



New Horizons

International Construction Costs 2023

Foreword

Our 2023 International Construction Costs Report, entitled ‘New Horizons’, looks back at another highly disruptive year across global construction markets. The high construction price inflation that we first reported in 2021 broke out across most parts of the global economy in 2022. Even as domestic inflation hit double figures, construction price rises accelerated further, prompted by a unique combination of strong demand, supply chain disruption, tight labor markets and soaring energy costs.

Construction markets had mixed fortunes in an unsettling year of stop-start development. Whilst overall volumes of work shrank by around 5% in the US and Canada, Australia and China benefited from a post-Covid bounce-back. In Europe, differences in fortunes were even more stark, with France, Belgium and the UK continuing to grow whilst previous high-fliers Germany and Ireland lost momentum.

The stop-start theme is an important one, because it points to widely based, contrarian trends that affect our markets. 2022 saw the likely end to an era of cheap money as interest rates were hiked around the world to tackle inflation. Such a move will have profound effects on demand for private sector construction, anticipated by a slump in real estate investment last year. At the same time, capital is pouring into giant energy transition and infrastructure programmes, soaking up available resources and creating new pinch points in specialist trades. Not even sky-high inflation will stop these government-supported programs, meaning that other clients are being crowded-out – unable to make timely investments in response to market signals.

One area where timely investment is critical is in the longevity of existing building stock in the face of the twin challenges of low-carbon performance and climate change resilience. The green premium for accredited low carbon buildings will get wider and wider. Property owners have no choice but to invest to protect asset value. High construction prices and rising interest rates are a big barrier to action, but ‘do nothing’ isn’t an option when regulations, investment standards and customer expectations are all ratcheting

upwards. These barriers need to be addressed head-on, and in this year’s International Construction Costs Report, we have chosen to focus on pragmatic steps that clients can take in any market to invest in the longevity of their building portfolio. Our five-point plan sets out a comprehensive approach to the repositioning of existing assets for long-term performance.

Even as markets stabilize in 2023, the challenges won’t go away. Prices will stay at a high level. Skills and resources will remain in short supply. Clients that understand and act on their own priorities and the ability of the market to respond will deliver highly successful investment programs in line with market expectations. This report provides the insights needed to anticipate market conditions and latest thinking on asset optimization, equipping clients to ensure that investments in new and existing assets are delivered successfully, whatever the temperature of the market.



Kathleen Abbott
Global Sales Director, Places, Arcadis



The Arcadis International Construction Costs Index 2023

A look back at 2022

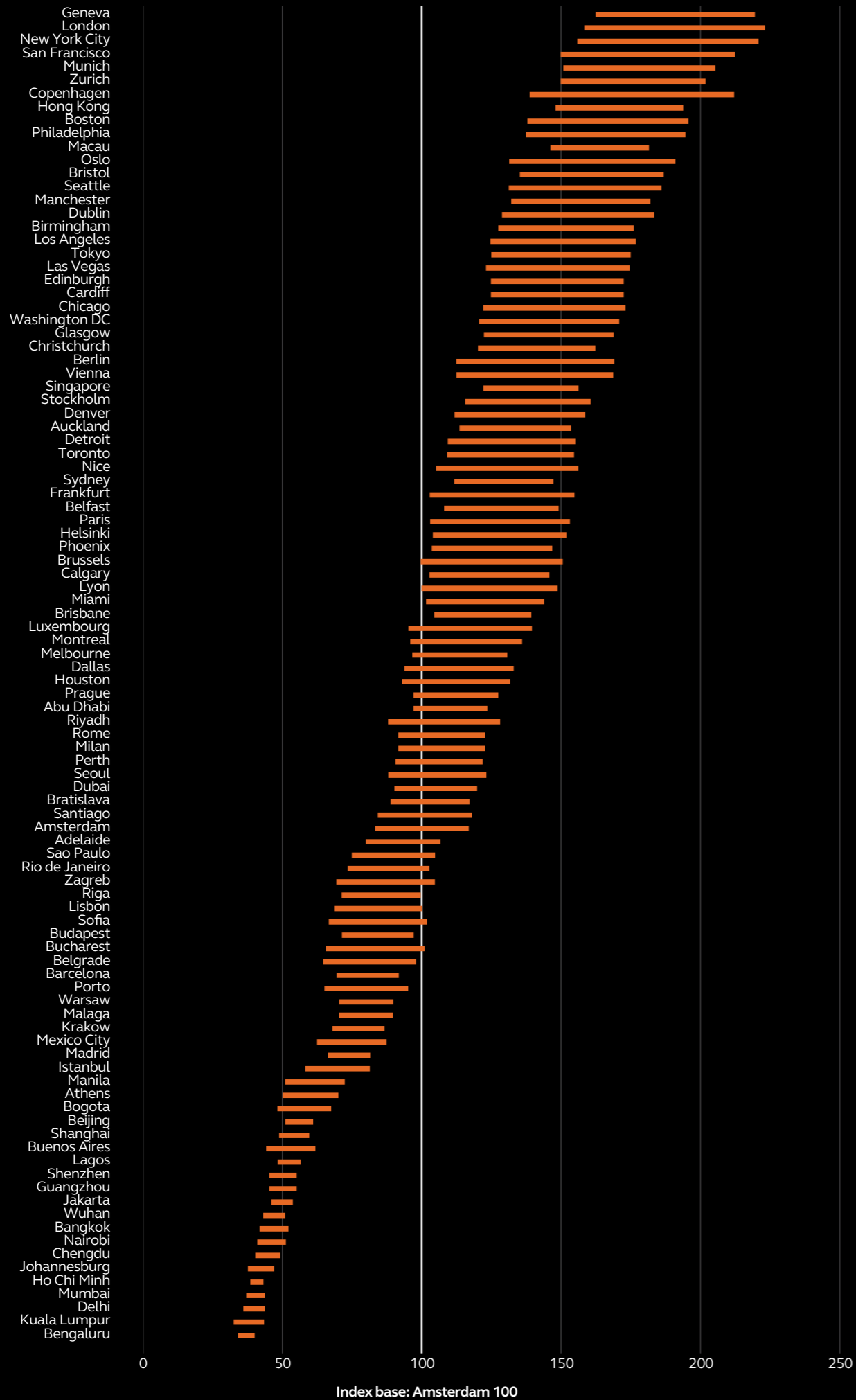
Inflationary spikes prevailed throughout 2022, even as a V-shaped recovery in Europe and North America petered out. The prospects for a sustainable recovery proved short-lived as supply chains continued to buckle under the strain of high demand, and as interest rates soared. The client challenge in 2021 was deliverability – assembling the team and the supply chain to deliver a project. During 2022 the challenge expanded to include viability, particularly as the cost of finance increased by 400 basis points or more.



By 4th quarter 2022, annualized GDP growth rates in most markets covered by the ICC had slowed to a crawl. Only the US, Australia, Denmark and the Netherlands showed much life, with the Eurozone contracting at an annualized rate of -0.1%. Prospects for 2023 are uncertain. Forecasters hope for a soft-landing in Europe and North America, but that might be difficult to engineer. Nevertheless, the International Monetary Fund (IMF) projects growth of 2.8% for 2023, with 5%+ expansion in China, India and South East Asia compensating for much weaker prospects in North America and the Eurozone.

It is by no means certain that Central Banks will be able to trace a path to low inflation by the end of the year. Whilst structural inflation associated with energy costs will drop out, core inflation has proven to be much more deeply rooted. The prospect of higher interest rates for longer will continue to weigh down on investment in the commercial and residential sectors.

International Construction Costs Index 2023



ICC 2023: Update on the index

For 2023, we have expanded coverage in Eastern Europe and Western Africa. Our commentary on Canadian markets is supplemented with insight from colleagues from Arcadis IBI.

Geneva tops the ICC index this year, closely followed by London. Most of the top 10 cities remain unchanged with perennial European construction cost hot spots, Copenhagen and Zurich, high in the rankings. Munich has moved up to 5th place, highlighting not only the impact of a second year of punishing price increases in Germany, but also the large premium associated with building in the city – costs are 25% higher than Berlin for example. Five of the top-10 are cities with dollar denominated or dollar pegged currencies, including Hong Kong. Boston and Philadelphia are new entrants. Their inclusion is mostly due to local inflation, although dollar appreciation during 2022 certainly helped. According to currency comparison model The Economist Big Mac Index, the Euro and US Dollar are broadly trading on a par, so the ICC ranking is a good reflection of current cost differentials.



One notable move in the 2023 ICC index is our baseline location, Amsterdam. As highlighted in our Country and City commentaries, the Netherlands construction sector has faced multiple headwinds during 2023, including an economic slowdown and permitting delays. Our data for Amsterdam shows that even though input costs were rising, contractors were discounting their bids to secure work. Overall, prices rose by only 1-2%, and as a result, Amsterdam fell 11 places from 51 to 62 in the rankings. This is an important point as we look forward to 2023, as we expect to see similar cost absorption in many markets as demand softens.

Inflation drivers – global trends and the impact of the Ukraine War

Looking at the wider index, and for the second year in succession, high levels of inflation affected most cities in the survey. Fewer than 10 cities recorded zero or negative inflation, all located in South East and East Asia. Cities in Australia and New Zealand previously affected by extended lock-down saw prices rise as they experienced their version of a V-shaped recovery. By contrast, China's extended lockdown means that a price bounceback in many Asian markets is not likely to take hold until 2023.

The sector-specific inflation we highlighted in 2021 proved to be an early warning of the much more broadly based price pressures seen last year. With double-digit consumer price inflation in many markets, construction clients were inevitably going to be exposed to further price escalation. Some price pressures did subside, with the prices of metal commodities falling by 25% between January and October 2022, and timber markets returning to normal.

The invasion of Ukraine inevitably had a specific effect on costs in European markets, over and above the worldwide increase in energy costs. Our assessment is that the combination of disruption to local manufacturing supply chains and regional-specific energy markets added 5-6% to inflation in European markets during the year. Construction was particularly exposed to the European energy crisis due to the energy intensity of manufacturing processes for materials including steel, cement, glass, brick and block. At the peak of the energy crisis in August 2022, Arcadis modeling of manufacturing input costs suggested that energy accounted for 50% of the manufacturing cost of cement and glass.

Colleagues across Europe have highlighted the steps taken by clients and their teams to ensure that budgets were met and that projects could proceed. Lessons learned during 2022 could be usefully applied across other markets in times of high inflation, for example in Ireland, where a new Inflation Co-operation Framework was added to the Public Works Contract. For the record, mitigations adopted included:

- Early purchase of materials
- Changes to the project scope
- Renegotiation of prices
- Inclusion of price revision clauses in contracts, including formula-based calculations
- Focused use of prime cost-based procurement on elements exposed to high inflation
- Use of provisional sums to enable delayed procurement of later packages.



Premium costs of net zero carbon

Our commentary on inflation in the ICC is mostly focused on background price increases that affect projects, irrespective of design and specification. The cost data behind the ICC rankings also accounts for changes to specification. With further changes to building codes and specification standards associated with the pathway to net-zero carbon buildings, we are seeing further evidence of the cost implications of low carbon design.

The Nearly Zero Energy Building (NZEB) standard has applied to EU markets since 2020, requiring improvements to thermal performance and some low-carbon energy sources. More recently in 2022, the UK launched an interim step to a fully net-zero specification for residential and non-residential buildings. Revised costs allow for a like-for-like comparison with previous standards, providing an early insight into the cost implications of low carbon design standards that will have to be adopted more widely.

In the UK this year for example, the budgets for public sector buildings including schools and hospitals were increased by 10% to allow for upgraded specifications. The cost uplift associated with the interim version of the UK's Future Home Standard are lower, typically in the range of 5-7%. Commercial buildings, also now specified to an upgraded standard, have seen costs increase by

7-10%. The increases seen in the UK are broadly compatible with changes seen to the costs of projects in the EU at the introduction of the NZEB.

Interestingly, although projects in Scandinavia have historically been associated with some of the highest cost levels in the ICC, we have not seen a cost premium associated with low carbon design. Specification standards in these markets are already very high, so the final steps to a net zero building can be taken with little additional cost implication.



Kayleigh Owen
Head of Cost and Commercial Management, Arcadis

Deep Dive:

New World Order - the impact of higher finance costs

The implosion of Silicon Valley Bank (SVB) in March 2023 was a brutal reminder of the risk that the effects of higher finance costs could spread far beyond the direct impact of increased costs of borrowing. Silicon Valley Bank collapsed after the falling book value of its long-dated bond investments created a liability mismatch, which triggered a run on deposits. SVB clients withdrew \$48 billion in one day, highlighting how digital systems can amplify some of the effects of contagion.

February 2023 saw base rates in the US and UK increase to a 15-year highpoint. Although they may be near their peak, the days of rock bottom rates are over. The market is normalizing, and expectations reported by CCLA and Bloomberg are for UK rates to still be above 3% by the end of 2026.

Demand for housing will inevitably be hard hit by affordability issues triggered by higher mortgage rates. However, the impact could spread much further. Evidence of the broader effect of the interest rate cycle is plain to see. Property related shares fell significantly during 2022, and as we write in March 2023, the UK's FTSE 350 Real Estate Index and the Dow Jones US Real Estate Index are both 30% below price levels seen in December 2021. Given the hefty discount to asset value, some developers are choosing to pay off expensive debt with sales proceeds rather than taking forward new development.



Some sectors are much more resilient. Multi-family rental housing development for example continues to benefit in many markets from high levels of demand and a shortage of supply. Other sectors which benefit from structural growth, including data centres and last-mile logistics, or energy transition, including gigafactories, have a momentum that won't be slow, even in the face of higher finance costs.

Existing commercial property is doubly exposed. Not only have finance costs increased by 400 basis points or more, but income streams and asset values are reduced by a higher discount rate, cutting for example, the present-day value of the benefits that can result from energy-saving low carbon investments. Lower asset values could trigger further risks associated with loan-to-value covenants and funding gaps. According to Bloomberg, the global stock of distressed debt in Real Estate totals nearly \$150 billion. Owners of office towers in midtown Manhattan are reportedly 'handing back the keys' to their lenders rather than wait for asset values to recover.

However, from distress comes opportunity. We anticipate that a shake-out of markets for existing city-centre stock will prompt fresh thinking about the reimagining of existing assets that benefit from excellent locations, with value-add and opportunistic funds leading the way. This is a huge challenge for existing investors, and new ideas and new investment will be needed to reposition what otherwise might become stranded assets. As we highlight in the next section on 'Taking the Long View', owners have many opportunities and levers to enhance the resilience of their properties. However, if proactive steps are not taken, then risks of a further deterioration in asset value will grow.

Investors in long-lived assets have to take a long-term view. Required adjustments to higher finance costs will be painful but the effects will eventually unwind, and ultimately owners and investors will benefit once again from improvements in investment value aligned to the quality and longevity of their asset portfolios.

Taking the long view – investing to protect property value for a net zero future

2022 was a very challenging year for developers and owners of investment property. This was one of the overwhelming messages that we took from our 2023 ICC surveys. Investors and owners have faced challenges from all angles, not only the higher construction costs that the ICC is focused on, but also increased finance costs, reduced numbers of transactions and, most significant of all, depressed asset values. Whilst rents for new Grade A assets in prime locations have held up, the outlook for returns from older stock has deteriorated.

Investors and owners need to respond to these challenges. However, property is a cyclical business and traditionally, in difficult times, the lowest cost and perceived lowest risk option has often been the do-nothing approach. An alternative, perhaps only for a more opportunistic, risk-seeking developer, is to invest in anticipation of market recovery. Looking back at the Great Financial Crisis (GFC) of 2008 to 2012, some of the best returns were delivered by properties that were launched early into markets that had been starved of new space requirements and box-fresh assets. These developments also benefited from access to new sources of investment capital from private equity, sovereign wealth, and other sources such as the giant property exchange traded funds established by asset managers such as Blackrock.



Protecting the value and future returns from existing assets

One difference between now and the GFC is that any hiatus in investment and letting is also likely to have a cost related to the climate change and carbon reduction agenda. Strong demand for the most sustainable buildings in prime locations underscores a tectonic shift in markets in favor of modern, green stock. As this stock becomes more common, what we currently describe as the 'green premium' is on track to become the baseline rent. When this happens, markets will have crossed an obsolescence horizon. Market support for returns and values from poorly located and under-invested assets will fall away and momentum behind a brown discount will accelerate. Little wonder that the green premium for prime assets, or the brown discount for tired buildings, has widened to between 25% and 35% in markets as diverse as London, Paris and Sydney according to latest data from RCA/MSCI.

As property markets evolve, Environment, Social and Governance (ESG) expectations and reporting standards are also getting tougher, such as the EU's updated Sustainable Financial Disclosure Regulation (SFDR) and the EU's Investment Taxonomy, which are having a direct impact on portfolio selection and performance reporting. New Nationally Determined Contributions (NDC) associated with the Paris Accord and COP 27 ambitions mean that more regulatory net-zero deadlines are in the pipeline, which means that leading-edge standards that are currently seen in the EU are likely to be applied to a wider range of markets, including the US.

Delaying investment to improve asset performance might be acceptable given current market conditions but taking the eye off the ball with respect to changing client and ESG expectations is a risk too far. Holders of investment property need to stay engaged with the market, focused on changing occupier needs, even as they wait out the current turmoil.

This is why it is so important to actively maintain the long view – looking through the current cycle - taking the steps that are needed to protect and ultimately enhance returns for today, and asset value for the long-term.



Insights from the Great Financial Crisis – getting on the front foot

We expect the 2023 slowdown to be short-lived, with many markets like the UK and US avoiding recession. By contrast, the GFC lasted over five years. Despite the big differences, there are some valuable lessons to take from the GFC for investors and owners who are faced with many challenges, not only with respect to the actions needed to maintain progress on projects, but also lessons about making sure that specification is fully aligned to occupier needs, and that projects are deliverable. These apply as much to refurbishments and upgrades as they do to new build. These include:

- Demand for space emerges before viability metrics stack up. In 2010 the blocker was availability of finance. In 2023 the issue for owners is much more likely to be linked to the cost of retrofit and upgrade.
- The window of opportunity to deliver the best development value in a downcycle is short. Projects need to be prepared in anticipation of the opportunity.
- Downturns accelerate change, particularly specifications and user expectations. Developers need to look ahead to the new standards, not backwards to the status quo.
- Difficult markets foster difficult projects. Clients who invest time and energy in a collaborative project team will secure the better outcome. Lowest cost is not always best value.

The current development cycle has lasted over a decade and the GFC is a distant memory. However, the key lesson of being ready to act when the time is right is completely relevant to the challenges faced by today's owners of existing assets, particularly when it comes to ensuring they remain aligned to current and future market need.

What levers to pull? Steps to increase the resilience and long-term value of investment property

The factors affecting long-term value are complex and interlinked. They vary by city, by location and by asset type. In US cities where home working has become much more entrenched since Covid-19, economic obsolescence has become a real threat to asset value, particularly in city centres. By contrast, in UK and European cities, office working is re-established, but the division between high quality and non-performing workspace, and between prime and secondary locations, has accelerated. In both situations, existing assets need investment to remain competitive, but the solutions are different.

Decisions are of course more complex when assets are held in portfolios. Investors and owners face the challenge of prioritizing expenditure against multiple criteria, having made trade-offs across asset types, geography, type of investment and the returns that are generated.

To support this complex process, we typically focus on four pillars that summarise the key variables that will help to determine the relevance of an asset and its value in the current market. The pillars naturally work together to enhance value, so a balanced application of the levers will deliver the optimum outcomes. The pillars cover long-term chronic issues, such as network capacity in the face of more acute challenges such as the weather effects of climate change. By applying the pillars using a holistic approach, decision making will be more balanced and better informed.

These variables operate at different scales ranging from national policy, through city climate and infrastructure, to the planning context of a city block and the level of the individual asset and user need.



Energy performance and decarbonisation:

Asset performance relative to current energy standards and sustainability reporting.

Planned performance and reporting targets for net zero, with implications for investment.

Planned investment, incentive, and penalty programmes.

Climate change exposure affecting assets and infrastructure:

Urban heat stress risks.

Climate-related natural perils – wildfires, flooding, storm surges.

Known plans for mitigation.

Local infrastructure resilience:

Quality and resilience of building infrastructure – networks, data and building services.

Clean energy provision, including plans for expansion across the network.

City infrastructure and network resilience, including disaster recovery planning.

Potential for asset repositioning:

Asset potential – location, design, and specification.

Planning potential – massing, change of use, planning gain.

Market potential – user and investment demand, green finance.

Creating momentum – taking first steps

Property's strength is that it is a long-life asset. Held as part of a wider portfolio, property's role is to provide portfolio diversification, predictable returns and inflation protection. Cyclical property markets also create opportunities and threats as markets ebb and flow.

In the current market, when 'do nothing' or 'wait and see' might seem to be the best option, these two characteristics – long-life and cyclical – work against investing in asset resilience. Long-life, because the durability of property can lull investors into a false sense of security, and cyclical, because owners stop investing when asset values are at risk.

However, this approach is no longer fit for purpose. The rate of obsolescence is accelerating as occupiers demand improved performance and as the range of risks increase, triggered both by climate change and consumer behavior. Who would have thought that urban heat stress was a risk to asset values in Northern European Cities before the summer of 2022? Assets need to be made resilient for a fast-moving market and that requires some targeted intervention.

There are many barriers to action, not least the fact that most buildings are occupied so delivering investment is hard work. Furthermore, as highlighted by our 2023 data, the construction supply chain is busy, and work is costly and challenging to procure. Clients will need to take a long-term view, but they also need to create momentum.



The best way to start is through **no-regret actions**. Work that will have to be done at some point, which has inherent value, but which could easily be put off. No regret actions could include simple energy efficiency improvements or carbon-emission reductions associated with energy sourcing. It could be a plan that anticipates government incentives and penalties for investment in low-carbon retrofits. It could involve the use of simple digital tools to improve the understanding of how users behave, and how a building could be adapted to improve their experience.

Existing assets will ultimately need significant investment to retain their long-term relevance and value. Given market challenges in 2023, this investment might not feel like a priority, but planning for the investment is. By investing in anticipation of their markets, developers and owners can take the first steps to protect the value of their assets against a net zero future.

Protecting property value

A five-step action plan to invest in the longevity of property portfolios

The past three years have been challenging for many property investors and owners. During times of uncertainty, the rational, least-cost and lowest-risk asset management strategy is often to do as little as possible, reducing investment until prospects improve, whilst also minimizing the chances of making costly mistakes.

But can investors afford to wait out the turmoil in 2023? Can previous experience be relied upon? Are markets moving faster than before in response to changes in product standards, regulation, risk exposure and client expectation? Has the time-bound requirement for low-carbon retrofit in many markets changed the investment model?

Our view is that risks affecting the underlying longevity of an asset, or a portfolio are becoming more complex and more significant. This is a product of the pace of change and the approaching obsolescence horizon driven by net-zero requirements. Fortunately, these risks are also actionable.

To guide these actions, we have developed this guide to prompt developers and owners to think about the full range of issues influencing the value and longevity of their property assets.

We have identified five key prompts to help clients interrogate their current approach to asset management. These prompts will help clients to identify whether they are considering and acting on all relevant issues that affect long-term returns and asset value.



1	 Plan ahead for how regulation and governance will affect property values	<p>Map the local timeline for developments in building design regulation, financial markets and reporting standards, including known changes and likely direction of travel.</p>	<p>Identify changes that will have a material impact on leasing, refinancing or asset valuation – e.g., new carbon intensity standards for loan portfolios.</p>	<p>Build mitigation steps into the long-term renew/reinvest/disposal asset management plan.</p>
2	 Identify and quantify the full range of risk exposures affecting your property portfolio	<p>Screen across a wider range of risk types and timescales – e.g., climate change, health and well-being, and business risks. Consider risks to 2050 and beyond to account for long-term asset value implications.</p>	<p>Size the big risks – even if they are far in the future. Use the 80:20 rule to focus effort. Identify the mitigation steps that could be taken now with little impact.</p>	<p>Identify no-regret actions that can be taken as a part of planned investment programs to improve risk resilience – e.g., energy efficiency measures to reduce sky-high running costs.</p>
3	 Track and adapt to changes in user demand	<p>Anticipate and follow market trends. Invest in understanding how tenant and user expectations are evolving. Build closer relationships with occupiers using flexible leasing models and opportunities for collaboration.</p>	<p>Use digital technologies to enhance the connection with your occupiers and investors – from BIM and digital twins to apps and virtual environments, use adaptable digital solutions to increase the attractiveness, flexibility, and value of your assets.</p>	<p>Understand how your buildings are used. Develop building intelligence capability including predictive analytics to track and anticipate building performance and user behaviors in real time.</p>
4	 Identify repositioning opportunities	<p>Maximize the value of the location and the site. How will the location develop in the future? Could a change of use enhance value? Can the potential of a site be enhanced through a new approach?</p>	<p>Exploit the strengths of the existing asset – identify opportunities to reuse and extend the existing fabric. Maximize reuse of the fabric to minimize embodied carbon.</p>	<p>Exploit the power of digital modeling to understand all the opportunities over the asset lifecycle. Model the implications of new proposals for future adaptability.</p>
5	 Build and measure a benefits case	<p>Develop a dashboard of asset performance metrics that support the business case for investment. Combine specification benchmarks and in-use KPIs.</p>	<p>Measure the wider social and environmental value of the asset in its current and future uses. Align to the targets of partners including users and funders.</p>	<p>Acknowledge the value of longevity by highlighting enhancements to asset resilience.</p>

Construction around the world



Europe

The Netherlands

GDP in the Netherlands grew by 4.3% overall in 2022, boosted by a strong rebound from lockdown in the first half of the year. Forecasts suggest that this will slow to just 0.4% growth in 2023. Consumer price inflation peaked at 11.6% in September 2022 but is predicted to fall to 4.9% in 2023 and 4.0% in 2024.

Growth of the construction sector has lagged the wider economy since early 2021. Output in real terms fell from 3rd quarter 2022 onwards as a result of project delays and de-scoping. As a result, construction prices rose by 1-2% in 2022, one of the lowest figures in the sample. Amsterdam fell from 51st to 62nd in the ICC rankings this year. Low inflation in the Netherlands resulted from contractor discounting of around 6% in competitive bids. Structural cost inflation increased by 7.5% overall, with labor costs rising by around 4% and materials by around 10%.

Affordability is still very much an issue and many clients have secured competitive bids by allowing for inflation risk transfer, often calculated using BDB indices.

Although deflation has helped to keep construction costs down during 2022, the introduction of net zero targets in 2021 has resulted in specification upgrades, with construction costs up between 4% and 11% depending on building type and size.

The outlook for 2023 is downbeat, with a cooling housebuilding sector. Statistics Netherlands (CBS) reported that in Q3 2022, the number of new build property transactions fell by over a third year-on-year. This was the largest decline since the measurement of transactions began in 2015.

Other headwinds include continued issues around nitrogen emissions, high building material prices, a shortage of development land, and local authority staffing issues impacting the processing of building permit applications. However, construction companies still have well-stocked order books, and the high energy prices have accelerated building activity for energy-efficiency improvements.



“Insight into the costs and cost developments, proactive steering and fair settlement are essential to keep construction projects affordable and feasible. This applies to both the client and the contractor or the installer.”

Maarten in 't Veld, The Netherlands

France

GDP in France increased by 2.6% in 2022, down from the 6.8% growth recorded during the 2021 rebound. Latest projections from the International Monetary Fund (IMF) have French GDP growth stalling at 0.7% in 2023, recovering to 1.6% in 2024.

Construction firms approached 2022 with optimism, with a high level of planned activity in the first half of the year. Total output eventually increased by 2-3%. The Ukraine war led to increasing difficulties in obtaining credit, triggering construction cost inflation to rise to an all-time high of more than 8% in the first three quarters of the year, according to the National Institute of Statistics and Economic Studies in France. This was experienced on Arcadis projects, with the data center segment for instance seeing significant price increases for specific equipment such as generators and transformers.

Looking forward, PMI data published in February 2023 showed that France's construction sector remained stuck in a downturn at the start of 2023, held back by the housing sector falling at “a considerable pace”. Housing looks set for a tough 2023, as the number of building permits issued declines.

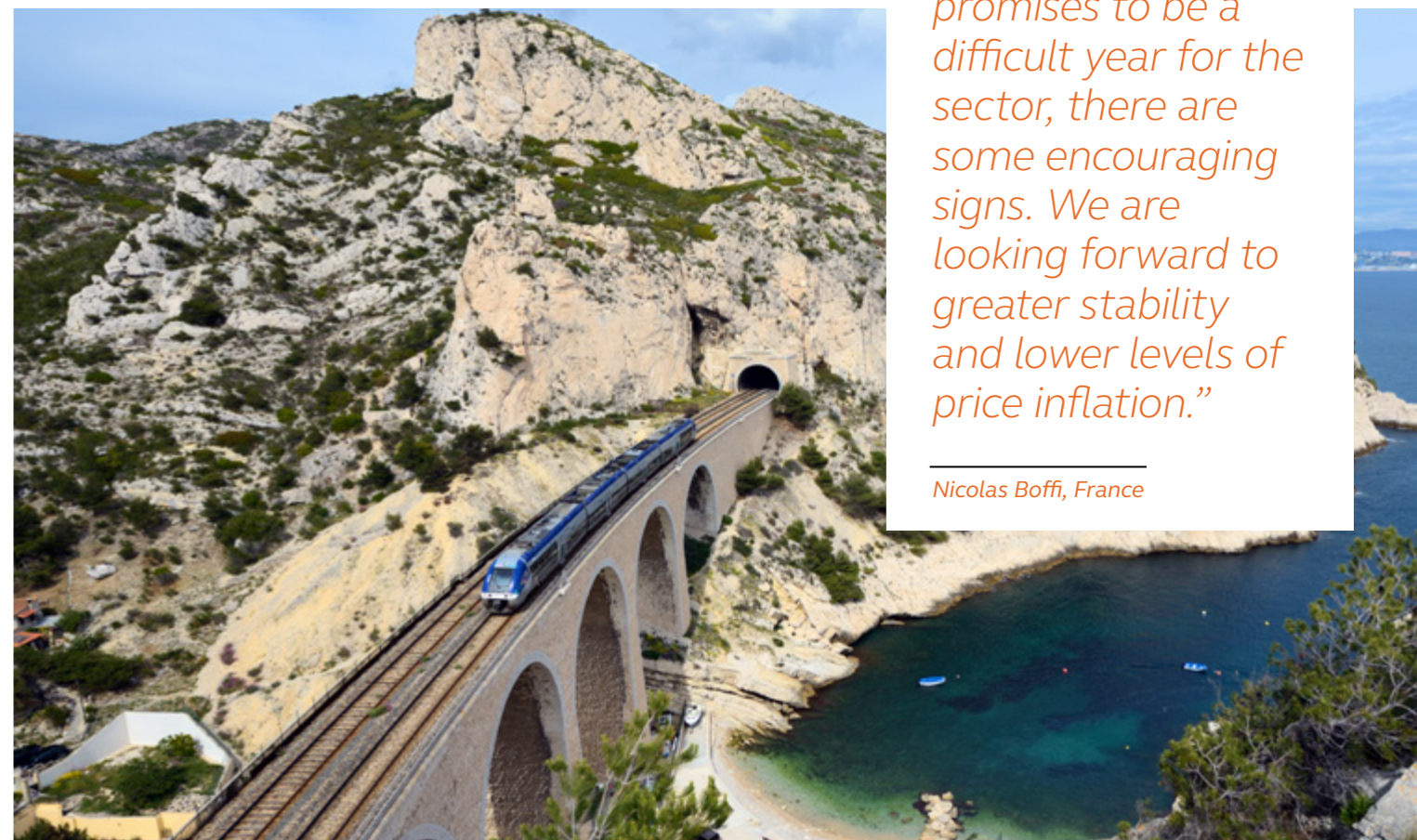
By contrast, some commercial sub-sectors will be more buoyant and offer better prospects for well-placed contractors. Demand for data centers is still strong, for instance, while the Paris 2024 Olympics continues to boost demand in the leisure and hospitality segment.

Looking further ahead, infrastructure will help to sustain long-term workload. High-speed rail projects remain high on the agenda. Projects in planning include the €19.4bn modernization of the Marseille - Nice line, along with the €26bn greenfield Turin-Lyon project. Elsewhere, work on the €42.6bn Grand Paris Express is well underway. It is due to be fully operational by 2035, adding more than 200km of track and 68 new stations to the existing network.



“2021 and 2022 were extraordinary years marked firstly by the Covid-19 pandemic and then disrupted by the shock of the Ukraine War. Our experience is that the French construction market has been flexible enough to adapt quickly to the changes. While 2023 promises to be a difficult year for the sector, there are some encouraging signs. We are looking forward to greater stability and lower levels of price inflation.”

Nicolas Boffi, France



Belgium

GDP year-on-year growth in Belgium was 3.1% in 2022. The rate of growth slowed in the second half of the year due to high inflation, which reached 10.3%.

For 2023, headline inflation is forecast to fall to below 4% by the end of the year, with GDP growth slowing to just 0.8% in the year, before rising to 1.6% by Q4 2024.

2022 was a tough year for the construction sector in Belgium, with high materials inflation leading to many discussions about project affordability. Growth was around 2% in real terms. Looking forward, there is evidence that clients are becoming more cautious regarding future project development. In the public sector, reduced estimates of social and economic benefits result in weaker business cases. With project bids often coming in at prices that are significantly higher than original estimates, political and public support for certain developments is eroding.

The European Investment Bank (EIB) recently loaned the Brussels Capital Region €475m to encourage greater use of public transport. Some of the money will be used to upgrade 63km of tram and metro track. Elsewhere, work is underway to develop a 150ha industrial estate in northeast Belgium. Road and utility upgrades are planned for the North-C Circular site to encourage companies specialising in 'circular systems' to locate there.



“For 2023, inflation continues to create uncertainty. To remain within budget, many planned project developments either require a major value engineering process, or an accelerated start date to minimize inflation impacts.”

Ann van Melkebeek, Belgium



Germany

Latest estimates suggest the German economy grew by just 1.8% in 2022, below the Euro area average of 3.5%. The German economy has stalled since Covid-19. Projections from the International Monetary Fund (IMF) for 2023 indicate negative growth of -0.1% against a Euro area average of +0.8%.

Germany saw some of the highest construction inflation in Europe in 2022, which in turn has led to some projects being put on hold, particularly in the schools, commercial and residential sectors. Overall, output fell by 2-3% during the year. A study by the Ifo Institute in Munich found 16.7% of German construction companies had suffered cancellations of building projects in November 2022, up from a rate that is typically only 1-2%. Meanwhile new home building orders in Germany fell by 14% year-on-year in October.

The February 2023 Construction PMI survey showed that demand for building work was still held back by high prices and a tight lending market. There was some good news, however. The survey highlighted that input costs increased at the slowest rate since November 2020, with the rate of inflation falling below its long-run average since 1999.

The outlook for 2023 sees opportunities in the German construction market being driven by large infrastructure projects for power distribution, rail and road projects. Large industrial projects such as gigafactories in Kaiserslautern and Magdeburg, and data centers in Frankfurt will also support demand.

Looking forward, the 2021-2026 National Recovery and Resilience Plan (NRRP) allocated €2.5bn for energy efficient upgrade measures, including for 40,000 homes by 2026. Progress is also being made on the €86bn investment plan to 2030 to upgrade Germany's rail infrastructure. A key focus is on the upgrade of 40 highly congested sections of the national railway to create a high-performance network. Work on lines between Frankfurt and Mannheim, and Hamburg and Berlin will begin soon.



It is important to ensure that key components of a project are pre-ordered to ensure price rises and time schedule effects are kept to a minimum. We are also seeing a much wider application of circular economy principles to determine if materials can be re-used.

Poul Syrratt, Germany





Ireland

GDP grew by 12% in 2022, reflecting Ireland's thriving multinational economy. Industrial output increased by a remarkable 23%. However, the rate of growth tailed off by year end, increasing by just 0.3% in the 4th quarter. Growth for 2023 is forecast to be 4.9%, still well above the EU average.

Total construction output reached €32bn in 2022, but saw a rapid slowdown in the second half of the year, with output in the 4th quarter down in volume terms by 11% year-on-year. There are signs of improvement however, and a recent market report highlights contractor confidence at an 11 month high in January 2023, with 85% of builders expecting better conditions in the coming year.

Inflation was inevitably a problem, and wholesale prices for construction products increased by 16.2% in 2022, according to the Central Statistics Office. Although material prices are likely to remain challenging in 2023, the February 2023 Construction PMI report showed that the rate of input cost inflation eased to a two-year low in January 2023, while program pressures fell to the lowest level since the start of 2020.

Following the introduction of the mandatory "Nearly Zero Energy Building" (NZEB) standard, the construction and renovation of greener buildings has gone mainstream. The standard aims for a 60% improvement in energy performance of non-domestic buildings and introduces a mandatory requirement of at least 20% primary energy use from a renewable source.

Looking forward, capital investment in housing is forecast to increase by €100 million to €3.5 billion in 2023, with €2.3 billion allocated for new build housing. There is a housing deficit of 250,000 homes in Ireland, with Taoiseach Leo Varadkar recently suggesting that 40,000 homes a year will need to be built to reduce the deficit. Further momentum in transport infrastructure should be expected, following progress in 2022 on projects such as Dublin Metrolink and the DART+ heavy rail programme. The hotels sector is forecast to perform well in 2023, with Dublin alone seeing the addition of 3,000 keys by 2024.

"Ireland has made impressive strides in developing its economy and raising living standards. This progress has allowed it to weather the Covid-19 pandemic and cope effectively with the repercussions from the conflict in Ukraine. However, price pressures and global factors will lead to an uncertain 2023."

Fintan Kenny, Ireland

United Kingdom

UK GDP grew by 4.1% in 2022, outperforming many eurozone and G7 economies. The impact of the Ukraine conflict and the resulting increases in food and energy costs saw the Consumer Price Index (CPI) peak at 11.1% in the 4th quarter of 2022. Interest rates increased from 0.1% to reach a 15-year high of 4.25% by Q1 2023. Having avoided recession at the end of 2022, the UK economy is forecast to contract by 0.5% in 2023.

Construction inflation peaked at around 10-12% in 2022. With the building sector expected to slow down the most, inflation for buildings is expected to fall to 2-3%, whilst price increases in infrastructure will be higher at 6-7%.

Meanwhile, the UK's construction markets continued to be resilient throughout 2022. The sector delivered record output, despite the various headwinds, which also included material price inflation reaching 30% in the middle of the year. Growth was driven by the housing, industrial and infrastructure sectors, with key projects like High Speed 2 and Hinkley Point Nuclear Power Station reaching peak workload. The construction sector's new work pipeline continued to be boosted right until the end of the year, with new orders in the 4th quarter 2022 down by only 1.8% and well above the long-term trend.

However, output is forecast to contract by 4.6% in 2023 according to the Construction Products Association (CPA), driven by a sharp fall in house building as changes in government policy, investor sentiment and affordability issues take hold. This will be the first contraction since 2012, aside from the Covid year of 2020.

Although materials price inflation is now on track to fall to 6% by mid-2023, labor scarcity will continue to be a problem, with industry forecasts indicating a requirement for an additional 225,000 workers by 2027. Continuing improvements in productivity will play an important role in reducing labor market pressure over the forecast period.



"The UK construction sector remained remarkably resilient despite a series of headwinds in 2022. While a slowdown has long been expected, it is still yet to materialize. Despite a recent improvement in sentiment, the market fundamentals for a slowdown are still there and the coming year will be challenging for many in the sector."

Ross Baylis, United Kingdom

Spain

Spain recorded GDP growth of 5.5% in 2022, according to the National Statistics Institute. Banco Espana forecast that this will slow to growth of 1.3% in 2023, increasing to 2.7% in 2024. This will be higher than the eurozone average, boosted by a positive contribution from tourism and further roll-out of Next Generation EU (NGEU) funds.

The Spanish construction market is estimated to have grown by 3.8% in 2022 despite significantly high inflation for key construction materials, including concrete, steel and plastic pipe. The buildings sector fell by 2% but this contraction was more than compensated by an expansion of the infrastructure sector. Mitigation of inflation took place through the re-evaluation of projects and the bulk procurement of materials was often the order of the day. Typical overall inflation peaked at 8-10% in 2022 and we anticipate that it will fall back to 3-5% in 2023.

During 2022, clients were particularly concerned about increased financing costs and extended lead-in times – particularly for data centers – as well as the impact of regular price increases on fixed price contracts. Improved relations between clients and manufacturers have helped to mitigate some of these issues, together with the introduction of fluctuation-based mechanisms in some instances.

The Spanish government's budget for 2023 includes nearly €17bn of investments in housing, transport and water projects. There is growing appetite for Build to Rent housing, with some investors spreading their strategies to focus on the secondary cities of Spain rather than the crowded markets of Madrid and Barcelona.



“For 2023, data centers, life sciences, health and logistics will continue to take the lead in terms of key growth segments, building on momentum from last year. However, a shortage of skilled workforce will remain prominent and could impact delivery.”

Emilio Garcia, Spain



Poland

Poland saw strong GDP growth of 4.9% in 2022, although consensus estimates suggest it will slow to around 1% in 2023. CPI inflation is thought to have peaked at 18.4% in February 2023 and is forecast to fall to around 10% by the end of this year.

In the construction sector inflation averaged 16% in 2022, with some materials and products – such as steel, insulation and HVAC equipment – seeing average rises nearer 25%. While price uncertainty caused some projects to be put on hold, especially in the residential sector, most proceeded after investors and contractors worked collaboratively, often using value engineering techniques to keep prices down. This included group purchasing of materials and building equipment, plus risk sharing clauses in contracts.

The result saw Polish construction output grow by 6.7% in 2022. That trend has continued into 2023 with February seeing a year-on-year increase of 6.6%, driven by a strong rise in civil engineering, where the effects of finalizing infrastructure projects in the last year of the current EU funding settlement is making an impact.

Net zero building standards are increasingly important, with developers and institutional investors keen to introduce measures such as PV installation and heat pumps to meet their ESG credentials, despite a potential increase in construction costs as a result.

The Polish government is offering tax incentives and speeding up project approvals to encourage manufacturing and logistics investors. Mercedes has plans to invest €1 billion in Poland to build the first electric-only van plant in Jawor. Elsewhere, infrastructure will be boosted by the Centralny Port Komunikacyjny (CPK) airport transfer hub on a 3,000-ha site between Warsaw and Łódź, which will integrate air, rail and road transport.



“It is hoped that construction cost stabilization and inflation reduction in the coming year will boost the Polish construction market across all sectors. Sustainable construction will be high on the agenda as clients seek to reduce the environmental impacts of their projects, while the increased use of prefabrication of building products should improve productivity levels and help to overcome a constrained construction workforce.”

Dominik Dąbrowski, Poland



Asia Pacific

Australia

According to the Australian Bureau of Statistics, the value of total construction work done in the Australian market in 2022 was A\$247.1 at current prices. This was a 10% increase on construction output in 2021 and reflects the fact that this was the Covid recovery year for Australia, which was later than many other countries to come out of lockdown.



Reduced market capacity, supply chain issues and rising inflation sharply increased the cost of building projects across the board during the last 12 months. We expect to see inflationary pressures on materials easing in the first half of this year as supply constraints have been largely resolved - although high energy cost inputs remain a challenge.

However, opportunities are increasing, and capacity is stretched, so we could start to see a second wave of inflation affecting labor and staffing costs on projects.

We anticipate that demand for net zero related investment will start to increase over the next 12-24 months, so specification changes influenced by carbon calculations will likely begin to impact costings.

The residential sector has cooled but there is growing investment in transport and social infrastructure, and this is providing most of the demand into 2023. Forecaster ACIF anticipates that overall growth in 2023 will be 2-3% in real terms.

Key projects include the Melbourne Airport Rail link and Sydney Metro Rail. Meanwhile, significant investment in energy transition across Australia will begin to make this market increasingly attractive to infrastructure players.

“A sudden influx of government committed spend of A\$10bn for health projects, combined with the A\$7bn projected investment for the 2032 Olympic and Paralympic Games will see Queensland become an overheated market with a lack of local capacity to deliver. This will likely lead to construction costs rising by between 7% and 12% as a result.”

Matthew Mackey, Australia

Mainland China

China saw annual GDP growth of 3% in 2022, a figure dented by a resurgence of Covid-19 in key cities in East China, which led to the suspension of much construction work. Activity has rebounded quickly across Greater China following the re-opening policy change from President Xi, with the International Monetary Fund (IMF) raising its forecast for the Chinese economy to grow by 5.2% in 2023.



Data from the National Bureau of Statistics (NBS) shows that the construction sector grew by 6.4% in 2022, with a large rise in spending on public infrastructure offsetting slack in the residential market.

The momentum is set to continue, with the National Development and Reform Commission (NDRC) recently approving 109 transportation, energy and water schemes, totalling CNY 1.48 trillion. Urban renovation and health projects are also expected to perform well this year, and the sector will be boosted by the recent lifting of the three ‘red line’ government restrictions that held back investment in residential development in 2021 and 2022.

China was one of the few markets where construction materials prices fell in 2022 as project starts slowed due to prolonged Covid restrictions. The country was mostly isolated from the dramatic energy price rises experienced elsewhere and benefited from lower commodity prices. Overall, construction prices fell by 2%. Construction price inflation is forecast to return in 2023, increasing by 3%.

China’s goals of ‘carbon peaking’ by 2030 and ‘carbon neutrality’ by 2060 are starting to influence the construction sector, with tighter environmental pollution controls at building material production plants and improvements in building assembly rates.

“The increase in government investment in infrastructure will drive the development of the construction industry and the ease of quarantine control is anticipated to boost market sentiment. Although real estate developments have not picked up quickly, the construction industry is expected to have a steady growth in 2023.”

Joyce Yang, China



Hong Kong

Hong Kong's real GDP shrank by 3.5% in 2022, as the total export of goods plunged amid a sharp deterioration in the external environment, coupled with the Covid shutdown in China. Domestic demand slackened, triggered first by the fifth wave of the Covid epidemic and subsequently by tightened financial conditions.

For 2023, domestic cost pressures may increase alongside an expected improvement in local economic conditions. Overall inflation could accelerate but should remain moderate in the near term. Government forecasts suggest economic growth of 3.5% to 5.5% in real terms for 2023.

The total gross value of construction works performed by main contractors in the first three quarters totalled HK\$179bn, ahead of final quarter data. This represents growth of 5.1% in nominal terms, compared to the same period in 2021.

The most recent industry forecast from the Construction Industry Council (CIC) indicates that over the next seven years, total construction expenditure in Hong Kong will keep rising steadily and may exceed HK\$300 billion per annum in the next couple of years. This represents an 28% increase on 2021 output levels, which totalled HK\$233bn in nominal terms.

Key strategic developments include the HKD100 billion Northern Metropolis and the Kau Yi Chau Artificial Islands in the Central Waters, which will provide additional land and create significant opportunities for the sector. However, the issue of having a sufficient construction workforce to meet this demand remains heightened, with Hong Kong facing a decrease in labor force due to an ageing population. The increased use of innovative technology and adoption of Modular Integrated Construction (MiC) methods, aided by a government injection of HKD1.2 billion into the Construction Innovation and Technology Fund for FY 2022/2023, should help.



“Recovery in Hong Kong is benefiting from public and housing sector stimulus, with contractors keen to tap into the expected increase in annual construction expenditure forecast by the CIC.”

Francis Au, Hong Kong



Americas

United States

The US construction market is valued at around \$1.95 trillion and accounts for about 4% of the US economy. Economic uncertainty and rising inflation through 2022 impacted the construction market, with recent figures suggesting it will have contracted about 6% during the last 12 months.

Inflation still affected the market during 2022, with prices rising by between 5-10% depending on location. Inflation in 2023 is expected to range between 4-8%, with the greatest inflationary pressure focused on fast-growing inland cities.

The latest Architectural Billings Index (ABI) from the American Institute of Architects showed firm billings declined for the fourth consecutive month in January. However, inquiries into new projects and the value of new design contracts strengthened at the start of this year, as firms reported a rise in interest in new projects.

For 2023, estimates suggest the US construction market will contract by a further 3.5% to 5%, driven mainly by a slump in residential construction. The blow will be softened by massive government stimulus in the infrastructure sector, with over US\$1.5 trillion signed off by President Biden. The investment will certainly benefit the energy, mobility and transport sectors and could bring forward many projects which were stalled following the Covid pandemic.

In Los Angeles, for instance, the LA Metro saw a decline in revenues as a result of Covid-19, which meant a re-prioritization of new projects and delays to others. Some of these will now likely move through the pipeline, together with large water/resilience projects in the region.

Despite the slowdown in housing markets, demand for infrastructure is high enough to trigger risks of delay and increased costs due to an incredibly constrained construction labor market. The Associated Builders and Contractors (ABC) industry group has suggested that the sector could be short of up to half a million workers in 2023.

“The passage of the historic Federal Government stimulus packages for infrastructure will help fund critical transportation and transit projects across the New York metro region. Capital budgets at transit agencies are the largest they’ve ever been. The Gateway (Hudson River) Tunnel may actually get built. The key challenge is having adequate capacity to deliver on this once-in-a-generation opportunity, while ensuring that these infrastructure investments are realized equitably, sustainably, and resiliently.”

Jee Mee Kim-Diaz, United States



Canada

Data from Statistics Canada is expected to show that the country recorded GDP growth of 3.8% in 2022. Moreover, Bank of Canada recently forecast growth of 1% in 2023, with inflation falling significantly in the coming 12-months, reaching its 2% target in 2024.

Skilled labor shortages, together with the increased cost of materials - particularly fuel, concrete and steel - were reported by contractors as key issues across the Canadian construction industry at the end of 2022. Construction inflation ranged from 10% to 12% in 2022, depending on location. Long lead times on certain materials look set to continue, with observers noting that lead times for power transformers have risen from ten months to nearly two years.

According to Statistics Canada, the construction industry contracted by 0.7% in November 2022 due to declines across nearly all sub-sectors. Residential recorded the largest fall - down 1.8% - representing the seventh monthly fall in the last eight months. Canada Mortgage and Housing Corporation reported that housing starts fell by more than 5% in December. Inflationary pressures will remain, however, currently forecast at 8% for 2023.

Infrastructure spending is a central tenet of the Canadian government's growth strategy, with more than C\$180bn of funding promised over the next 12 years. Projects include public transport links, energy infrastructure and improved broadband. In Ontario, C\$84.7bn has been allocated over the next ten years for the region's transit plan. In British Columbia, several mega-projects are planned or proposed, including a \$16bn Site C dam, the \$2.8bn Broadway Line and three major new hospitals.



“Whilst a slowdown was forecast in residential construction in the early part of 2023, sentiment across the wider construction market is positive for the year ahead. Growth in more sustainable infrastructure and buildings will create opportunity and the use of technology and modular construction could help ease the ongoing labor shortages in the industry.”

Mansoor Kazerouni, Canada



Methodology

The Arcadis International Construction Cost Index covers 100 cities. The index is based on a survey of construction costs which covers 20 building functions. This data is supplemented by a review of market conditions in each city combined with the professional judgement of a global network of experts.

We collect indicative cost ranges for each building function for each city. The low and high range costs for each building type are converted into US Dollars (USD). They are normalized and indexed against the cost range for equivalent buildings in Amsterdam, where Amsterdam = 100. We calculate an index range for each city comprising the low and high values for each of the 20 building types.

The data was collected in the first quarter of 2023.

Costs used to calculate the index are based on buildings delivered to local specification standards, meeting both functional requirements and quality expectations. As a result, the index compares the relative costs of delivering the same building functions in a city, it also reflects the different levels of quality expectation reflected in a specification.

Costs covered in the index exclude land, demolitions, external works and services and risk allowances. This means that major sources of variability are removed from the index. Similarly, we exclude costs of professional fees and local sales taxes.

The index does not take into account purchasing power parity. The construction cost data used in the index is current as of 1st quarter 2023. The exchange rates used to calculate the index were current on 27th January 2023.

Acknowledgements

We would like to thank the following organisations for their support in providing data for the 2023 ICC.

Bangkok - Mentabuild, hello@mentabuild.com

Kuala Lumpur - JUBM Group, info@jubm.my

Bengaluru, Mumbai and New Delhi - Arkind LS Private Limited, bd@arkindls.com

Lagos - Q Associates, Danjuma Waniko, info@qassociatesltd.com

Ho Chi Minh - DLS Consultant Company Limited, minh.truong@dlsconsultant.com

Prague, Belgrade and other East European cities - Grinity s.r.o., Mirek Vaško, miroslav.vasko@grinity.com

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Singapore - Asia Infrastructure Solutions Singapore Pte. Ltd., info-sg@asiainfrasolutions.com

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