material. Should roughly 10 percent of cement be replaced with CLT, carbon emissions would be reduced by up to 750 million tons each year (about 2 percent of global emissions). Additional new value pools include prefab and modular housing, which incorporate off-site production, and BIM. Greater transparency means less waste and likely a reduction in the amount of cement or concrete required. Indeed, digital technology is at once supporting the cement industry's decarbonization efforts and contributing to its growth challenges.

Companies that hope to lead the industry's decarbonization efforts must identify the best path forward, pursue the right technological advancements, and rethink their products, portfolios, and partnerships. That said, making decisions

on investments in the current asset footprint will remain a challenge. Possible solutions include building an abatement curve, establishing different scenarios, and creating a road map that allows decisions to be triggered based on the outcomes of different scenarios.

A twofold, systematic assessment of decarbonization options can provide transparency on existing levers and accelerate rollout while driving innovations in collaboration with other industries or sectors. This includes plant-specific assessments and creating heat maps and abatement curves as well as the evaluation of local ecosystem partnerships with start-ups, other value-chain players, or governmental institutions.

To understand the shifts in value pools, cement players should develop a vision of the future target portfolio and business model implications to capture the value of sustainable building solutions. The industry will remain a local business; hence, there remains the need to build this perspective micromarket by micromarket. From there, the findings should be elevated and cross-cutting opportunities, such as sustainable concrete, should be prioritized.

The success of such a strategy, however, depends on leaders' abilities to achieve an organization-wide mindset change that promotes rethinking the current way of working. Leaders should therefore consider the best ways for encouraging the entire organization in their decarbonization journey.

Construction steel news headlines

construction market and regulations

President Joe Biden provided long-awaited details for a $2 trillion infrastructure plan that touches on everything from airports to highways, clean drinking water to revamped electric grids, school construction to public transit and clean energy to bolstered broadband deployment. The plan carves out $621 billion for transportation infrastructure; $689 billion for buildings and utilities; and $500 billion for worker training, research and development and domestic manufacturing initiatives. Link

India Ratings and Research (Ind-Ra) revised its outlook for the construction sector outlook to improving in the next financial year (FY2021-22) from negative in FY21. Increased focus on infrastructure spending in the recently announced Budget for FY22 where healthcare, water, roads, and railways have seen strong allocations will result in higher order inflows to the sector. Sector revenue is expected to grow by 15 to 20 per cent year-on-year in FY22. Link

Investment in real estate in China jumped 38.3 percent year-on-year in the first two months of 2021, reaching $215.2 billion. Investments in residential was up 42 percent, accounting for 75 percent of total investments in real estate. Link In the meantime, new home prices rose 4.3 percent in February from a low base last year, after a 3.9 percent increase in January, recording the fastest increase over the last five months. An extended surge in home prices in recent months has raised concerns about speculative asset bubbles, prompting tighter regulations to close loopholes in home transactions and contain illegal fund-flows into the sector. Link

New planning rules making it easier to convert commercial premises into homes has come into force in the UK. A new fast track for extending public service buildings has also been introduced to allow for bigger extensions to existing public buildings including schools, colleges, universities, and hospitals. Unused commercial buildings can now become homes through a simpler 'prior approval' process instead of a full planning application while public buildings will be expanded more quickly through the planning system. Link

In order to tackle poor productivity in its fragmented construction industry, the government of Singapore will require companies throughout the supply chain to band together in "alliances", and to come up with joint business plans lasting at least three years showing how these alliances will raise their productivity with offsite manufacturing and digitalisation. Link

State-owned Abu Dhabi Airports Company to has decided to pull contractors' performance guarantees for the Midfield terminal building project at Abu Dhabi International airport, which highlights that the UAE's construction sector is now in a full-blown crisis. There has been a growing trend of international contractors exiting the market over the last years after sustaining financial losses, and several regional heavyweights have teetered on the brink of bankruptcy, with Dubai-listed Arabtec Holding being the most high-profile contractor to be affected recently. Link

construction materials

The US Bureau of Labor Statistics price index of materials and components for construction was up 1.4 percent in February, seasonally adjusted. The index was 8.0 percent higher than its year-earlier level, several materials, especially lumber and plywood, seeing double digit price increases for the year. Link

According to the National Association of Home Builders, the elevated price of lumber is adding approximately $24,000 to the price of a new home. Link

The construction materials shortage has not prevented UK construction returning to growth, but amid Brexit delays and ongoing shortages, self-builders, renovators and DIYers are still being warned that delays and disruption to projects are likely. The Builders Merchants Federation expects average construction materials prices to increase 5-10% this year, and the recent Federation of Master Builders State of Trade Survey showed 87% of builders had reported rising costs. Link

Saudi Aramco and the American Concrete Institute (ACI) will launch the Centre of Excellence for Non-metallic Building Materials (NEx), to develop and promote the use of non-metallic materials in the construction sector. The centre will be based at the ACI world headquarters in the United States. The centre will leverage ACI's role as an authority and resource for the development, dissemination, and adoption of consensus-based standards for concrete design, construction, and materials. Link

Worn-out wind turbine blades destined for the incinerator will instead be used to create carbon-friendly reinforced concrete on Britain's new high-speed rail network. The project will swap steel rebar, traditionally used to reinforce concrete, with sections of glass fibre reinforced polymer turbine blades that have reached the end of their operational lives generating low carbon electricity. Link

America's first 3D-printed homes-for-sale have been put on the market in Austin, Texas. They were developed by Kansas City real estate company 3Strands, designed by Logan Architecture and built using the Vulcan technology pioneered by local 3D printing specialist Icon. Link

construction sector players

French construction and concessions giant Vinci has agreed to acquire the energy business of ACS, Spain's largest contractor. Vinci will pay approximately €4.9 billion for the business, which will include most of the contracting business of ACS Industrial Services, including its current EPC projects, which are largely in the energy sector. Within the scope of the acquisition, Vinci will take over an identified potential 15GW of renewables projects, primarily in the form of solar parks and both onshore and offshore wind farms. Link

Bentley Systems has entered into an agreement with investors led by Accel-KKR to acquire 3D Modelling company Seequent for US$900 in cash plus shares. New Zealand-based Seequent is a leader in software for geological and geophysical modelling, geotechnical stability, and cloud services for geodata management, visibility, and collaboration. The company serve the world's top mining companies, geologists, hydrogeologists, geophysicists, geotechnical engineers, and civil engineers in over 100 countries. Link

Building materials giant CRH is prepared to spend big on acquisitions and return more cash to shareholders this year. Company's overall sales dipped 2% to $27.6 billion in 2019, but its profit after tax rose by 18% to $2 billion. Both Americas and Europe Materials division saw a decline in sales, while Building Products division was boosted by strong residential repair, maintenance and improvement activity in North America, offsetting lower activity levels in non-residential markets. Link

A new partnership has been formed to help decarbonise the UK's construction industry using hydrogen. Hydrogen power generation solutions firm AFC Energy and construction firm Mace Group will co-deploy zero-emission hydrogen generators to decarbonise construction sites both in and outside the UK. The aim is to get rid of the sector's reliance on polluting diesel generators. AFC Energy and Mace will commission their first AFC Energy H-Power hydrogen systems on site in early 2022. Link

Japanese electronics company Panasonic has announced plans to enter Thailand's modular construction housing market, citing the growing demand for detached properties in urban areas. Together with Thailand's Steel International, Panasonic has opened an "Experience Centre" – a two-storey model home showcasing its technology. Panasonic will start offering homes that contain inbuilt appliances, such as air purification devices, at the beginning of this fiscal year. Link

Bouygues Construction Matériel (BCM) is to install sensors on more than 20,000 pieces of equipment, in an IoT (Internet of Things) project that aims to equip the units with real-time remote management and optimisation capabilities. The platform enables the digital management of an entire fleet and can calculate performance indicators, equipment turnover and utilisation rates. Fleet managers can also inventory the equipment by technical base, worksite or number of billable days. Link

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