

INTERNATIONAL CONSTRUCTION COSTS 2016



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FOREWORD



Tim Neal
Global Director of Buildings

The costs associated with constructing the buildings of tomorrow around the world are both varied and unpredictable. Rapidly shifting commodity prices, political instability and fluctuating currencies conspire to make investment and development decisions highly complex and fraught with risk.

For this reason we have produced the latest edition of our annual Arcadis International Construction Costs Index, detailing the relative cost of building in 44 of the world's major cities.

For those operating in or considering entering the global construction market, knowing when and where to invest is critical. As is doing one's homework to understand the relative costs and economic pressures across multiple global jurisdictions. The consequences of not doing so can be time overruns, spiraling costs or even project failure. The insights provided in this report can prove invaluable when making the right investment, development, commercial risk and control choices to drive best return.

As we enter 2016, the construction industry is facing a host of challenges. Putting the ongoing ups and downs of the global economy aside for a moment, it is important for us to ask ourselves – what more can be done to improve productivity and close the supply constraint gaps that are hampering growth?

The cities cited in our report are major economic centers on which national, regional and international economies are heavily dependent. These engines of growth are themselves reliant on the investment and stability that construction can bring. Some cities are already experiencing skill and resource supply constraints which can significantly increase costs and further restrict growth.

One way to tackle this is to look at how our industry operates. We need to find more innovative and environmentally sound construction methods if we are to safeguard our economic and environmental future. The likes of modular offsite production and robotics have been used periodically for some time now, but these methods must be expanded to help assure sustained improved performance in price, quality and safety on sites. Furthermore, more contemporary innovations such as the enormous latent potential of 3D printing should be more closely reviewed to deliver lower-cost, more efficient construction delivery.

As things stand, however, the cost of construction remains changeable and has the potential to make or break investment decisions. This report, compiled courtesy of Arcadis cost management experts around the world, aims to provide greater insight for those weighing up where in the world to invest for target returns. Cost is one of the key factors that determine which developments go ahead, reach completion and deliver strong returns, so as the old mantra goes, *forewarned is forearmed*.

THE YEAR IN CONSTRUCTION



Simon Rawlinson
Head of Strategic Research and Insight

As the world's urban population grows at an unprecedented rate, our towns and cities come under increasing pressure. The challenges associated with urbanization are now major focuses for the international business community, investors, economists and policy makers. With so much investment focused on major cities, we have elected to shift the focus of our annual construction costs report.

In previous years, our data has compared the average cost of construction in countries, however for our 2016 report we have recalibrated our cost data to focus on the differences between major global cities.

Throughout 2015, economic recovery in many markets around the world, along with currency and commodity price fluctuations, have triggered some big movements in the relative construction cost rankings. Overall a general slowdown in global construction activity has resulted in relatively few locations seeing significant price growth throughout the year.

For the cities themselves, the major financial hubs of New York, London and Hong Kong are the most expensive locations in the world in which to build. These cities, however, also represent some of the best development opportunities, largely due to high demand for prime property and continuing investment in enabling infrastructure. That said, these world cities have also experienced significant resource constraint which has, subsequently, increased costs over the last twelve months.

Other cities in Asia and Europe have seen much less pressure on construction. With Asian economies losing some momentum during 2015 due to China's transition away from an investment-driven economy, and European countries continuing a slow recovery following the financial crisis, we do not anticipate much change throughout 2016.

Meanwhile, in most locations, deflation in many commodity markets and over-supply of key materials such as steel have also helped to keep price rises to a minimum. The well-documented falling oil price has helped to boost GDP in non-producer countries which should, in turn, increase demand for construction.

As we saw in 2014, the main factor determining relative construction costs this year has been large exchange rate adjustments. This trend has continued to affect most currencies relative to the dollar and sterling. Even though the rate of change has slowed since summer 2015, countries including Australia and Malaysia have seen their currencies fall relative to the US dollar by over 25 percent in the past year. The Brazilian Real has fallen against the dollar by over 50 percent during this period.

These movements have resulted in a significant reduction in relative costs in many European and Asian markets compared to the US and UK. This shows that, in dollar terms, construction in the likes of Jakarta and Kuala Lumpur costs a fraction of the equivalent in the US and UK. Currency movements have also made inward investment from Asia into the US and UK more expensive – which, in turn, could dampen demand for investment in global cities such as London and New York.

In this year's city rankings we have opted to exclude the highest cost levels associated with super-luxury developments. Nevertheless, the data confirms the existence of significant product quality, supply chain and cost differential factors, that are specific to world city locations including London, New York and Hong Kong, as well as long-established high cost locations such as Switzerland. Our findings also point to significant cost differentials within the Eurozone, with costs in peripheral locations including Lisbon and Athens now at a 60 percent discount to that of south east England.

EXECUTIVE SUMMARY

- **New York, London and Hong Kong** are the costliest locations for construction in the world. Cost premiums in these cities range from 40 to 60 percent compared with many European cities.
- Price inflation in hot local markets in the **UK and US** is beginning to threaten the viability of commercial and public sector schemes. This is challenging the ability of **New York, London** and other cities to respond to growth opportunities.
- Middle Eastern commercial centers of **Doha and Dubai** remain, unsurprisingly, relatively low cost locations, benefitting from access to low-cost labor and energy.
- The strength of the dollar puts US and dollar-denominated investors in a strong position to invest in global markets. Currency depreciation and slowing cost inflation has seen many **Asian and European** cities fall further down the rankings.
- The falling value of currencies represents a threat to the ability of investors from **emerging markets** to compete in global cities. This could cut off a source of demand for assets in these locations and potentially trigger a shift in investor interest to lower-cost locations.
- The gradual recovery in the **Eurozone** has meant that none of the high construction inflation seen in the UK or US is affecting these markets. With costs in many European locations stable and the euro competitive, the attraction for construction and investment is growing.
- A combination of the Chinese economic slowdown and the easing of a property development cycle in many Asian cities including **Singapore and Jakarta**, mean that growth in wider Asian markets is expected to ease.

GLOBAL TRENDS IN CURRENCY AND COMMODITIES

COMMODITY PRICES

Falling commodity prices over the last twelve months have helped keep cost inflation to a minimum in all construction markets. Lower energy prices have also supported the manufacturing, leisure and retail sectors, which have the potential to boost demand for construction in many markets.

Throughout 2015, the most significant commodity price movements have involved crude oil, iron ore and nickel, with prices down by between 30 and 50 percent over the year. Meanwhile, copper and aluminum have also seen significant falls of 25 percent and 20 percent respectively. In fact, such is the extent of price falls of copper that it is trading at levels

not seen since the aftermath of the crash back in 2009.

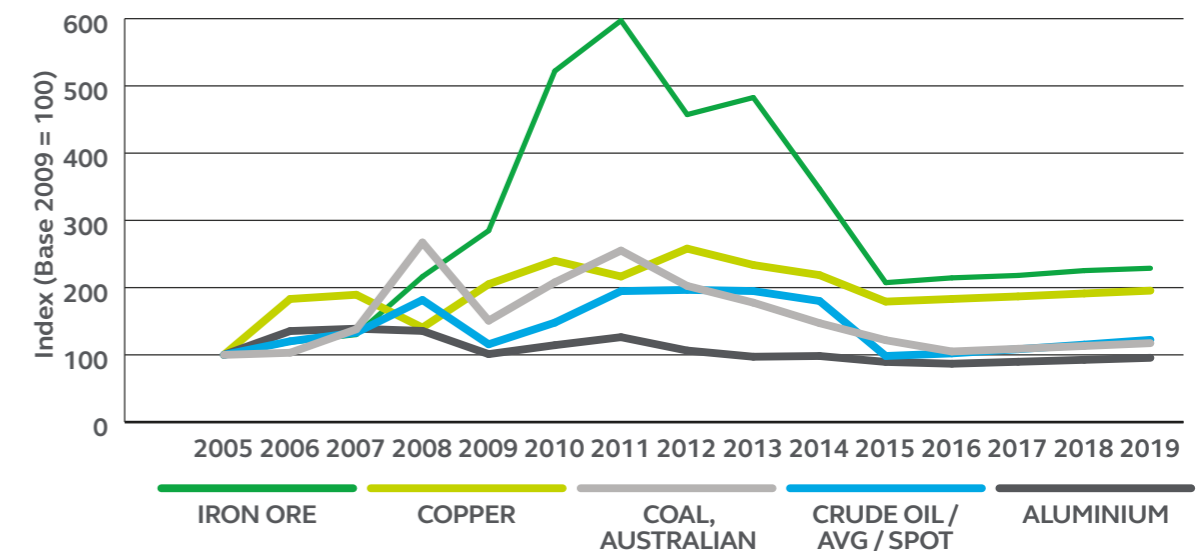
These substantial movements continue to have a major impact on construction around the world, and have been caused by a perfect storm of falling demand, increasing supply and high stakes competition between commodity giants.

In oil, high production by OPEC, led by Saudi Arabia, is intended to push high cost suppliers in Europe, US and Canada out of the market. Meanwhile, the crash in iron ore prices, following a 35 percent fall last year, is also a direct result of major suppliers in Australia continuing to increase production, even as demand in China and the developed world has fallen. Such is the impact of these drops that many producers in emerging

markets have seen export income fall which has, in turn, directly hit GDP growth.

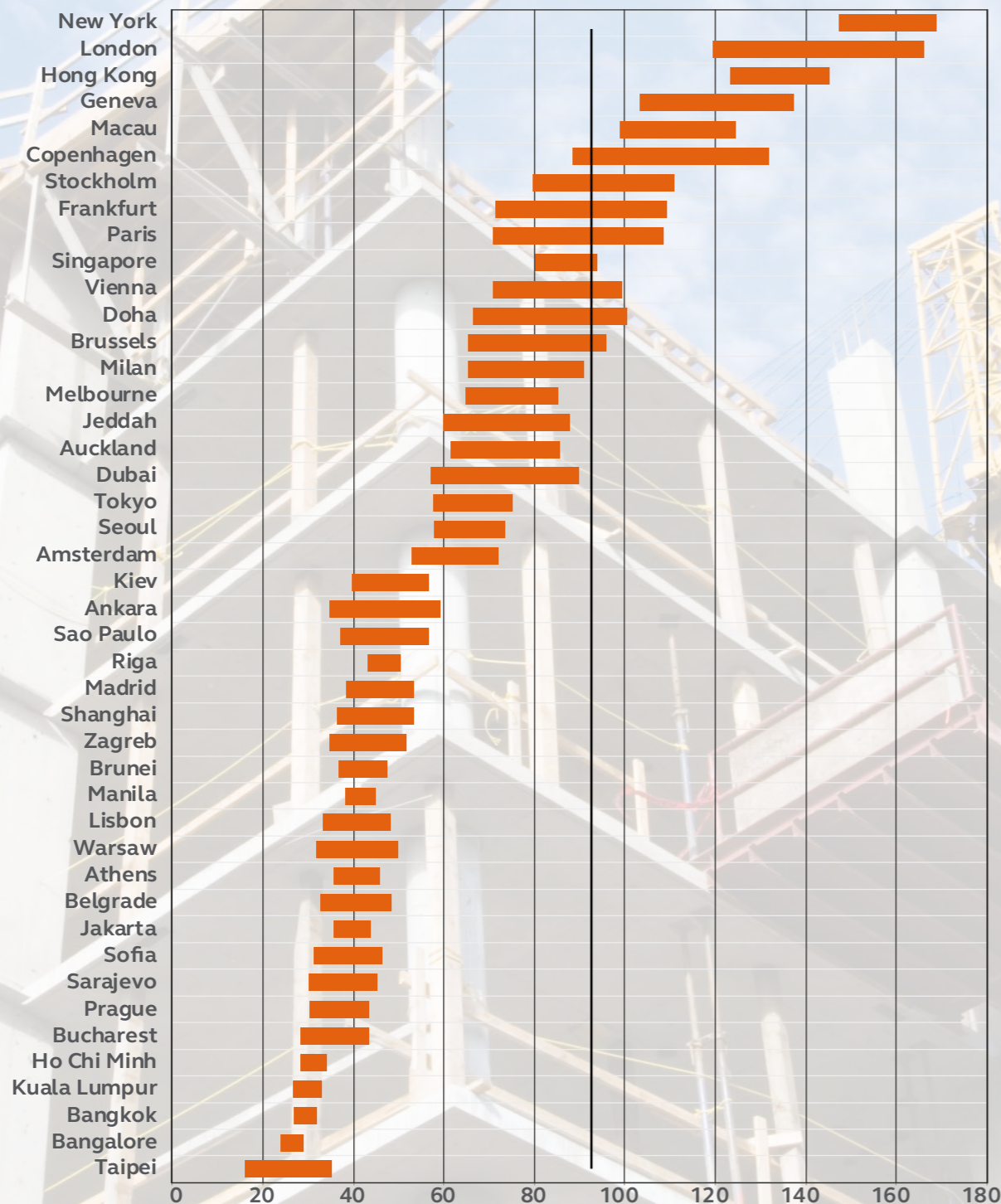
However, according to the World Bank forecasts, commodity prices are expected to remain steady over the coming five years with some increase in prices from the lows of 2014/15. Crude oil is expected to make the biggest recovery with prices increasing to US\$69 per barrel. Nonetheless, there is inevitably a high degree of uncertainty with these forecasts – as they simply cannot account for the potential of additional supply, geopolitical disruption or a further fall in demand.

World Commodity Prices 2009 - 2018



Source: IMF and World Bank

International Cost Comparison 2nd Quarter 2015
(Indexation based on UK Average = 100)



Source: Arcadis

The cost comparison represents cost differentials for a range of building types in typical city locations. Costs are at 2nd quarter 2015 price levels and are compared using \$US exchange rates current on 26th August 2015

CURRENCY TRENDS

The past year has seen large fluctuations amongst the major currencies as the US dollar has strengthened. A number of emerging market currencies have also engaged in a cycle of competitive devaluation, with interest rates being cut in order to maintain growth in the face of increasingly tough export markets. The devaluation of the Chinese yuan during 2015 is the prime example, triggering further currency movement in Asia. The yuan's managed depreciation is expected to continue, devaluing by 7 percent against the US dollar by the end of 2016, according to the Bank of Nova Scotia.

Over the past year, both the US dollar and British pound sterling have appreciated significantly

against other currencies. The strength of these currencies has been a deflationary factor in their home markets, particularly for UK construction where twenty-to-thirty percent of work by value is imported. However, it does mean that for overseas investors, construction in dollar and sterling-pegged locations has become even more expensive when paid for in local currency.

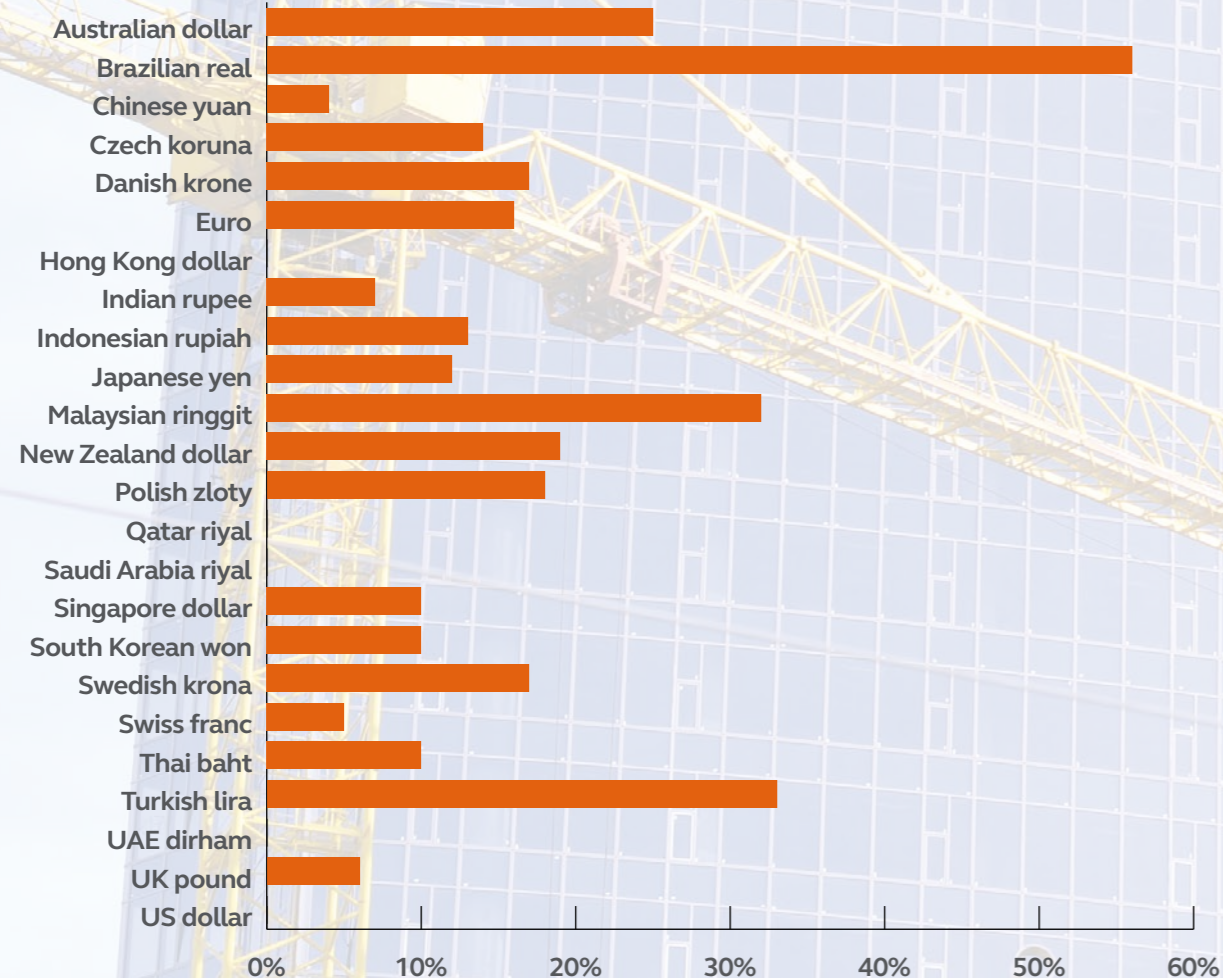
Clearly, dollar denominated investors will be in a strong position in the future, with Goldman Sachs forecasting that the US dollar will appreciate by 20 percent against other major currencies by 2018. This will be sustained by the US being ahead of the interest rate cycle compared to both Europe and emerging markets. UK pound sterling is also expected to strengthen by 12 percent.

Paradoxically, falling commodity prices could contribute to the continuing weakness of developed world currencies such as the euro and Japanese yen, with the threat of deflation keeping interest rates low and currencies weak.

In emerging markets, it is possible that competitive devaluation will continue, particularly if imports into China from emerging markets fall further. Such a situation could affect inward investment from dynamic countries such as Malaysia or India, who in recent years have played an integral role in the growth of world city construction markets such as London, New York and Dubai.

GLOBAL CONSTRUCTION MARKET TRENDS

12 month US dollar movement against global currencies Oct 2014 - Oct 2015



AMERICAS

Economic recovery in the US has helped to cushion the construction industry from a loss of momentum in previously fast-growing markets such as house building. However, after posting disappointing data in the third quarter 2015, it remains to be seen whether the economy's current growth trajectory can be maintained. This is important as the strength of the US economy has helped to underpin global growth over the past 18 months as China's rate of expansion has faded. Construction output growth eased during 2014 and 2015 as rebounding sectors such as housing began to return to more normal conditions, after having grown by over 12 percent in 2013. Growing demand for office space in many cities has fed significant increases in commercial development activity. In total, the US construction industry is now worth £650bn per annum.

Canada's post-crash winning streak looks to be coming to an end. GDP growth in 2015 is forecast to come in at a mere 1.5 percent. Oil and gas investment has started to fall but with committed, long-term construction investment on big pipeline projects, spend cannot be turned off quickly. That said, with some other large scale investments cancelled, the fall in commodity prices can be seen to be having a direct impact on the construction pipeline, dampening prospects for years to come.

Meanwhile, the Brazilian economy has entered recession which will have inevitable consequences for construction. Falling commodity prices for exports and reduced demand from China have really hit revenues, whilst interest rates have been hiked to nearly 14 percent. If these headwinds weren't enough then the Petrobras scandal, which has implicated a number of Brazil's largest contracting firms, has led to a further seizure in construction markets. Overall, workload is forecast to fall by at least four percent by the end of 2015 and to continue to contract in 2016.

NEW YORK

The Big Apple is the most expensive place in the world to build. This trend is likely to continue into 2016 and beyond as large-scale construction projects progress, labor shortages continue and international investors drive development.

The New York construction market is unique and one of the key differences is union labor. This, coupled with the shortage of workers and the need for labor on weekends leads to cost of wages often reaching premium rates. Rising insurance costs for builders, too, have doubled in the last five years, reaching up to ten percent of the total construction value.

To help move projects forward, builders, developers and owners are looking for ways to save on costs. Over the past year, non-union firms have seen an increase in building work. However, there are inherent risks associated with using these smaller firms, such as limited experience on mega projects and potential bankruptcy challenges.



ASIA

The effects of China's transition away from an investment-driven economy are felt globally. However, they are also set to have a particular impact in the wider Asian markets which have prospered not only from booming export markets, but also from substantial inward investment from China-funded businesses. Whilst most Asian economies continue to see levels of growth that are the envy of developed economies, a growing range of factors are holding back built asset investment. These include measures taken to cool residential markets in many countries, and falling exchange rates which have increased the costs of servicing dollar denominated debts and PPP charges.

China is moving towards a safer, more sustainable pattern of economic growth, but as recent events have shown, an orderly transition cannot be assured. GDP growth is forecast at 6.9 percent for 2015, its lowest level in 25 years. Some of the biggest reforms needed to change the direction of the Chinese economy have implications for property and construction. The latter has been a huge driver of the economy over the past 25 years, but there are signs of a structural shift that is likely to result in slower, more sustainable rates of growth.

Meanwhile, across the continent, growth rates have generally eased significantly over the past 18 months as commercial and residential development rates have peaked. Looking forward, maintenance of investor confidence in the private sector in the face of potential turbulence from China will be vital for the health of Asian construction markets. However, given significant investment backlogs associated with infrastructure and affordable housing in many countries, construction markets are less likely to be affected than other parts of these economies.

HONG KONG

Hong Kong has seen buoyant market conditions as a result of strong growth in both the private and public sector. Output in 2014 reached record highs. High levels of public sector investment into the metro system and high speed rail, for example, have created something of a labor shortage. Not only are these labor shortages pushing costs higher but they are also resulting in project delays.

Despite worries about over-heating, the Hong Kong residential market has remained in check, while the office market is also in good health with high levels of demand and rising rents coinciding with a healthy development pipeline.

Looking forward, Hong Kong's twin challenges are the constraints of an ageing and shrinking workforce, where 30 percent are aged over 55, and risks associated with a slow-down in mainland China.



SINGAPORE

Singapore's construction market has enjoyed a strong recovery since 2010. It is for this reason that the recent slowdown in residential and commercial markets represents something of a correction. In the private sector, both the residential and industrial sectors were relatively weak in 2015 and the office market also suffered due to over-supply.

Whilst output in 2014 totaled US\$28bn, this year, output is currently forecast to come in between US\$21-25bn – quite a significant drop. Sustained workload in the public sector – particularly in public housing and civil engineering – has supported the industry during the correction and, as a result, prices have remained broadly stable. Looking ahead, continuing investment in road and rail can be anticipated as these aspects of infrastructure have not received much investment in recent years.



EUROPE

Falling energy prices, quantitative easing and a depreciating euro are some of the tailwind factors encouraging the European Commission (EC) to remain optimistic about the Eurozone's recovery in latest economic forecasts.

The EC forecasts growth of 1.5 percent in the Eurozone, driven mostly by accelerating private consumption. Encouragingly, a rebound of investment is expected throughout next year, exemplified by the EC's Juncker Infrastructure Investment Plan worth €315bn. Recent GDP data has confirmed that the engines for the EU's growth include Poland, the UK, Ireland, Spain and the Netherlands and even France, Italy and Austria, previously lagging behind, are showing some signs of recovery. However, Germany's growth is being held back by weak export markets.

Expansion in construction investment in the EU last year mostly took place in non-Eurozone member countries including Poland and the UK. Across the EU, the construction industry is expected to grow for the next three years by an encouraging 2.3 percent per year, with the most buoyant markets expected to be in the UK, Czech Republic and Poland. New build residential and civil engineering sectors will be the main drivers of construction output.



FRANKFURT

The German construction sector has seen encouraging levels of growth in 2015. Increasing demand for housing in tandem with low interest rates and record levels of employment have seen rents increase steadily and house prices in Frankfurt rise by as much as 35 percent since 2014. This growth has, therefore, incentivized many developers to undertake new projects in the city with German housebuilders anticipating an increase in turnover of 7.5 percent by the end of 2015.

With other areas of the German economy not growing at the same rate, some 1.7 million square meters of office space is currently lying unoccupied in Frankfurt. 2016 is likely to see a continuation of the recent trend in converting older, unlettable commercial premises in the city into modern apartments or student accommodation. However, with the government now capping rental increases for residential lettings, the recent housing boom may have a limited shelf life, lasting only as long as interest rates remain historically low.

AMSTERDAM

As with many major cities, Amsterdam has experienced steady population growth in recent years. Undersupply of housing has seen residential real estate prices increase 15 percent since 2014. To counteract this, the municipal government is targeting a 5,000 unit increase in house building per annum. In fact, since the financial crisis, the construction industry is showing signs of recovery with a modest growth of 1.2 percent this year which is forecasted to increase to 2.2 percent in 2016.

Having lost a great deal of capacity during the downturn, the construction industry is likely to see costs in Amsterdam increase steadily as the market revives. The cost of building in the Dutch capital is expected to have grown by 2.7 percent by the end of 2015, while another 4.4 percent and 6.3 percent is expected in 2016 and 2017 respectively. This will likely result in costs returning to pre-crisis levels within three years.



LONDON

The UK capital is facing a severe construction market imbalance. As contractor capacity fails to keep pace with demand, cost inflation is being heavily driven by a difficult combination of limited bidding resource and supplier opportunism. Although stable material costs have taken some steam out of the market, rapid inflation affecting the cost of labor and on-costs such as profit margins, mean that accurately predicting prices has become near-impossible in some areas of the market.

There are signs that supply chain insolvencies are on the rise. Cash-flow failures, problem projects and lack of control over the supply chain are becoming ever more prevalent issues. These factors conspire to reduce the certainty of delivery, just as the development industry is being asked to pay an additional premium to build.

Meanwhile, despite growing costs for non-sterling investors, the London market is now highly geared to international investors, a demand trend that is moving out to lower-value, less mainstream areas of the city. This is as a result of investment yields shrinking in 'prime' areas of the city, reducing the potential for long-term value growth of these assets.



MIDDLE EAST

The steep fall in the price of oil over the past ten months and the strength of currencies tied to the US dollar will inevitably have long-term impacts on construction markets in the Gulf Cooperation Council (GCC) countries. National budgets are coming under greater scrutiny and assets in markets such as Dubai are likely to become more expensive. Political unrest has also been a negative factor. All GCC states have raised public expenditure over the past three-to-four years in order to accelerate economic diversification and reduce levels of inequality, but with the collapse in the price of crude oil during 2014/2015, constraints on spending will grow. Qatar, Kuwait and the UAE, for example, need the oil price to be about US\$70 per barrel to balance the books, so deficits will grow quickly.

This is not an immediate problem but steps are being taken to rationalize the timing of investment programs. National debt is extremely low and countries such as Saudi Arabia have plenty of assets which can be sold to fund long-term investment. However, the GCC region is not immune to wider shocks in the global economy. Dubai, for example, receives a lot of investment cash from other oil economies such as Russia and Iran, which will have also been affected by the commodity price crash. A strong dollar also makes both tourism and property investment more expensive for key Asian investors.

DUBAI

Dubai remains one of the nation's most powerful emirates, an emergent global city and now major regional hub. The city's economy, however, is expected to grow by less than five percent in 2015 and the real estate market has softened across most asset classes.

While oil is not a major part of the economy – Dubai's main revenue comes from tourism, aviation, real estate and financial services – uncertainty associated with low oil prices and falling commodity markets can still have a big impact on the construction market. This, combined with falling real estate values, is leading to some uncertainty. With the value of project awards at half that of 2014, previous fears of substantial construction inflation have not materialized, which has led to a relatively stable position in our ranking.

Dubai, however, is a major business hub of the Middle East. Its airport has surpassed London Heathrow as the busiest airport in the world and hence it is becoming a major global destination. This, together with the recent Dubai 2020 Expo win, is expected to bring in major economic benefits, generating activities worth billions of dirhams and creating over 270,000 jobs.

DOHA

Doha's position as a major world city will progress quickly over the next decade. The Doha economy is expected to maintain double digit growth until 2019, supported by a number of large infrastructure investments in the World Cup and other major programs set by Qatar's 2030 National Vision. Construction was one of the largest contributors to non-hydrocarbon GDP growth in 2014, increasing by 11.4 percent.

Over the next ten years US\$150 billion is expected to be spent on the likes of roads, railways, stadiums and ports, as well as hospitality and social infrastructure. Moreover, the country has plans for further investment in transport infrastructure, water and electricity by 2020.

However, this growth is subject to supply and logistics and there is a danger of substantial building material inflation unless the supply chain is carefully managed. Pressure from other parts of the region is, nevertheless, reducing as spend is moderated as a result of falling energy prices. This means that further construction resources can be expected to meet local demand in Qatar.

AUSTRALIA PACIFIC

The economic performance of Pacific markets is inevitably influenced by global demand for commodities. However, the two key economies of Australia and New Zealand are showing reasonable resilience and are currently heading towards a soft landing rather than a full-blown slowdown.

Both economies benefit from low commodity prices, competitive currencies and accommodative monetary policy. Furthermore, they are forecast to grow by over two percent from 2016 onwards, significantly stronger than the EU, but down from levels seen in 2013/14.

In Australia, mining investment is expected to fall by over 20 percent, while there are significant backlog requirements for infrastructure investment in sectors such as roads. Interest rates have, therefore, been cut in part to stimulate a switch away from the mining sector to PPP investment. These low interest rates certainly stimulated the Australian residential sector during 2015, but with economic growth slowing and uncertainty increasing, this rate of growth is unlikely to be sustained over the next couple of years.

New Zealand is similarly vulnerable to falling prices in agricultural commodities. However, unlike Australia, New Zealand finds itself at the tail of a housing boom and although public sector investment is expected to remain steady, the contribution to growth from the residential sector can be expected to fall as measures are taken to cool the market.

MELBOURNE

The Melbourne construction industry has been in decline for a number of years with commercial developments, in particular, seeing a significant drop off in demand. However, better news appears to be on the horizon with activity seeing a welcome uplift as 2015 draws to a close. Greater positivity is now entering the market and expectations are high for 2016.

One of the main drivers behind this growth is the welcome increase in demand for residential property. A significant number of multi-level apartment developments have gained approval across the city in recent months which promises to be something of a shot in the arm for developers and contracts operating in the Victorian capital. Furthermore, rather symbolically, work has recently begun in the Southbank area on what promises to be the tallest apartment building in the Southern Hemisphere.

METHODOLOGY

The comparative cost assessment is based on a survey of construction costs in 44 locations undertaken by Arcadis, covering 13 building types. Costs are representative of the local specification used to meet market need. The building solutions adopted in each location are broadly similar and as a result, the cost differential reported represents differences in specification as well as the cost of labour and materials – rather than significant differences in building function.

Costs in local currencies have been converted into a common currency for the purpose of the comparison, but no account has been taken of purchase power parity. High and low cost factors for each building type have been calculated relative to the UK, where average costs for south east England = 100, using US dollar as the currency unit. The relative costs plotted in the chart represent the average high and low cost factor for each of the 13 buildings included in the sample. Construction costs are current in Q2 2015. Exchange rates were current on 26 August 2015.

ACKNOWLEDGEMENTS

We would like to thank Constance Lau of Arcadis in Hong Kong and Mark Williams and Ciara Walker of Arcadis in London for their assistance in the production of the report, as well as our correspondents in 44 locations who contributed cost data and market intelligence.

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