



Lift off

Australia Construction Market View

Summer 2022

Overview

The spectre of widespread inflation looms over the global recovery. The Australian economy has bounced back better than expected but capacity constraints and other headwinds are now of concern. How much further can prices rise?

Following a buoyant Q2 2021, and quarter-on-quarter GDP Growth of 9.6% which surpassed all expectations, Q3 brought a sharp contraction in economic activity. This was due to lockdowns associated with outbreaks of the Delta variant of COVID-19. This contraction has not derailed the economic recovery that was underway, but it has delayed it. In November the Reserve Bank of Australia forecast a rapid bounce back in demand in the December and March quarters. This remains to be seen; the latest figures will reflect the impact of increasing infections associated with the highly contagious Omicron variant.

While Federal and State governments grapple with the new threat of Omicron, and as vaccination rates increase across the country, the Australian economy continues to be relatively strong. Forecasts indicate infection rates will peak at some stage during Q1 2022. From this point, the economy is anticipated to rebound from this recent setback.

Inflation grew in September 2021, albeit by a small margin, by 3.5% compared to 0.9% the previous year – higher than expected and double the RBA's forecast from February last year. In the wider economy, inflation is being driven by increasing energy costs and a rapid increase in the cost of scarce goods. This higher inflation will spill over to energy intensive sectors such as construction. Price increases are currently in line with the RBA's target for monetary policy: to achieve an average inflation rate of 2-3%. Previously, the RBA predicted, along with a smattering of economists, inflation would fall below 2% before the end of 2021.

As of November 2021, the unemployment rate in Australia was at 4.6%, down from 5.2% the previous month. This shows a significant recovery; unemployment spiked to 7.4% at the height of the pandemic's second wave in 2020. This is great news for the economy. According to the Labour Market Information Portal, maintained

by the Australian Government, the total construction workforce equates to just over 1.1 million. The total workforce has increased by 8.5% in the five years to August 2021 and is projected to grow a further 6.8% over the next five years.

Simultaneously, Australia faces a very hot jobs market. There was a record of almost 400,000 vacancies in November 2021, an increase of 18.5% in just three months. However, many of these vacancies are concentrated in specific sectors, such as hospitality and health. Construction currently has around 30,000 vacancies, while health care has twice as many. Construction's relatively small requirement is partly due to the sector's high proportion of self-employed operatives. However, the number of vacancies across the construction industry has increased by 80% since February 2020, a considerable jump from pre-pandemic levels.



It is more worrying that this situation is expected to worsen. According to the Market Capacity Report published by Infrastructure Australia last year, there is likely to be a peak of 105,000 unfulfilled roles in construction by mid-2023, or 48% higher than projected supplier. Victoria, Queensland, and Tasmania are anticipated to experience the greatest risk of labour shortage. The report suggests these three States will require a workforce approximately twice the size of the projected supply available within their borders.

However, at this point, national unemployment is at its lowest point in more than 13 years, supported by increasing business confidence. According to National Australia Bank, which collects data around 350 companies, business confidence increased slightly towards the end of last year driven by a rise in the employment index as businesses re-hired staff alongside the recovery in activity. The Westpac Consumer Sentiment Index, updated in December 2021, decreased by 1.0% from November, while remaining comfortably in positive territory overall. According to that index, there was a clear difference in responses between the States hardest hit by the Delta outbreaks and the rest of Australia. While high vaccination rates have enabled States like New South Wales and Victoria to reopen, we will need to wait and see the impact of the Omicron variant.

Despite multiple headwinds associated with a bumpier recovery, the outlook for construction remains relatively positive. Recent data on construction output and new orders confirms the market is still going strong, driven mainly by an increase in activity within the infrastructure sector. Output in construction fell by 0.3% in the three months to September 2021, compared against a consensus forecast of a 3.1% decline. This equates to almost \$54 billion in seasonally adjusted terms. This very slight decline was largely driven by a 2.2% decrease in non-residential building work. It should be noted this reduction was on the back of significant increases in construction output between June 2020 and June 2021, equating to 2.1% and 8.9% for general building and residential work respectively.

The Performance of Construction Index (PCI) is a composite indicator providing an overall view of sector activity. The latest update indicates it declined by 0.6 points to 57.0 points in November 2021. Despite this decline, the November index increased 3.7 points since September, as reported in our Spring Market View. Although there was a decline, the latest results indicate the improvement between September and November was largely maintained, following the end of lockdowns and a return to more normal conditions. For context, a reading above 50 indicates an expansion of the sector compared to the previous month, with a reading below 50 representing a contraction. It will be interesting to see if this expansion will continue through the start of this year, particularly with the surge of case numbers brought on by Omicron.

Overall, this positive data confirms there is still strong demand. It removes some of the competitive pressure for contractors, now aware of the plethora of inflationary risks, to secure work.

Prices of some raw material inputs, such as iron ore and timber, eased during the latter part of 2021. For example, the price of iron ore at USD 93/t is 60% down from its peak in July, and back towards pre-COVID levels. However, the inflationary pressure driven by raw materials has already been replaced by energy costs. Since the end of August, we have faced unprecedented increases across the spectrum of energy sources, with natural gas, thermal coal, metallurgical coal, and oil all rising by 100%-250%. This means the inflationary trend for construction materials has some way to run. The implications are currently unknown and difficult to forecast.

Famously, the cure for high prices is high prices, as they choke off demand. And indeed, in the second half of 2021 we witnessed a rapid and remarkable lift off in costs, which is likely to continue into the first half of 2022. We may see a two-speed pattern emerging, with some sub-sectors such as private residential or industrial pressing ahead despite the headwinds. More price sensitive markets, such as rental and affordable housing, may see some projects placed on hold until markets stabilise.



In Focus: QLD, NSW, VIC

While many factors impact the construction industry nationally, each State continues to face local challenges and opportunities.

Queensland

- Costs increased significantly over the last 12 months and this trend is expected to continue. Workload has started to grow, and contractors are now busier than they were at this time last year. According to the Australian Bureau of Statistics (ABS), non-residential construction costs increase by a staggering 8.6%, beaten only by Western Australia (9.1%) and Tasmania (11.4%). This increase was driven largely by material cost rises and trade prices, as well as increases in head contractor margins and preliminary costs. Increases are likely the result of extended border closures.
- We have reported higher-than-anticipated construction costs in Queensland for some time, largely due to a shallow pool of contractors, particularly at the Tier 1 level. This has reduced competitive tension and has led to increasing costs over the last decade, exacerbated further by limited coverage at the specialist and trade contractor level. As workload increases, and unless contractors based in the southern states start to focus more on the Queensland market, construction costs are only going to go up.
- Material and labour shortages are impacting Queensland as much as other States. Skills shortages are already prevalent and will worsen as the number of projects and opportunities increases.
- The domestic housing market continues to power on, driven by a combination of stimulus, via the HomeBuilder grant, and increasing interstate migration. There is now a growing backlog of projects competing for available materials.
- The Queensland Government has launched the Best Practice Industry Conditions (BPIC), which may be applied to government procured projects. This document is a draft enterprise agreement and contains specific employment conditions and will be applied to any public sector project above a \$100M threshold. We anticipate it will increase labour costs between a further 10% and 15% over and above existing and standard Enterprise Bargaining Agreements, with a confirmed 5% increase per annum. This translates to an increase of between 10% and 15% on total construction cost when compared to non-EBA projects.
- While BPIC is being applied only to public sector projects, we have seen some developers look to source lower priced non-EBA contractors. However, contractors bound by an EBA are currently able to operate under a reduced site allowance agreement for projects below a \$50M threshold. This has been implemented to increase competitiveness.
- Another feature of the market that will impact contractors is project trust accounts. These effectively replace the Project Bank Accounts first introduced via the Building Industry Fairness (Security of Payment) Act 2017. The latest changes came into effect on 1 March 2021 and, as of January this year, can now be applied to the private and public sectors for projects valued at more than \$10M. Full implementation for all project values is expected by 1 January 2023. While these costs have yet to bed down, it is anticipated their administration will increase contractors' preliminaries and overheads. Developers are advised to investigate their obligations under this scheme, as it could impact project cash flows.

New South Wales

- Like Queensland and Victoria, material availability, shortages, and rising costs are impacting construction projects – regardless of sector. Labour shortages, which started during lockdown in the middle of last year, persist. As a result, the employment market is becoming more competitive. Project managers, site managers, estimators, quantity surveyors, and commercial managers are in high demand. This growing demand is increasing wages costs significantly and there are signs this is now impacting contractors' preliminaries and overheads.
- According to the ABS, non-residential construction prices increased by 2.9% annually to the September quarter. It is becoming increasingly clear contractors are now no longer able, or willing, to absorb increasing labour and material costs. These costs are now being passed on to clients.
- Despite these headwinds, margins are still relatively tight, with builders trying to fill their order books for this year and beyond. However, we have seen signs of contractors now becoming more selective on which projects to tender across some sectors. Timing, the number of bidders, risk allocation, and overall project attractiveness are factors now being considered.
- As reported in our Spring View late last year, the recently negotiated New South Wales Enterprise Bargaining Agreements will increase labour costs by at least 10% over the next two years. Therefore, developers should ensure these increases are factored into their business cases as early as possible.

Victoria

- 2021 was another year of turmoil and uncertainty for Victoria, with regular and lengthy lockdowns an ongoing feature.
- However, the outlook for the construction industry is increasingly positive. Delayed projects are now coming back online and new projects and opportunities are starting to emerge.
- Although delayed, some 'shovel ready' and stimulus-badged projects are moving into their construction cycles. There is now a lack of major projects over the course of the next 12-18 months. The contractors and supply chain members that traditionally service this end of market will likely become more competitive as we move through 2022 and these players look to secure more work to offset the shortfall.
- The ABS has reported non-residential construction costs increased by only 2% during the last year – one of the lowest recorded of all States (The ACT was the lowest, at 1.2% over the same period).
- As per other States, material and commodity supply issues are becoming more prevalent. Reduced supply and ongoing issues with availability are increasing material costs. There are signs this is now impacting construction costs. Broadly, contractors are increasingly unable to absorb material price increases. However, increased competition in the Tier 1 and upper-Tier 2 space may alleviate this risk.

- Domestic and residential construction continues to soar across the State, with the ABS reporting an annual increase of 6% in house construction pricing. The backlog facing the domestic market alone will continue to drive demand and competition for construction materials.
- Government stimulus within the residential sector, coupled with increased activity within the infrastructure sector, continues to drive labour demand. As noted previously, labour and skills shortages are likely to become the defining challenge of this decade, if negative migration continues and as major projects steadily increase.



Our Forecast

The third quarter of 2021 saw the high volume of delivered output and strong new orders continue. At the same time, inflationary pressures multiplied, leading to another upgrade to our forecast.

Introduction

The inflationary landscape that emerged during spring and early summer shows no signs of fading, triggering another upgrade to our forecast. While pressures related to raw materials costs have eased, they have been replaced by rising energy prices. Despite these headwinds, business confidence is still in place and demand remains strong. Output is increasing and getting closer to pre-COVID levels. The performance differs between sub-sectors, with some projects more exposed to materials-driven inflation. Others, like logistics, continue to run hot despite price increases. Unfortunately, this means many clients remain exposed to inflationary risk. It is difficult to predict when the inflationary cycle will peak. We need to brace for further price increases if demand is in place and input costs continue growing.

Flying high

Recent data on output and new orders confirms construction will return to pre-COVID levels sometime during 2022. Since March 2021, monthly output has not dropped below \$17.5 billion, consistent with 2019 activity levels. In fact, in the June 2021 quarter, construction output recorded an average of \$18 billion per month. The last time we exceeded this was in the March 2019 quarter.

While infrastructure has not yet reached pre-pandemic levels, 2021 output increased by approximately \$2 billion when compared with 2019 and 2020. The recovery is generally being driven by sectors less sensitive to inflation. For example, private housing continues to boom despite high exposure to record timber prices. Commonwealth Bank data indicating a 7% annual increase in house prices will more than cover additional build costs. Similarly, the industrial and logistics sector is flourishing, with new orders already higher than the annual average of the last five years. This shows clients who can pass on increased costs, or have a strong business case, are continuing to invest.

This appetite is reflected in our internal survey, in which 70% of the respondents reported an increase in instructions from clients, and healthy order books for both main and specialist contractors. Further demand will follow with the latest rounds of investment in civil infrastructure and health projects.

By contrast, the situation in the commercial sector is mixed. Commercial offices, tourism, and retail continue to be the most impacted by the pandemic with construction activity in these sectors significantly lower than long-term averages. However, there has been strong growth in approval levels throughout 2021. Approvals for non-residential buildings between January and November 2021 were 13.4% higher than for the same period in 2020, and 9.5% higher than the same period in 2019. Approval levels for non-residential construction are now significantly higher than pre-pandemic levels.

The picture is not even across all sectors. As highlighted in the Overview, some sectors are more price sensitive and have put some projects on hold. Although a concerning development, it is not yet widespread enough to have a material impact on demand.



No signs of headwinds easing

During most of 2021, both the wider economy and the construction sector have experienced accelerating inflation. As described in the Overview, energy has become the main driver of a second wave of inflation for a wider range of construction materials. Products such as bricks, glass, cement, and concrete are now among the most exposed, due to the energy intensity of their manufacturing processes (for details, see our 'Zoom into' section). Furthermore, increases in energy prices will translate into higher plant and transport costs.

Plant and logistics continue to be an issue. There are no signs of a resolution of either the ongoing container crisis or driver shortages, a relatively recent development due to increased Omicron cases. Furthermore, the base cost of diesel itself has increased by around 30% compared to pre-pandemic prices. Overtime. It is hoped the use of an electric and hydrogen powered fleet will become widespread. Our Spotlight section sheds light on these issues.

Labour cost developments are a mixed picture too. Average Australia wages have recorded a 2.2% annual increase. Interestingly, the construction industry is slightly ahead of this trend, at 2.6% (ABS). This data suggests, due to the reduction in migrant workers in recent years, labour is likely to be an ongoing inflationary factor. The strong likelihood of increased construction activity across numerous sectors will add to this

inflationary pressure. However, while ABS data suggests labour markets are still relatively stable, there is a growing recognition of shortages across specific trades. According to National Australia Bank, tradespeople now account for 35% of labour shortages across the country. The most sought-after tradespeople are plumbers, electricians, labourers, and wet tradespeople such as brick layers and plasterers.

As market conditions improve, contractors are likely to try and improve margins after a tough few years. However, with input price rises and many projects facing viability challenges, this won't occur in all sectors. Clients need to be aware there is less pressure to absorb cost increases within the supply chain, resulting in much less predictable tender returns on many projects.

Upgraded price forecast

At the time of preparing this forecast, there is insufficient data to evaluate the possible impact of the Omicron COVID strain, so it is excluded from the considerations described below. However, the escalation of already known and emerging inflationary pressures has triggered a further revision of our forecast. In some instances, this revision has been significant, based upon emerging trends. The situation is uncertain not only across the sub-sectors, but also regions, so we have applied a range of values to our 2022 - 2023 predictions.

The reasons for this uncertainty are two-fold. Firstly, the impact of inflation across different building types is quite marked due to materials inflation exposure. Secondly, the degree of inflation being passed on to the clients can vary significantly between projects, sectors, and contractors. Market feedback highlights not all sectors are booming. Where clients remain price sensitive, projects are being delayed and turnover put at risk. Price levels reflect this reality.

We saw much stronger evidence of inflation pass-through in the third quarter of 2021. There was a lag between disruption in material supply chains at the start of the year and the emergence of high bid inflation, particularly in the building sector. Most inflation in 2021 occurred during the second half of the year and we expect this trend to continue into the first half of 2022, until some of the annual materials and logistics inflation can be removed from the calculation.

However, as tender price inflation lags input prices, increases will continue throughout the year.

The difficult year to predict is 2023. From 2024 onwards, our inflation outlook is driven by increasing labour costs resulting from an accelerating skills shortage. The skills shortage is already a problem, but we think that this will intensify as the regular flow of skilled migrants has been cut-off due to international border closures and restrictions. For 2023, there is no scenario for material and energy costs to continue at their current rate, so a big inflationary driver will fall away. The rate of growth in some sectors is also forecast to ease during 2022 and 2023. Our expectation is inflation will revert in building sectors to the long-term trend, in line with the RBA's expectations, before entering a new, labour-driven price cycle. This forecast relies on sustained demand and current signs are positive. But in today's uncertain world, little can be taken for granted.



The Arcadis Forecast



Inflationary Factors

- Increases in the cost of construction materials across a wider range of products.
- Increasing energy costs – at least in the short term.
- Increasing labour costs due to shortages.
- Strong order books and eased pressures on winning new work.
- Contractors less able, or less willing, to price risk and implementing higher risk premiums.
- Contractors aiming to improve margins.
- Logistics costs.
- General awareness of highly inflationary circumstances.

Deflationary Factors

- Australian dollar still strong against the US dollar.
- Contractors willing to secure workload beyond 2022 and willing to absorb some cost increases.

The Arcadis Forecast

Arcadis Buildings Tender Price Forecast

	Adelaide	Brisbane	Canberra	Darwin	Melbourne	Perth	Sydney
2021	3.1%	8.1%	1.8%	4.7%	2.0%	15.2%	10.1%
2022	2.0%-3.0%	4.0%-5.0%	2.0% - 3.0%	3.0% - 5.0%	3.0% - 4.0%	5.0% - 7.0%	4.0% - 5.0%
2023	1.5%-2.5%	4.0%-5.0%	2.0% - 3.0%	3.0% - 5.0%	4.0% - 5.0%	3.5% - 4.5%	4.0% - 5.0%
2024	2.0%	3.5%	2.0%	3.5%	5.0%	3.5%	4.5%
2025	1.5%	4.0%	2.0%	3.0%	5.0%	3.0%	4.0%
Total	10.1%-12.1%	23.6%-25.6%	9.8%-11.8%	17.2%-21.2%	19.0-21.0%	30.2%-33.2%	26.6%-28.6%

Arcadis Infrastructure Tender Price Forecast

	Queensland	Victoria	New South Wales
2021	5.0%	4.5%	5.0%
2022	5.0%	6.0%	6.0%
2023	6.0%	6.5%	6.5%
2024	6.5%	6.5%	6.5%
2025	6.5%	6.5%	6.0%
Total	29.0%	30.0%	30.0%

Zoom into:

The impact of energy prices on the cost of construction materials



Increased energy costs are adding to pressures faced by the wider economy and the construction sector. Is this a short-term glitch or are we facing the rise of new long-term inflationary factors?

Recent developments within the energy market

Unprecedented cost increases in raw materials, especially timber, iron ore and copper observed since the beginning of 2021, have led to elevated inflation levels. While this trend has begun to ease, the inflationary cycle is far from over. Now, the spotlight has moved from raw materials to energy as the main inflation driver. In particular, the cost of coal and gas have been increasing since the end of August. Prices have doubled compared to pre-COVID levels. Construction products are energy

intensive, and this development is going to have a much wider impact than the raw materials boom that mostly affected metals and timber. Below, we describe energy's role in construction and the likely impacts of the ongoing energy crisis.

The role of energy in the construction materials supply chain

The manufacture of many construction materials is energy intensive. For example, the energy required to produce a tonne of stainless steel is equal to that needed to travel by Tesla from Sydney to Coffs Harbour - and back - 80 times. The energy required for a tonne of aluminium could get you even further.

Energy used in manufacturing construction materials comes from various sources. Electricity – including from renewable sources – is one of them. However, for materials such as steel or cement, more than half of the energy used in production comes from

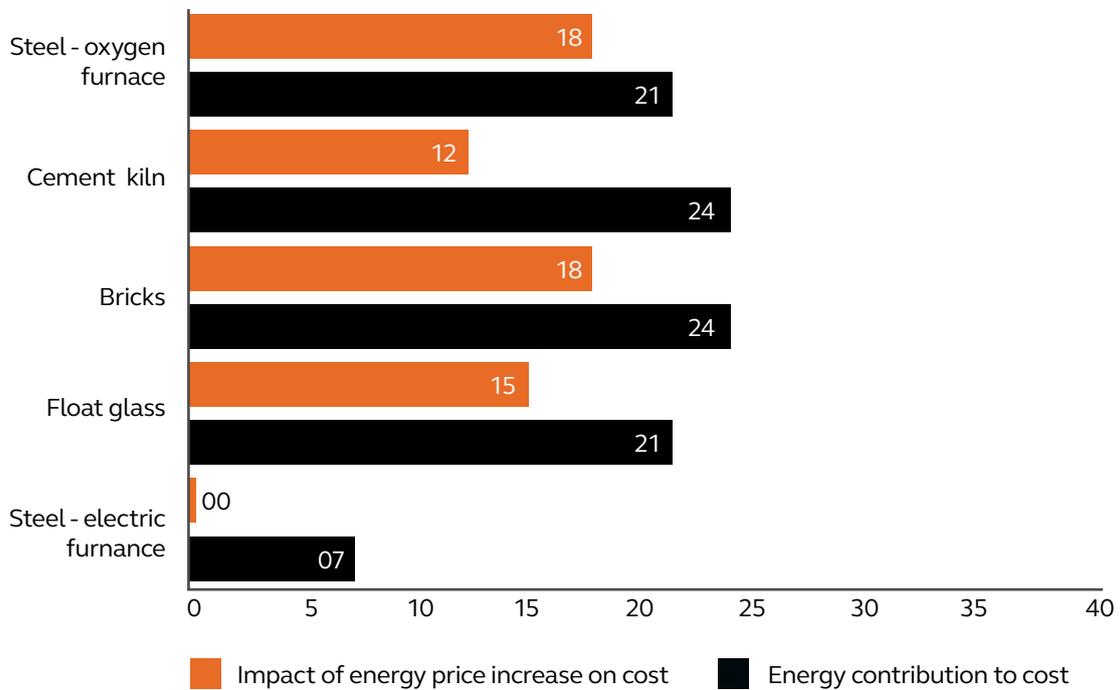
coal – either metallurgical or thermal. Natural gas, on the other hand, is mainly used in the production of bricks and roof tiles. High energy demand translates into approximately 25% of the manufacturing cost of construction materials.

A high exposure to coal, gas and electricity makes the construction materials sector vulnerable to prolonged energy price increases. For example, although iron ore prices have recently fallen by almost 50% compared to recent peak values, the price of steel has stayed high due to high coke costs.

In Figure 1 we illustrate how recent price increases impact costs for some of the most energy intense materials. The chart shows energy costs account for up to 38% of the total costs associated with some energy-intensive manufacturing, such as blast furnace steel and cement. With the energy mix for different processes increasing by around 12-20%, clearly the impact of higher energy costs will be significant. So, what are the factors driving this situation and the likely outlook?



Figure 1: The contribution of energy costs to construction materials prices and impact of recent energy price increases (quantified as % increase on product price)



What is driving the energy crisis?

In common with raw materials, multiple triggers have caused price increases. Recent developments in the gas market illustrate how different factors combine. Gas consumption continues to rise, with a reported increase of 4% between 2019 and 2020. China and other countries in Southeast Asia are also importing more gas following a decision to step up decarbonisation efforts by closing coal-fired generation. Limited supply of Liquefied Natural Gas (LNG) from the US, and a squeeze in Europe on supplies from Russia and North Africa, have further disrupted the global balance of trade. As such, competition for imported LNG is fierce, with tankers being redirected to the highest bidder. On the flip side, Australia is less exposed to these global factors due to our ability to produce and store natural gas. However, most of the natural gas produced here is exported overseas. Australia is expected to reclaim its title as the world's biggest exporter after shipments hit a record high in 2021.

The price trajectory

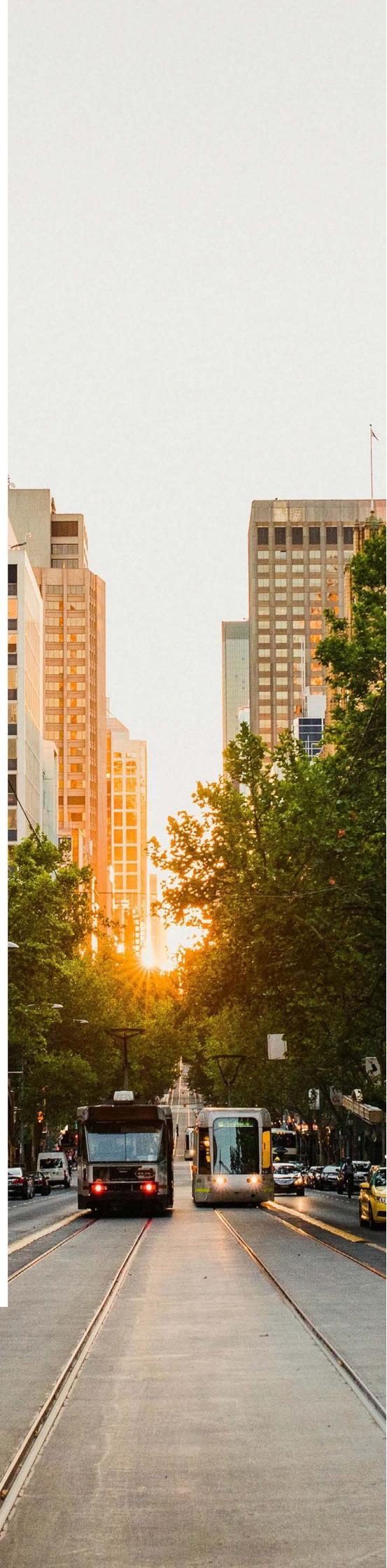
The price of power supplied to the industrial sector is not subject to regulation. To manage volatility risk, forward purchase and price hedging mechanisms are used by large energy users. Normally these allow manufacturers to even-out price fluctuations. However, in the current situation, price deals are likely to postpone, rather than eliminate, cost increases. In addition, the materials sector and manufacturers have continued to pass on price rises to the customer. Clearly such price increases are unsustainable, so when will energy prices come back to pre-COVID levels?

There is no simple answer. Neither the International Monetary Fund (IMF) nor the World Bank saw the crisis coming, but they think that the end is in sight. The IMF expects natural gas prices to stabilise by the end of Q2 2022 at a level 50% higher than in Q1 2019. According to the World Bank, price increases will slow to only 2% in 2022, falling sharply in 2023 because of increases in supply.

What are the likely impacts on construction?

The price of a basket of construction materials, according to our latest data and research, has increased by approximately 12% in the past 12 months. So far, this has been driven by a surge in costs of steel products (+24%) and primary metal manufacturing (+29%). The latter is not likely to decrease any time soon, partly because of higher energy costs. Additionally, the price of new categories of materials including cement, bricks, and plasterboard will increase. Price rises of 10-20% will likely come into effect in the first half of this year, meaning clients and the construction supply chain will have to endure another year of price uncertainty.

The exposure of construction materials manufacturers to fluctuations in the price of coal, electricity and gas isn't going away. Indeed, the energy transition may result in higher costs of gas and electricity as more generators move away from coal. However, as the share of renewable electricity grows, prices should stabilise and fall, so long as the wind blows. Further developments in energy markets, including the shift of energy transition levies from electricity to gas, will mean energy costs and material prices remain unpredictable.



Spotlight on:

Removing carbon from construction sites

Post COP26 we must act urgently to ‘keep 1.5 alive’. Construction needs to address some big challenges in the coming years. But there are also quick wins that can already make a huge difference – for example reducing carbon on construction sites.

Construction has a big role to play in the quest for a carbon neutral world. According to the International Energy Agency, construction materials and site operations contribute 10% of global emissions. And while a big part of that is attributable to construction materials, a third is a result of transport and operations on site.

The biggest contributor to emissions from construction sites is energy consumption; the industry relies heavily on diesel-fuelled heavy plant and temporary power on sites where more permanent energy infrastructure is not in place. Industry leaders need to take carbon reduction seriously and there are growing signs many companies are now focusing on reducing on-site emissions. It remains to be seen whether this will stay at the top of the agenda. The Construction Leadership Council in the UK has recommended nine ConstructZero Priorities. The first three relate to transportation:

- Accelerating the shift of the construction workforce to zero emission vehicles and onsite plant.
- Optimising the use of Modern Methods of Construction and improved on-site logistics to reduce waste and transport to sites.
- Championing developments and infrastructure investments that enable both connectivity with low carbon transport modes and design to incorporate readiness for zero emission vehicles.

In light of these priorities, we have provided recommendations on how construction companies can lower the carbon footprint of on-site activities:

- 1. Reduce the idle and stand-by time of equipment** - reducing the time when equipment is switched on but not in use will cut energy use and carbon emissions. The use of telematics by Costain in the UK illustrates how this can be accomplished with real time data gathering and monitoring. Interestingly though, according to a report by the Climate Neutral Group, maximising the productive use of plant over an extended lifetime also has a positive impact on total carbon footprint, as it helps to spread the embodied carbon impact of the machinery.
- 2. Switch to electric equipment** – subject to access to site power and preferably on a 100% renewable tariff, this is the most efficient replacement for fossil fuels. But one needs to bear in mind the availability of electric machinery can be limited. One company dedicated to changing this is Wacker Neuson, based in Germany, which produces excavators, wheel loaders and battery-powered rammers.
- 3. Educate plant operators** – operators have a key role in managing carbon emissions on site associated with both standard and low-emissions equipment. A more ‘eco’ approach to plant and machinery operation will help reduce emissions and, in so doing, can provide some cost savings on fuel / energy consumption.
- 4. Plan for the adoption of hydrogen** – heavy and highly utilised construction plant is difficult to electrify and is likely to be one of the first industrial fleets to migrate to hydrogen. Recent announcement by construction equipment specialist JCB to launch its first hydrogen powered plant in 2022 and to purchase green hydrogen highlights this is no longer a pipedream. Before imported green hydrogen is available on a large scale though, operators may find themselves competing against bus operators for Australia’s available supply of industrially produced hydrogen.
- 5. Optimising of logistics and a shift towards electric fleet** - while heavy equipment on-site is the main consumer of fuels and energy, the contribution from transporting machinery, materials and people to site is also significant. Increasing the load factor, selecting the right size truck and van, and limiting distances travelled through local sourcing of labour, machinery and materials can help limit their carbon footprint. Replacing fossil fuel run vehicles with electric already cuts emissions and, over time, HGVs are likely to start benefitting from the switch to hydrogen fuel cells.

These interventions are first steps towards reducing emissions on construction sites. They align with key priorities established by the Clean Energy Finance Corporation in collaboration with the Green Building Council of Australia and the Infrastructure Sustainability Council. They will also have a wider social impact, paving the way not only for carbon footprint reduction but also for healthier surroundings, with less air and noise pollution.

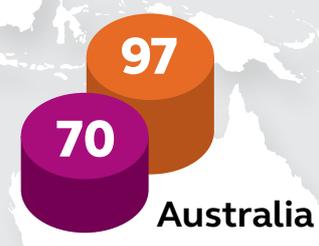
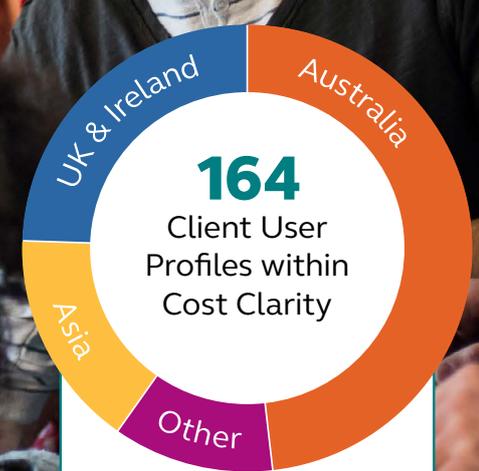


Cost Clarity

An Arcadis Service

Cost Clarity is our response to the many challenges that are now facing the construction industry. Developed by Arcadis cost management specialists, Cost Clarity is an online application designed to improve and maximize our client's experience by:

- Giving you instantaneous access to your project cost data enabling faster decision making.
- Challenging and improving project performance by generating advanced analytics and insights.
- Providing you with an elevated understanding of the cost of your decisions.





Arcadis

Our world is under threat - from climate change and rising sea levels to rapid urbanisation and pressure on natural resource. We're here to answer these challenges at Arcadis, whether it's clean water in Sao Paolo or flood defences in New York; rail systems in Doha or community homes in Nepal. We're a team of 27,000 and each of us is playing a part.

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