Linesight

Europe Handbook 2020

Construction trends and insights

linesight.com

Contents

Europe Handbook

01 Macro Indicators

02 Construction Costs

03 Indices

04 Contractors

05 Wage Rates and Charges

06 Housing

Global Insights

About Us

68 King William Street, London

Architect:
Orbit Architects

Linesight services:
Cost Management

Welcome to the **Linesight European Handbook 2020.**

Each year, we gather the key indices and trends in European construction, giving you the most comprehensive overview of the industry.

For the complete global view, visit the Linesight Knowledge Centre: **linesight.com/knowledge-centre**

Aloft Hotel, Dublin

Architect:
Nikki O'Donnell Architects
Linesight services:
Cost Management

Europe Market Review and Outlook

Michael Bonner, Cost Manager at Linesight, reviews the 2019 European construction industry. performance in 2019, and discusses what we can expect in the coming months.

Growth in construction output has seen a decrease to a rate of 2.3% in 2019, from its peak (by volume) of 4.1% in 2017. Growth levels are expected to decrease further and stabilise around 1% in the 2020-2022 period, according to Euroconstruct.

Overall, the European outputs have not hit the levels of output prior to 2008, even though there has been six years of growth. This can be attributed to the output of larger countries within Europe contracting to a fraction of what they were previously. However, the economic outlook remains positive, although all main construction sectors will face a decline in average annual growth.

Overall the outlook is one of slight growth, with construction set to grow in Europe, albeit at a much slower pace than we have seen in recent years.

Residential

As the most active sector, residential has experienced an ongoing upturn in housing prices and investments since 2013, which has led to significant works in residential development in these years, making it the biggest contributor to construction output. The sector reached its peak output in Europe since 2006 in 2017, and we have seen a slowdown in growth in the sector in 2018-19, with this growth expected to slow to 0.5% in 2020.

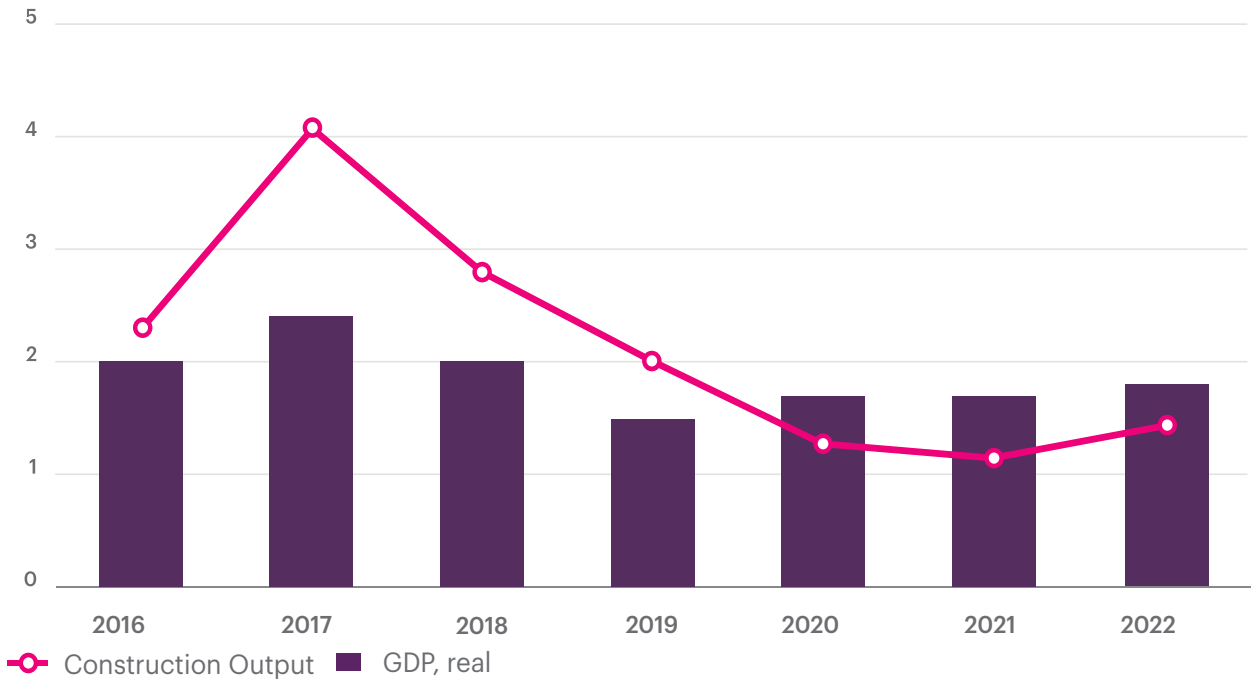
Non-residential

Non-residential construction is recovering at a slower pace than both the residential and civil engineering sectors. Growth was 1.8% for 2019 and it is expected to decrease to 1% in 2020. Commercial construction in Europe's larger economies will be low.

Civil engineering

The recovery of the civil engineering sector continued throughout 2019, with growth in the sector predicted to be 2.2% in 2020.

Europe construction output vs. real GDP



Source: *Euroconstruct*

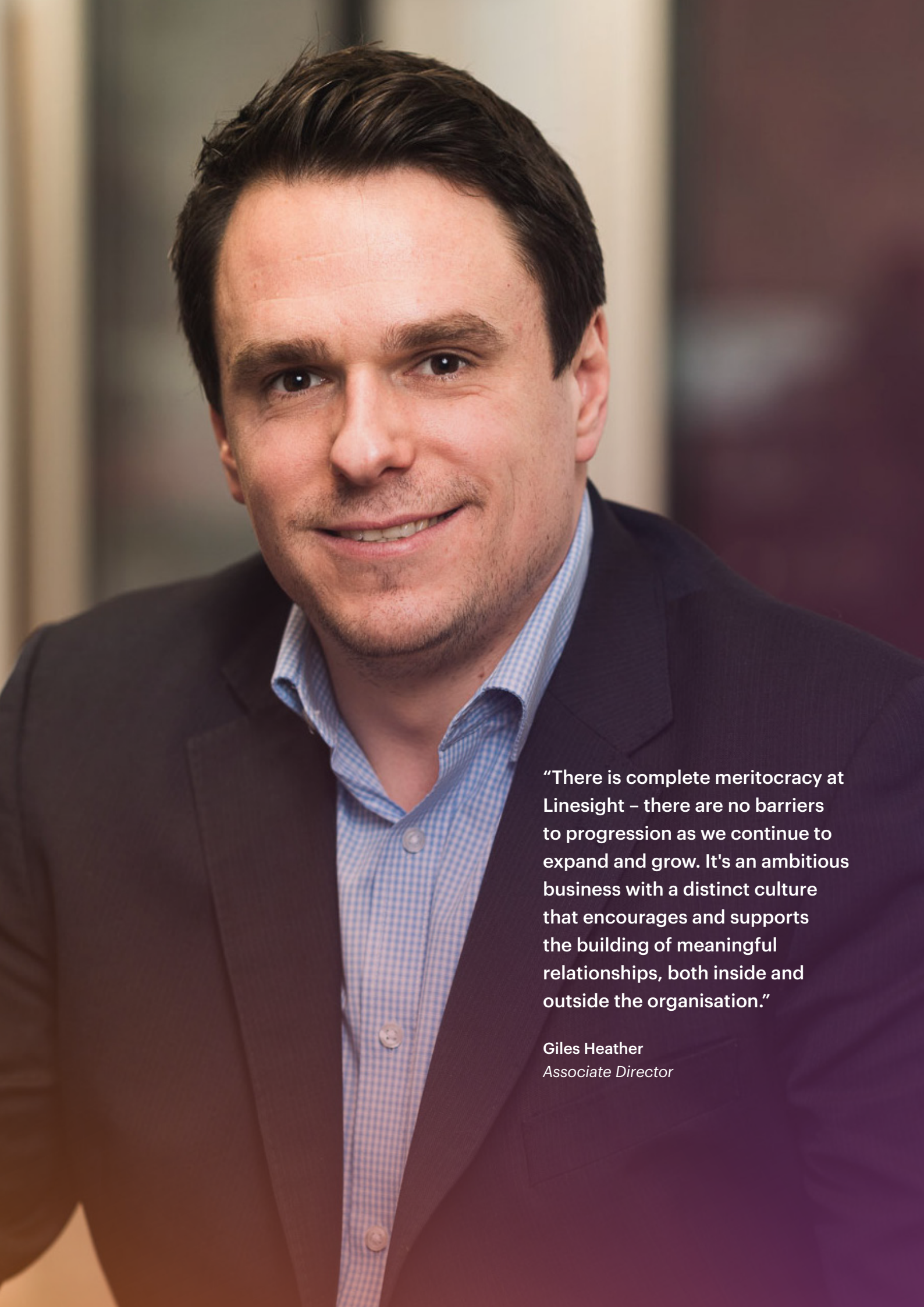
The Eight Building, Dublin

Architect:
Reddy Architecture + Urbanism

Linesight services:
Cost Management

Ten Hanover Quay, Dublin

Architect:
O'Mahony Pike Architects
Linesight services:
Cost Management

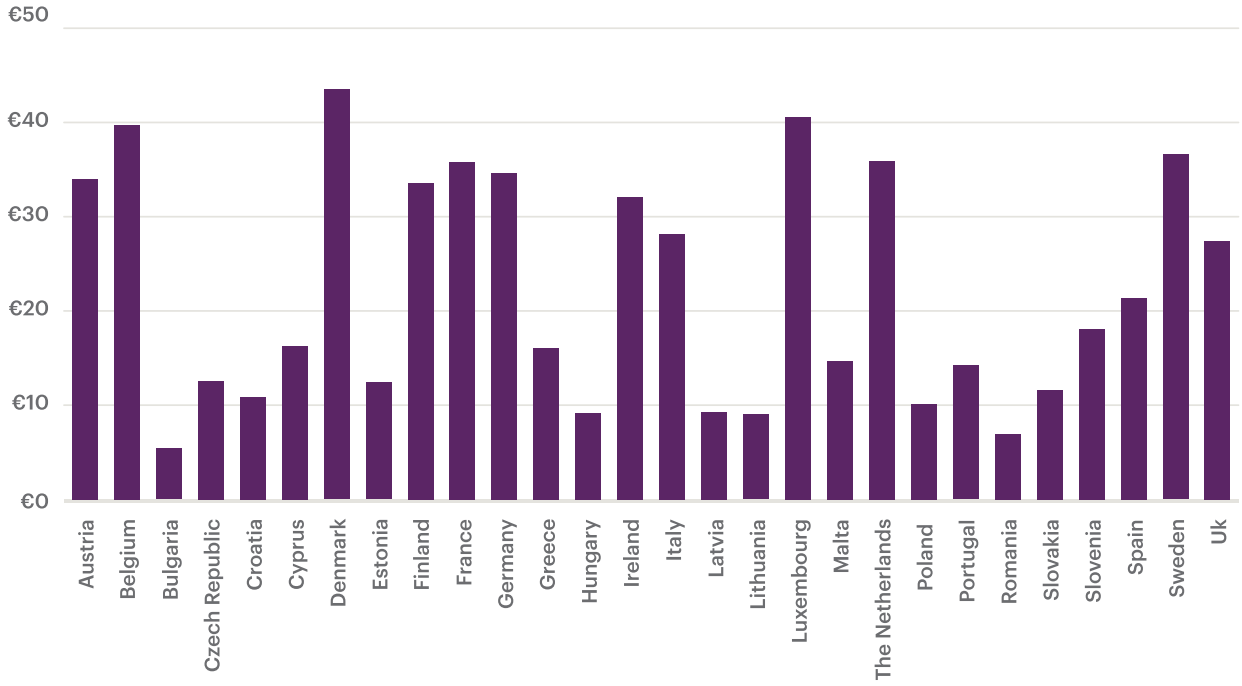


"There is complete meritocracy at Linesight – there are no barriers to progression as we continue to expand and grow. It's an ambitious business with a distinct culture that encourages and supports the building of meaningful relationships, both inside and outside the organisation."

Giles Heather
Associate Director

1. Macro indicators

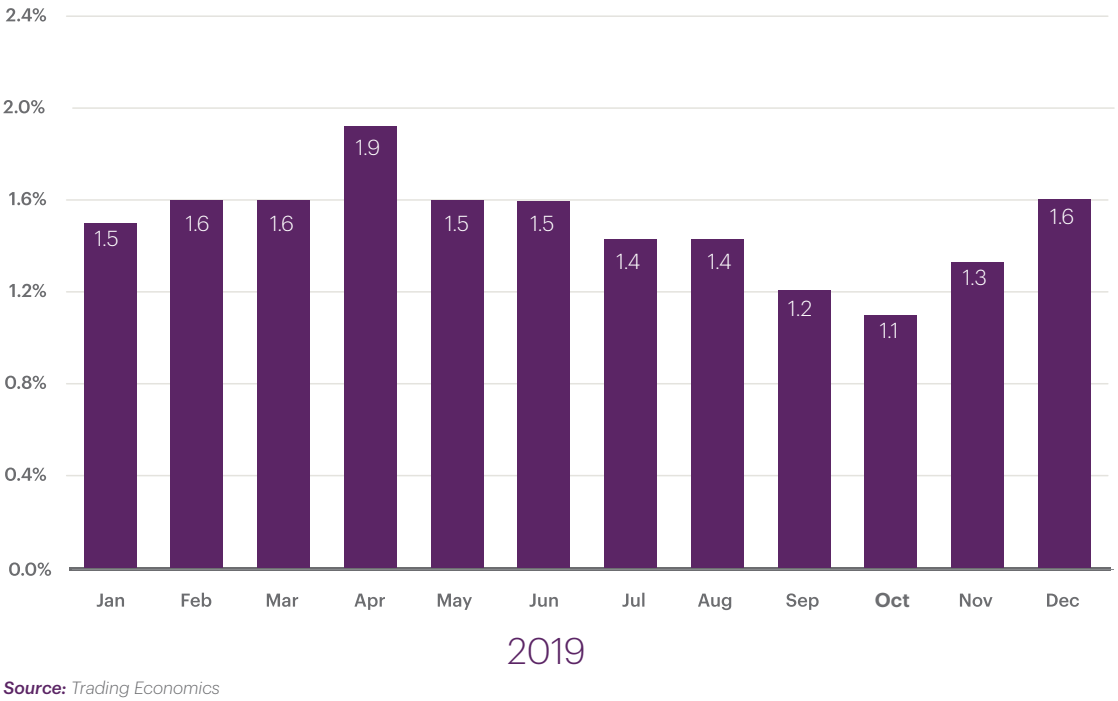
1.1. EU labour costs in construction



Note: *Hourly Labour costs*

Source: *Trading Economics*

1.2. EU inflation 2018

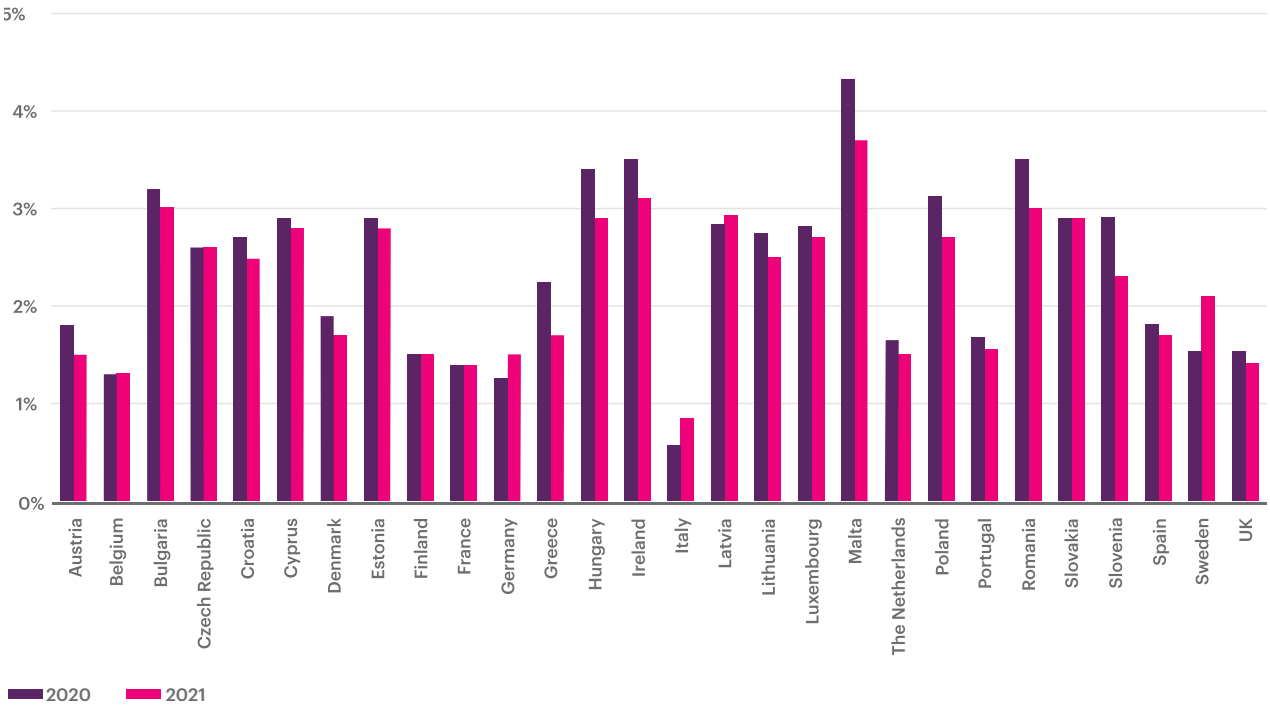


Source: *Trading Economics*

“There’s an open-door policy with management, and always someone you can turn to for advice and support. I really enjoy working with so many passionate and knowledgeable professionals in an open environment, in which communication and productivity are vibrant.”

Grace McConnell,
Senior Quantity Surveyor

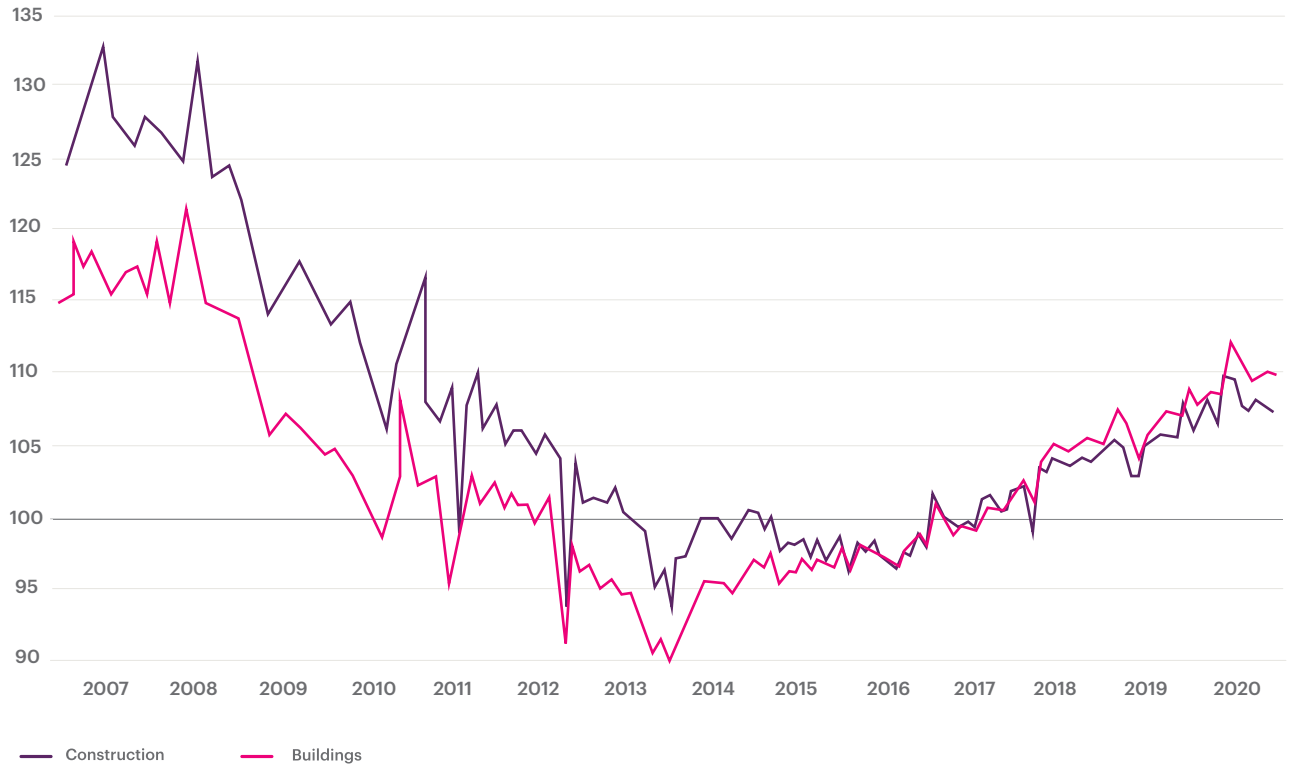
1.3. Forecast Europe GDP annual % change 2020-2021



Source: *Europa.eu*

2. Indices

2.1. Index of production in the European construction sector



Note: *Seasonally and calendar adjusted*

Source: *Eurostat*

2.2. Construction cost - new residential building index

	2016		2017		2018		2019	
Index (2010=100)	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3
Belgium	110.3	110.8	111.7	112.6	104.6	105.8	107.5	n/a
Bulgaria	105.6	104.8	107.6	107.5	104.3	106.3	109.2	111.1
Czech Republic	102.7	103.5	105.2	106.4	205.2	108.0	111.6	113.9
Denmark	112.9	113.4	114.2	114.3	103.3	104.4	104.7	104.8
Germany	109.4	110.8	112.2	114.1	106.6	108.1	109.3	110.1
Estonia	114.0	114.2	114.5	116.0	102.0	102.7	104.0	104.8
Ireland	100.7	100.7	101.0	101.9	102.9	106.6	107.6	n/a
Greece	92.8	92.6	92.9	92.8	99.1	99.9	99.1	99.1
Spain	99.9	101.9	102.6	104.4	102.2	103.0	104.5	104.9
France	103.3	104.6	105.7	106.4	104.2	105.5	106.6	n/a
Italy	106.6	106.7	107.0	107.4	101.5	102.8	102.0	n/a
Croatia	95.9	94.6	65.0	95.8	99.3	101.8	102.9	103.0
Cyprus	96.8	97.2	97.3	N/A	100.1	100.9	102.1	102.4
Latvia	123.2	119.8	122.0	123.2	110.9	113.9	117.9	117.1
Lithuania	119.1	121.2	122.9	127.0	108.2	111.2	113.1	116.8
Luxembourg	111.5	112.0	113.1	N/A	103.8	104.2	106.8	n/a
Hungary	115.7	119.0	123.2	126.9	109.4	11.3.3	119.4	127.0
Netherlands	108.6	109.2	110.6	112.4	105.4	107.2	108.6	110.1
Austria	108.5	110.4	112.6	113.9	106.0	107.7	107.7	108.6
Poland	97.8	98.0	98.2	98.8	101.9	104.3	106.6	n/a
Portugal	106.8	108.6	109.5	110.7	104.4	106.2	106.4	108.1
Romania	108.0	109.7	116.3	118.9	119.0	121.6	127.9	134.5
Slovenia	100.6	100.9	105.5	106.6	104.2	108.0	109.0	112.8
Slovakia	104.6	105.4	106.6	108.4	106.3	108.1	111.2	n/a
Finland	108.5	109.1	109.0	109.4	102.0	103.5	103.9	104.3
Sweden	111.9	113.8	114.9	116.7	107.3	109.6	110.5	112.3
United Kingdom	115.6	116.9	120.0	N/A	107.0	109.2	110.7	n/a
Malta	111.6	111.8	112.1	114.3	104.8	104.9	105.7	106.0
European Union Average	107.0	108.2	109.5	110.7	104.9	106.4	106.7	107.5

Note: *n/a = not available*

Source: *Eurostat*

3. Top contractors and design firms

3.1. Top 15 European contractors

2019 rank	2018 rank	Global rank	Firm	Revenue (€ bn)
1	1	1	ACS, Spain	38.04
2	2	2	Hochtief Aktiengesellschaft, Germany	27.79
3	3	4	VINCI, France	22.20
4	4	5	Strabag, Austria	15.77
5	6	6	Bouygues, France	15.58
6	7	8	Skanska, Sweden	13.58
7	8	10	Ferrovial, Spain	11.89
8	5	11	Technip, London	11.14
9	9	16	Salini, Italy	6.46
10	10	17	Consolidated Contractors Group, Greece	6.20
11	13	20	Royal BAM Group, The Netherlands	5.30
12	12	21	Petrofac Ltd, U.K - FCC SA, Spain	5.23
13	11	22	Tecnicas Reunidas, Spain	5.05
14	-	26	Eifage, France	4.81
15	15	32	Acciona Infraestrucras, Spain	3.94

Note: *2019 ranking is based on 2018 construction revenue*

Source: *Engineering News Record*

3.2. Top 15 European design firms

2019 rank	2018 rank	Global rank	Type of firm	Firm	Revenue (€ bn)
1	-	1	EC	WOOD, U.K.	5.99
2	1	5	E	Arcadis Nv, The Netherlands	3.45
3	6	12	EA	Rambboll Group A/S, Denmark	1.59
4	4	13	E	Arup, U.k.	1.36
5	5	14	AE	Sweco Ab, Sweden	1.36
6	7	15	EC	Tecnicas Reunidas, Spain	1.35
7	3	17	E	Mott Macdonald, U.K.	1.22
8	2	19	GE	Fugro, The Netherlands	1.19
9	-	20	A	AF Poyry, Sweden	1.02
10	-	22	EC	TECHNIPFMC, U.K.	0.85
11	8	23	E	Egis, France	0.84
12	12	24	EC	Maire Tecnimont Spa, Italy	0.83
13	10	29	E	Cowi A/S, Denmark	0.65
14	14	34	E	Systra, France	0.51
15	15	35	E	Tractebel Engineering, Belgium	0.49

A - architect; E - engineer; EC - engineer-contractor;

Note: *2019 ranking is based on revenue for design services performed in 2018.*

Source: *Engineering News Record*

“Although I studied general quantity surveying in college, Linesight has given me the chance to focus on MEP by joining our dedicated team. The scale of projects that we work on really appeals to me – I’m getting the chance to work on large-scale, complex projects for world-leading clients, with the opportunity to gain experience abroad as well.”

Manli Hu,
Cost Manager

4. EU procurement

4.1. EU public procurement fact sheet

Definition

Public procurement is the purchase of goods, works or services by contracting authorities[1].

Drivers for change of the rules

The rationale behind the EU Procurement Rules 2014 and the Irish implementation of the Regulations in 2016 was to:

- Simplify and streamline procurement
- Modernise the process and make it more flexible
- Give better access to EU procurement markets, and in particular, enhance opportunities for SMEs
- Supporting innovation and the possibility of focusing more on the EU objectives of environmental protection, sustainability and social inclusion, rather than solely on best value in price terms.

The principal changes in the 2014 rules

- Concessions[2] get a new separate EU Directive
- All communication and information exchange for above-threshold procurement, including electronic submission of pre-qualification questionnaires, tenders and "call offs" under framework agreements, must be carried out using electronic means of communication
- Additional grounds for disqualification of tenderers, but they can self-clean and get back into the process
- Preliminary market consultations are better defined
- Most economically advantageous is the only means of awarding a contract
- Rules for in-house, vertical and horizontal inter-authority cooperation
- Self-capacity declarations for minimum required standards and standard questionnaire for some repetitive selection criteria
- Distinction between Types A and B services removed but there is now a 'Light Touch' regime for social, health, cultural and assimilated services. The requirements are considerably less onerous than the full EU procurement regime
- New and altered award procedures
- Reduced timescales
- Promotion of innovation
- Conflicts of interest rules
- Codification of rules and exemptions for modifications to existing contracts
- More onerous reporting requirements (Regulation 84),
- Local and regional authorities allowed more flexibility.

What contracts are subject to EU public procurement?

Low-value contracts (below EU threshold) that could have cross (EU) border interest are subject to the rules of the Treaty on the Functioning of the European Union, i.e. must respect:

- Transparency Advertising and being open with the process
- Equal and fair treatment
- Non-discrimination
- Proportionality
- Mutual recognition of standards

There are values expressed in government policy, below which contracts are generally not considered to be of cross border interest. The contracting authority should assure itself that there are no circumstances that would suggest otherwise for a particular low-value contract.

High-value contracts are those where the genuine value exceeds the EU thresholds (either an individual contract, several contracts that make up a project, or a four-year valuation for longer-term arrangements without a defined contract price). All contracts falling into this category are subject to the full EU procurement regime.

The thresholds

The thresholds, which exclude VAT, are revised every two years (next revision 1st January 2022), with the below applying from 1st January 2020 to 31st December 2021.

	Supplies services	Works	Light touch
Public sector			
Central Gov.	€139k	€5,350k	€750k
Other	€214k	€5,350k	€750k
Small lots	€ 80k	€1,000k	N/A
Utilities sector			
All	€428k	€5,350k	€1,000k
Concessions			
All		€5,350k	

Times

Award procedures

For normal competitive procurements, one of the following procedures must be used - either normal timescale or accelerated timescale if applicable and justified.

Open - free choice, T: 35 days

- All interested parties can submit a tender
- No negotiation with bidders is permitted
- Suitable where tenders will be easy to evaluate.

Restricted (free choice subject to government policy), EoI : 30 days, T:30 days

- Interested parties can submit an expression of interest
- Only those meeting the contracting authority's prequalification or selection criteria will be invited to submit a tender, and may be further limited by the application of transparent and objective scoring system
- A minimum of five suppliers must be invited to tender provided sufficient qualified firms apply
- Negotiation with bidders is not permitted, just clarification and finalisation of terms.

Competitive dialogue - justified when an essential element of the competition cannot be adequately defined, EoI: 30 days, T: not prescribed

Interested parties meeting the contracting authority's prequalification or selection criteria may be invited to participate in dialogue with the contracting authority.

- A minimum of three suppliers must be invited to dialogue provided sufficient qualified firms apply. The contracting authority enters into a dialogue with bidders to develop one or more suitable solutions to meet its needs
- When one or more appropriate solutions have been identified, the dialogue phase concludes and final tenders are invited.

Competitive procedure with negotiation - justified when an essential element of the competition cannot be adequately defined, EoI: 30 days, T: 30 days

- Interested parties, which meet the contracting authority's selection criteria, may be invited to negotiate the terms of the contract.
- A minimum of three suppliers must be invited to submit initial tenders provided sufficient qualified firms apply. The contracting authority may award the contract based on initial tender (if the contract notice allows for this) or enter into negotiation with bidders on the basis of the initial tenders.

Innovation partnership - justified when there is a need for a solution that is currently genuinely not available on the market, EoI:30 days, T: not prescribed

- The establishment of a structured partnership with the aim of developing an innovative product, works or service which will be subsequently purchased by the contracting authority; so long as the supplier has complied with the agreed performance levels and costs
- Normally a minimum number of three suppliers would be invited to compete.

Notes:

1. *Central Government, sub-central government, bodies governed by public law and bodies (otherwise not subject to public law) who are receiving majority public funding for a particular project become subject to public law for the project in question.*
2. *Concessions involve a contractual arrangement between a public authority and an economic operator (the concession holder). The latter provides services or carries out works and is remunerated by being permitted to exploit the work or service e.g. toll bridge*
3. *Electronic means' equals electronic equipment for the processing (including digital compression) and storage of data which is transmitted, conveyed and received by wire, by radio, by optical means or by any other electromagnetic means.*
4. *Times quoted above are "normal". The use of electronic tendering reduces minimum tender times where prescribed by 5 days. Further reductions are possible when accelerated procedures are justified and the use of a PIN can in certain circumstances further reduce times.*
5. *T=Tender*
6. *EoI=Expression of Interest*

5. Exchange rates

5.1. Currency movements – Euro vs. various European currencies

Year	Bulgarian lev	Croatian kuna	Czech koruna	Danish krone	Hungarian forint	Polish zloty	Romanian leu	Russian rouble	Swedish krona	Turkish lira
	BGN	HRK	CZK	DKK	HUF	PLN	RON	RUB	SEK	TRY
2020	1.96	7.61	25.57	7.47	337.7	4,32	4.81	84.16	10.68	7.03
2019	1.95	7,40	25.69	7.46	318.07	4.32	4.73	75.22	10.48	5.94
2018	1.96	7.46	25.49	7.44	308.59	4.16	4.65	69.12	9.83	4.53
2017	1.96	7.46	26.36	7.44	309.19	4.34	4.51	65.94	9.64	4.12
2016	1.96	7.66	27.03	7.46	312.30	4.44	4.54	82.85	9.35	3.24
2015	1.96	7.64	27.58	7.45	309.06	4.19	4.43	56.43	9.22	2.84
2014	1.96	7.63	27.45	7.46	300.75	4.18	4.50	45.28	8.86	2.96
2013	1.96	7.58	25.98	7.46	296.87	4.20	4.42	42.34	8.65	2.53
2012	1.96	7.54	25.72	7.44	314.63	4.47	4.34	40.83	8.70	2.40
2011	1.96	7.44	24.59	7.45	279.37	4.12	4.24	40.88	9.03	2.34
2010	1.96	7.29	25.28	7.45	275.48	3.99	4.21	40.26	9.54	2.00

Note: *Based on March exchange rates*

Source: *European Central Bank*

Rhodes Bay Hotel, Greece

Architect:
MKV Design
Linesight services:
Cost Management and Employer's Agent

Marshall Yards, Dublin

Architect:
O'Mahony Pike
Architects
Linesight services:
Project Management

Primark,
Birmingham

Architect:
3D Reid
Linesight services:
Cost Management

Review and Outlook

Global Insights

Global Market Review

Although the global uncertainty arising from the US-China trade war has been paused with the recent Phase 1 deal, there is a new threat to the global economy - Coronavirus

For most of last year, the global economy was focused on the trade dispute between the US and China, which saw each impose tariffs on hundreds of billions of dollars' worth of one another's goods. The resulting uncertainty has impacted the global economy for the last eighteen months, although this was somewhat eased when agreement on the Phase 1 deal was announced in early 2020. The agreement was welcomed with cautious optimism by commentators concerned with its durability and longevity.

Disruption in APAC

However, there is now a new threat to the global economy – Coronavirus (COVID-19). At the time of writing, there were 90,000 cases resulting in almost 3,000 deaths. As it continues to spread following its initial outbreak in late December 2019, it has become apparent that the economic impact will not be confined to China and that it may impact the global economy. With factories in China closed or on limited production, reduced manufacturing threatens the global supply of personal computers and other electronics. Apple has already issued a sales warning due to a shortage of supply, resulting in stocks across the globe falling. With many countries restricting the entry of Chinese nationals, the impact on the global aviation, tourism and hospitality industries could be vast.

Having seen economic growth of 6.1% in 2019, despite the trade war, the Chinese economy could be severely impacted by the outbreak. Additional funds have been injected into the economy to ensure enough liquidity in the banking system and to help provide a stable currency market. The Government has adapted a relatively loose macro policy and provided targeted financial support for the industries worst affected. But analysts say the economic impact of the virus – which has left major cities in full or partial lockdown – could significantly harm growth if it lasts for a prolonged period.

India was until recently the fastest-growing major economy. However, some important recent reforms, while expected to benefit the economy in the longer term, such as a unified tax system and demonetisation, have been disruptive in the short term. Reliance on consumption continues and the large informal labour base indicates that there is room for this to strengthen. The large disparity between urban and rural infrastructure emphasises the importance of spreading investment and economic opportunities while addressing urbanisation.

In Australia, sluggish wage dynamics and a rising saving ratio weighed on consumer spending, while contracting investment conditions are constraining the economy. The particularly severe bushfire season also weighed on business investment, farm production, tourism and retail expenditure. However, retail expenditure has seen a rebound in early 2020, and a reduction in unemployment, improving business conditions and indications of a rebound in house prices all provide hope for some improvement.

Singapore's economic growth should rebound in 2020 on

the back of stronger exports and investment, as well as Government stimulus measures. However, like many other countries particularly in the APAC region, the Coronavirus, will likely weigh on activity by disrupting supply chains, global trade and tourism.

Uncertainty in Europe

Unemployment in the eurozone is falling and is currently at its lowest since 2008. However, the European economy is barely growing. The ECB is operating with negative interest rates and has restarted quantitative easing. The UK leaving the EU could further damage growth in the eurozone should they fail to agree a trade deal by the end of this year, when the UK's transition period ends. Faced with the further threat of a potential slowdown due to Coronavirus, Germany's finance minister is now hinting that stepping up public investment might be possible, as Germany may be prepared to drop its traditional veto to fiscal stimuli. This is seen as a huge step, as it signals a significant change in the country's attitude and may facilitate a relaxation of EU fiscal rules.

As Europe's largest economy, Germany, is going through a period of political instability and ongoing economic uncertainty. As with much of Europe, there has been a rise in the popularity of far-right parties and the green parties. The grand coalition is under strain and Chancellor Angel Merkel, who has steered the country for the last decade, has announced she will not seek a fifth term in office. The Bundesbank has predicted marginal economic growth of 0.5% in 2020 and stronger growth of 1.5% in 2021, driven by improved trading conditions and a view that manufacturing will stabilise in early 2020. The domestic economy is robust due to strong consumer confidence, fuelled by positive income prospects and favourable financing conditions, which is resulting in a booming domestic construction market. This is countered by the poorly performing export economy, with the auto industry under pressure from electric technology. The sea change in politics, coupled with the economy nearing technical recession in 2019, does not bode well for the outlook in 2020.

Meanwhile the French economy, Europe's second largest, shrank in the last quarter of 2019. Nationwide strikes relating to pension overhaul were a significant feature towards the end of last year, but have recently ended, partly due to a capitulation by Government on increasing the retirement age. However, with further reforms in the pipeline and the threat of future strikes, further disruption is likely. France's domestic economy is due to grow as a result of tax cuts implemented in the 2020 budget and a tightening labour market. As one of the global leaders in the automotive, aerospace and railway sectors, as well as in cosmetics and luxury goods, a subdued global economy is likely to weigh on these exports, causing concern.

The ESRI predicts that the Irish economy will continue to grow at a rate of 3.3% in 2020. Unemployment is expected to remain low as the country reaches full employment. However, of all the eurozone countries, Ireland potentially stands to lose the most in a disruptive no-deal Brexit scenario, and so, uncertainty around Brexit will continue for a fourth year. Political uncertainty also prevails with the recent election and the increase in popularity of left-wing political parties.

In the UK, a comprehensive victory for the Conservative Party has resulted in some political certainty, as they enter negotiations over the future trade deal with the EU. The tight timeframe is a concern and a no-deal Brexit at the end of the year remains a possibility. The Bank of England recently downgraded growth projections for GDP to 0.8% and 1.5% for 2020 and 2021 respectively.

The European economy is barely growing - the ECB is operating with negative interest rates and has restarted quantitative easing.

The Israeli economy is expected to perform fairly well this year, with some commentators expecting growth of 3.1%. This growth is underpinned by a strong labour market, population growth and gas exports from the new Leviathan field. However, global trade tensions, a large fiscal shortfall, volatile regional geopolitics, particularly tensions with Iran, and domestic political gridlock all pose risks to the economy.

Record-length expansion for the US

The IMF projects that the US economy will slow slightly in 2020, but numbers still remain strong, continuing their longest economic expansion on record. In late January, the Federal Reserve left interest rates unchanged and changed their description of household spending to 'moderate' rather than 'strong'. Low unemployment and rising income are fuelling consumer confidence and modest household spending. With the upcoming presidential election, President Trump will avoid implementing policies that will negatively impact the economy and possibly jeopardise his opportunity for a second term in office.

Reaching stabibility in the GCC

Growth across the GCC countries is expected to remain modest in 2020. Oil prices are subdued, and although many countries in the region are diversifying away from their economic oil-reliance, the growth in non-oil exports is being hindered by the slowdown in the global economy. In the UAE, the economy is expected to pick up this year, as Expo 2020 restores business volumes and bolsters the tourism industry. However, already in early 2020, we see a decline in the Purchasing Managers Index and consumer pricing. Saudi Arabia, the largest economy of the region is expecting modest growth in GDP from a very low base in 2019. This projected growth is dependent on oil market conditions, with any pressure on oil prices resulting in a reduction in output, risking this growth projection. In Bahrain, economists expect 2020 growth to stabilise, rather than recover on the basis of flat non-oil-sector growth; the economy is vulnerable to the pace of disbursement of the $7.5 billion GCC development fund, which was announced in 2011. On the back of the Coronavirus and the associated reduction in demand, oil prices fell by 20% in early February from the same day in January. This volatility, together with geopolitical tensions in the region, pose major downside risks for the GCC going forward.

Kim Hegarty
Director


1893-1976

Lidl Ballymun - Student Accommodation, Dublin

Architect:
MCA

Linesight services:
Cost Management

GLOBAL INSIGHT

Managing bioreactor lead times for success in biologics

Because of their long lead times, bioreactors can greatly influence a biotech project's critical path and affect the overall project timeline. Linesight has conducted in-depth market research to better understand the current conditions, drivers and future trends of the bioreactor industry.

Jeff Peragallo,
Director and Vice President of Operations

Nigel Barnes,
Director of Life Sciences

Ronak Shah,
Scheduling and Project Controls Graduate

With the global healthcare spend continuing to increase dramatically and projected to reach in excess of US$10 trillion by 2022, pharmaceutical companies are making significant investments in the research, development, and manufacturing of biologics, which are drugs that are derived in living organisms. Biologics projects consist of many elements, including the overall design, construction, and start-up of the entire facility, but one of the most important pieces of equipment involved in the manufacturing process is the bioreactor. Because of their long lead times, these reactors can greatly influence a biotech project's critical path and affect the overall project timeline. By focusing early on a bioreactor's design and development, clients can control one key aspect in ensuring the successful and timely delivery of biologics projects.

Key considerations

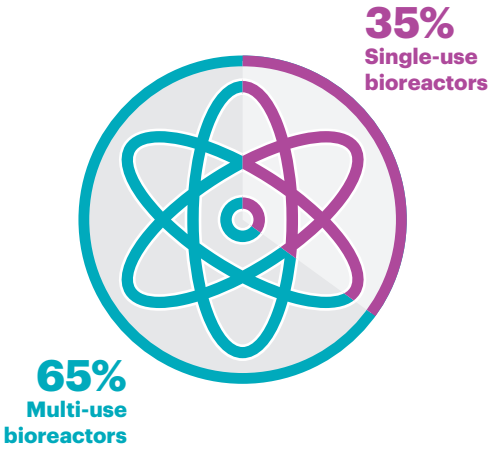
- Preparing for a project's success begins with understanding critical equipment lead times
- Bioreactors are major components in biologics facilities
- Developed by rigorously distilling project and market data, Linesight's diagnostic reveals vital insight into the impact of bioreactor lead times on the overall project timeline.

Investments in biologics are driven in large part by the global increase in life expectancy, improved access to medicines and the growth of non-communicable diseases, most prominently cancer, heart disease and diabetes. Spending on new cancer drugs alone is expected to grow by more than 50% over the next few years, with particular focus on the production of biologics. These biologics have revolutionised the treatment of many cancers and chronic conditions, such as multiple sclerosis, arthritis and rheumatoid arthritis, Crohn's disease and other autoimmune diseases.

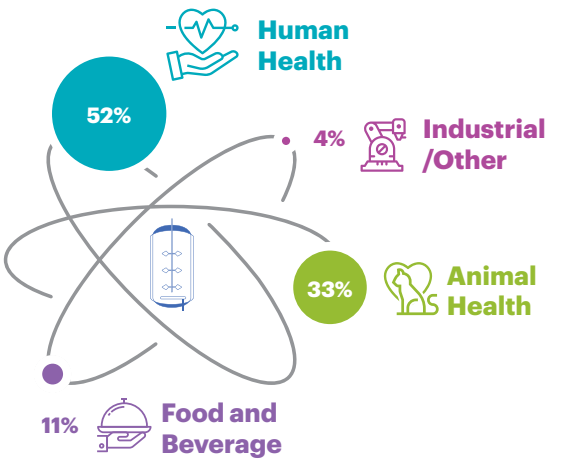
Additionally, established life science companies are upgrading their existing facilities to keep track with the latest regulations and technology. Start-ups are also joining the fray, as funding has become available based on the anticipated high return-on-investments. Thus, biologics manufacturing is expected to skyrocket over the coming years.

The manufacturing of biologics relies heavily on the use of bioreactors. A bioreactor is simply a vessel in which a chemical process, usually involving organisms or biochemically active substances derived from such organisms, is carried out. There are two types of reactors: multi-use and single-use.

TYPES OF BIOREACTORS BEING BOUGHT



WHO IS BUYING?



A single-use bioreactor, or disposable bioreactor, is a bioreactor that is lined with a disposable bag. A multi-use reactor is a vessel made typically of stainless steel or glass. With the full-on press of the pharma industry into biotech, the bioreactor market is red hot.

As such, with any significant investment, understanding the critical equipment and the lead times help our clients to better plan and prepare their projects for success. Our clients depend on us, as the market intelligence leader, to bring this insight to their projects.

To this end, Linesight created a diagnostic that was based on real-time data that was gathered through a survey administered to a cross-section of bioreactor manufacturers located across the globe. The respondents were business owners, operations managers, and sales managers with current project experience. The objective of the survey was to understand the current conditions, drivers, and future trends of the bioreactor industry.

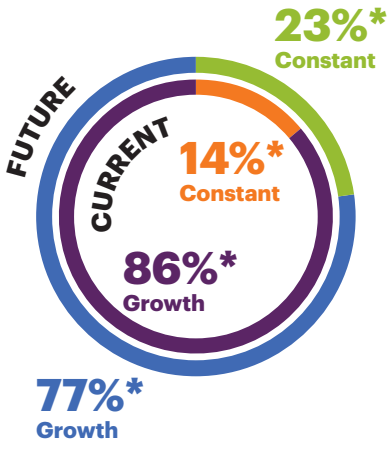
Insights and market forecast

Historically, the US and Europe have been the major consumers of bioreactors and continue to be in a strong position with robust demand. The US biologics market could, however, face possible threats to its vitality, depending on the US Presidential election and any incoming changes to policies regarding healthcare and drug pricing. The market in Asia, on the other hand, is having a major effect on the purchasing of bioreactors and is expected to see growth, with many of the bioreactor suppliers moving to the region to meet the demand. 80% of the reactor suppliers see the market increasing in activity, thus adding more pressure to lead times. The factors that are driving biologics are not expected to change if a global recession were to occur.

Conclusion

With their long lead times, bioreactors are driving the critical path of biotech projects. Though lead times are primarily influenced by reactor size and the manufacturers' supply chain, there are specific actions that clients can take to help minimise

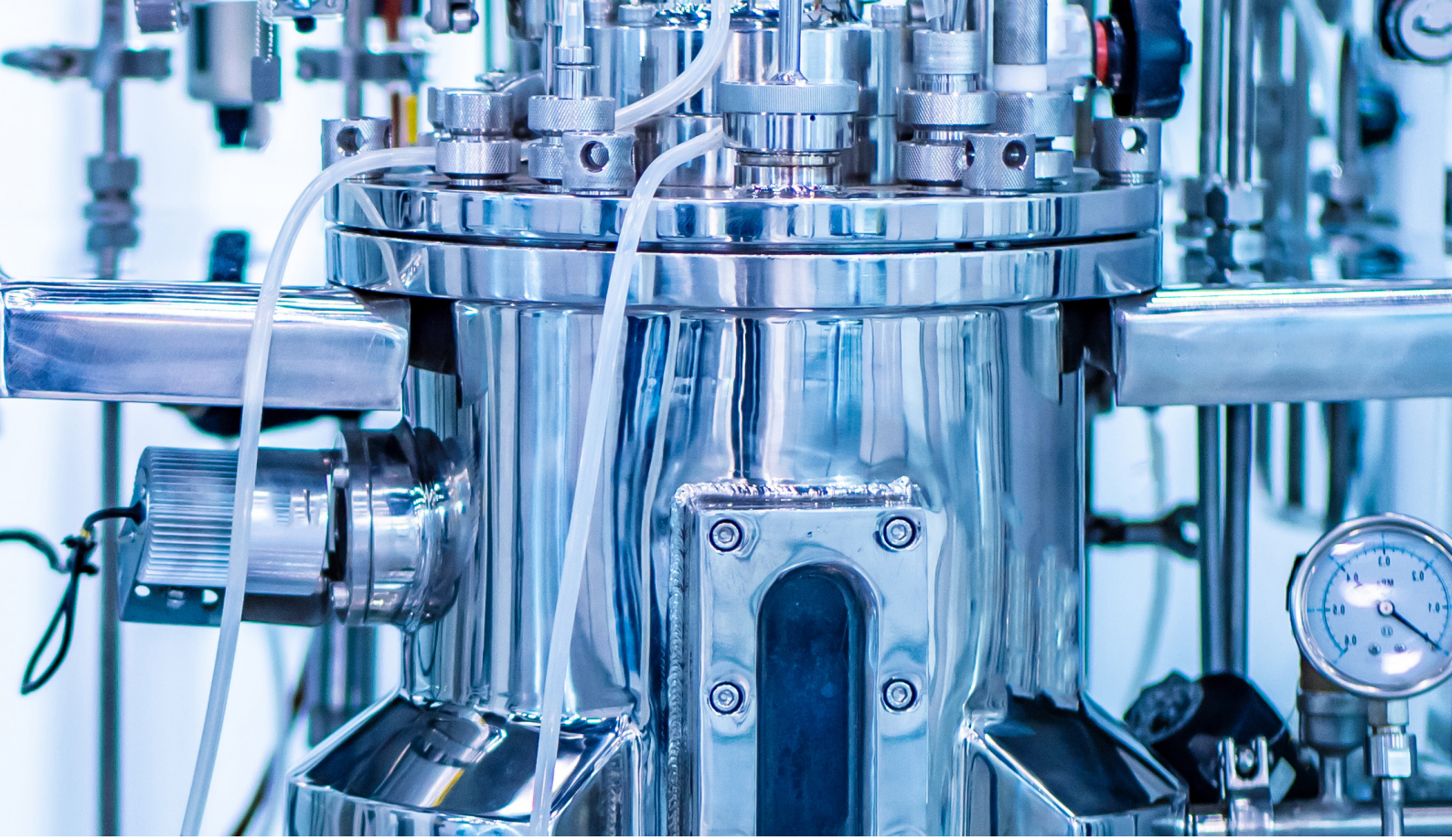
MARKET CONDITIONS



* % of respondents

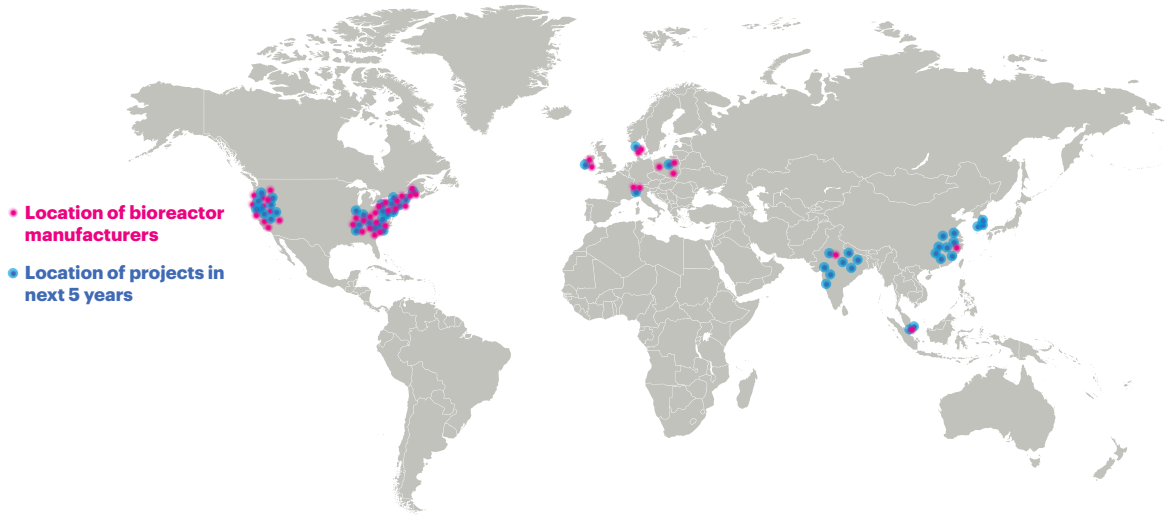
IMPACT TO MARKETPLACE IF GLOBAL RECESSION OCCURS

* % of respondents



delays by **locking in their process design early**, providing **focused show drawing reviews** and **streamlining approvals**. Linesight has seen success with clients that have a strategic focus on sourcing. These sophisticated clients have engaged Linesight to bring industry and marketplace expertise to help implement and execute sourcing strategies that are aimed to deliver value across their programme of work. These clients have successfully leveraged their buying power and have strategically aligned with some of these reactor manufacturers to improve costs and lead times. The work does not stop at the sourcing stage; order management is equally important, where focus must be on maintaining regular contact with the manufacturer and visiting the fabrication facilities to ensure processes are on track. Understanding bioreactor lead times and working with construction consultancies that have experience in reducing delays on this critical equipment are proactive steps to ensuring overall success on biotech projects.

WHERE THEY ARE VS WHERE THEY ARE NEEDED



GLOBAL INSIGHT

The rise of the smart hotel

Intelligent buildings are not a new concept, but the level of advancement is gathering pace, and the way in which smart technology is being adopted in the hospitality sector is evolving.

Andrew Callaghan,
Director

Des O'Broin,
Director

Hugh McElvaney,
Senior Quantity Surveyor

Intelligent buildings are not a new concept, but the level of advancement is gathering pace and the increasing adoption of smart technology is spreading across multiple sectors. While these core drivers impact every sector, the influence of technology and shifting demands is particularly significant within the hospitality sector, as it shows a marked shift towards integrating these technologies into the latest developments. This boils down to a few key factors, as discussed below.

The hyperconnected guest

One of the most fundamental drivers behind the trend for smarter hotels comes in the form of the rise of experience consumption, which is a key catalyst in a sector wherein consumer needs are front and centre. As noted by Alex Witkoff, Executive Vice President of Witkoff Development, at Bisnow's Hospitality Investment, Development and Management Summit in New York earlier this year, "Spending on the experience economy is expected to reach $8 trillion by 2028". The experience is becoming even more important to the guest and optimising this can make all the difference against an increasingly competitive landscape. Recent reports actually suggest that 2020 will be the year that customer experience overtakes price and product as the key brand differentiator.

There is a plethora of ways in which intelligent technologies can be leveraged in order to optimise the guest experience, but the crucial aspect is its ability to tailor and personalise their stay. Indeed, 86% of consumers say personalisation plays a role in their purchase decisions, according to recent Kahuna survey, and brands that incorporate personalisation by integrating data and advanced technologies report revenue increases of 6-10% (Qubit). Ultimately, Millennials or Generation Y form a very significant proportion of the target market, influencing the design of new hotels, from incorporating new technologies to the inclusion of co-working areas.

Customer expectations are evolving in line with their adoption of technology in their day-to-day lives. Guests are using technologies, from streaming services and smart assistants to remote climate control in their homes, so the expectation that hotels will have the infrastructure to support and match these technologies is taking hold. They expect the ability to tailor their experience to some extent, and to have the autonomy to control their space and hotel experience, including:

- Climate and temperature control
- Temperature for showers
- Curtain/drapes/blinds
- Entertainment systems
- Hands-free, voice-control
- smart assistants
- SmartBed™ technology
- Smart self-check-in/check-out kiosks

Needless to say, it is now the norm to interact with multiple devices at any given time.

Furthermore, hotels are now in a position to collect and analyse insightful data, and to anticipate, manage and understand guest preferences, in order to enhance the guest experience. Data-driven insights will help to personalise the experience and guide service provision.

Guiding operational efficiency

The second key driver lies in operational efficiency. Integrating smart technologies, from the simple occupancy detection systems to the more complex smart phones operating the lights and electricity within a room, keyless access and mobile check-in — these measures are proving to offer tangible benefits to the running costs of a hotel. We are moving towards the concept of a truly connected hotel, by leveraging Internet of Things (IoT) technology to ensure systems work together and communicate to deliver efficiencies in all areas. This extends from robot butlers delivering your room service to digital door signage functionality, to allow housekeeping staff to remotely see the rooms to be cleaned and devise an efficient workplan around that live data.

Smarter hotels in practice

Yotel, Citizen M, Best Western and Wynn Resorts are just some of the names adopting and promoting these new technologies.


32°
Sunny
1 Feb
Wednesday
25.3°

Marriott International is often perceived to be leading the charge in this regard across its 30 brands in 126 countries, from integrating keyless access on a widespread basis, to continuing to work on its connectivity and adoption of smart technologies via its IoT Guestroom Lab within its Innovation Lab. An example of how it is implementing this technology in practical terms lies in the Aloft Hotel chain, which sits under the Marriott umbrella. Linesight was a part of the team that delivered its Dublin City branch last year, with some interesting and forward-thinking technologies delivered as part of the project:

- Mobile check-in
- Keyless access via an app
- Wireless printing facility in reception
- Large video walls to reception and bar area
- USB charging sockets
- Integrated international adaptors in guestrooms
- A fully-integrated VRF AC system, controlling the room temperature and power supply to the room
- An integrated door sensor for room access. Once the room is activated by the guest's smartphone, the power is automatically supplied to the guestroom and the VRF system comes online and goes offline automatically when the room is unoccupied for any length of time
- An automated minibar system - once an item is removed, if it is not returned within a certain time period (can be set by the operator), a charge will be applied to the room for that item
- 43" smart TVs in all bedrooms with a casting system for the whole hotel, to allow guests to watch content from their own devices
- A room service robot named 'Lofty' or 'Botlr'. Once an order is made and placed, the robot travels to the lift, which it calls wirelessly on its way to the room. Once it arrives, the room phone will ring and inform the guest that the order has arrived

Costs

There are reasonably significant costs associated with upfront investment in these technologies and systems, including high-speed WiFi everywhere and boosters for the latest 5G mobile coverage, but the pace of demand for smart hotels and the latest technology is on the increase.

In summary, the hyperconnected guest, and their needs, evolving habits and expectations are driving the shift towards smart hotels. In their 'home away from home', they expect an integrated experience that aligns with the technology that they have become accustomed to in their day-to-day lives. Hotels should leverage the data that they can now readily collect to glean meaningful guest insights, and to anticipate and better manage guest preferences. Room presets based on loyalty scheme guest accounts can have the room set-up for guest preferences, including temperature, lighting and even minibar contents.

From an operational perspective, there are a multitude of benefits that arise from integrating smart technologies, from streamlining running costs and optimising operational efficiency, to reducing power consumption, and playing its part in making the hotel a more sustainable facility.

GLOBAL INSIGHT

The evolution of data centres

By 2025, the International Data Corporation (IDC) projects that the global need for data will skyrocket to 163 zettabytes. But how is this dependency on data in our day-to-day lives affecting the data centre sector?

Gavin Flynn,
Program Director

Eoin Byrne,
Associate Director

Today's world is dependent on data, and that dependency is growing. By 2025, the International Data Corporation (IDC) projects that the global need for data will skyrocket to 163 zettabytes. From our banking infrastructure to our smart homes, technology and information play an increasingly crucial role in every aspect of our daily lives. This demand will continue to propel the data centre market, which has changed dramatically since the 1940s, when large computer rooms like the Electronic Numerical Integrator and Computer (ENIAC) became the predecessors of modern data centres. From 2019 to 2023, the global data centre market size is expected to grow by US$284 billion, at a compound annual growth rate (CAGR) of more than 17%. But with the accelerated pace of innovation calling for facilities that are built faster, on tighter budgets and to evolving specifications, the construction industry must first understand the new challenges impacting the market. By bringing improved construction management methods like cost management, procurement and supply chain management, the industry can address the new challenges related to cost and time to market.

The impact of cloud and edge computing

The adoption of cloud infrastructure has heavily influenced the requirements of modern data centres. With the advent of cloud-based software platforms, the organisation of resources has shifted to hybrid cloud systems, which pools off-premises and on-premises resources to optimise digital processes.

Another shift in workflows that affects the market is the rise of edge computing. More Internet of Things (IoT) devices, and the increased need for real-time data analytics and interactions, have pushed the demand for applications to have their computing processes closer to end users, which is usually at the edge of a network. By 2025, it is projected that 75% of enterprise-generated data will originate and be processed outside of traditional data centres or clouds.

This restructuring of digital resources has caused many enterprises to begin shifting from owning or operating their own data centres to incorporating colocation and managed hosting services. Businesses are now spending more on cloud infrastructure services than on data centre hardware and software: from 2009 to 2019, spending on cloud infrastructure services has grown by 56% annually to nearly US$100 billion, while annual enterprise spending on data centre hardware and software grew by only 4% on average.

Hyperscale and colocation

This substantial change in how digital resources and infrastructures are managed has boosted the hyperscale market, but also shortened project timelines. More than half of data centre hardware and software spending now comes from cloud providers' hyperscale facilities. This massive demand for more capacity means that previously acceptable project durations are no longer sustainable. Providers must explore other options to reduce their construction schedules, which can include changing designs, land banking, developing cold shells and applying pressure to the construction market to match the speed of data centre growth. The added demand has a domino effect. If hyperscale facilities and their supply chains cannot meet the need for more capacity, enterprises can lease more space from colocation providers to handle changing workload requirements.

Modular construction

Another way in which data centre demands can be met is by adopting a modular construction approach. By applying modular techniques, speed to market can be addressed with an efficient supply chain. Modules can be manufactured offsite and tested for compliance, while the shell and core are built on location. Once the modules are ready, they can be shipped to the site and installed quickly. The simultaneous progress of all elements of the build shortens schedules significantly, with a 25-30% reduction in the time needed to build and commission a modular project.

There is also the added benefit of cost efficiency when adopting a modular approach. This is achieved by standardising certain building materials and designs. The modular method also employs economies of scale, where building materials that are mass-produced can be made at a lower cost.

Supply chain and procurement management

While modular construction methods may help in preventing delays and cost overruns, supply chain and procurement management processes are also extremely important tools that can be used to drive down costs and control project schedules. With market growth comes stress on the pool of available equipment manufacturers and suppliers, and if there are delays to equipment deliveries, then there will be interruptions in the overall project schedule. Equipment is a critical part of the project and can have a direct impact on a provider's ability to complete builds on time. By having an established supply chain with robust contracts, providers can take proactive steps to protect themselves.

Vendor Managed Inventory (VMI) is another key element. With the market moving towards more cost effective and consistent oversight of large equipment, VMI provides suppliers or the supply chain with more certainty around the construction project pipeline. This in turn helps them to be more economical and flexible to align with their customers' demands. VMI also enables owners and data centre providers to reduce their overall lead time. Collaboration and information sharing between clients and suppliers are essential to drive these results. By implementing supply chain and procurement management processes, and working closely with suppliers, project costs can be reduced and delays can be minimised.

The next step in data centre construction

The changing requirements of data centre builds and the growing demand for capacity highlights the need for a solution that can bring projects to market quickly and within a reasonable budget. Providers must now look beyond traditional construction techniques to meet market demands by employing a developed approach to procurement and supply chain management in navigating the new age of data centre construction.

GLOBAL INSIGHT

The true adoption of BIM - adding tangible project value?

Despite improved quality of information, as well as more accurate and speedier cashflow analyses being obvious advantages in the built environment, these benefits of BIM are often not realised to their full potential, due to implementation or adoption issues.

Diarmaid Connolly,
Associate Director

It is fair to say that BIM has been a topic of great interest within the construction industry over the last number of years, hailed as one of the core ways that we as an industry are embracing technological evolution, tackling inefficiencies, improving information quality and increasing design team collaboration. It is true that it offers a number of distinct advantages, and yet, as noted by John Hainsworth of Aurecon in his article, 'The promise of 'digital' won't be achieved by doing things the way we've always done things', with an array of definitions and a lack of clarity surrounding BIM, its full benefits are yet to be realised. John points to the fact that its implementation is often carried out in a file-based, transactional manner, with a truly collaborative approach absent and ways of working essentially the same as they have been traditionally – just using the technology to do the same things and missing out on the potential benefits.

At Linesight, the lack of willingness to fully adopt is something that we see on a global basis, although the extent does vary somewhat from region to region. We have adopted BIM on a global basis and invested heavily in its implementation, both in hardware and software, and in continuous staff training, to ensure that we are up to date with the latest developments and at the forefront in terms of its effective utilisation. Below is a summary of the key benefits that we see in the effectual use of BIM.

Speed and agility

The pace at which estimations can be produced increases considerably with the use of BIM, and this is one of the key advantages of its effective implementation. It enables the creation of option costs with greater speed, as well as the potential for live cost planning and modelling – introducing a level of agility with cost planning and estimating that has not traditionally been possible. Ultimately, this leads to faster decision-making and thus, a faster speed to market.

Accuracy and quality

Information accuracy and quality has been a particular challenge for the industry in recent years, with the UK's 'Get It Right' initiative finding that information errors cost the industry an estimated 5% of project value globally. In addition to the abovementioned speed and agility benefits, effective BIM implementation increases the accuracy with which cost estimating, planning and modelling can be carried out, by minimising the risk of human error, as well as supporting a higher quality of information. This in turn leads to a more cooperative project, as tenderers are much less likely to recover costs incurred due to poor or inconsistent information.

Increased productivity

While increased collaboration is often touted as a key benefit associated with BIM, this is not something that comes to fruition as often as one may think. The technology facilitates clarity, transparency and real-time sharing of information across the project team, coordinating information from various disciplines and eliminating version control issues, as well as keeping the lines of communication open. However, a proactive approach is needed across the team to actually realise these benefits, which is quite often lacking.

Cashflow

Managing and forecasting cashflow throughout a project is fundamental to its success, and traditionally, cashflow analysis is a lengthy and tedious process. From Linesight's perspective, this is one of the biggest advantages associated with BIM – its effective adoption facilitates more accurate speed forecasting by linking cost-loaded models and programmes, with more detailed models producing more accurate cashflow analyses. Ultimately, our early involvement in a project means that cashflow investment can often be deferred, which is particularly beneficial for projects with a large capital spend.

Cost intelligence

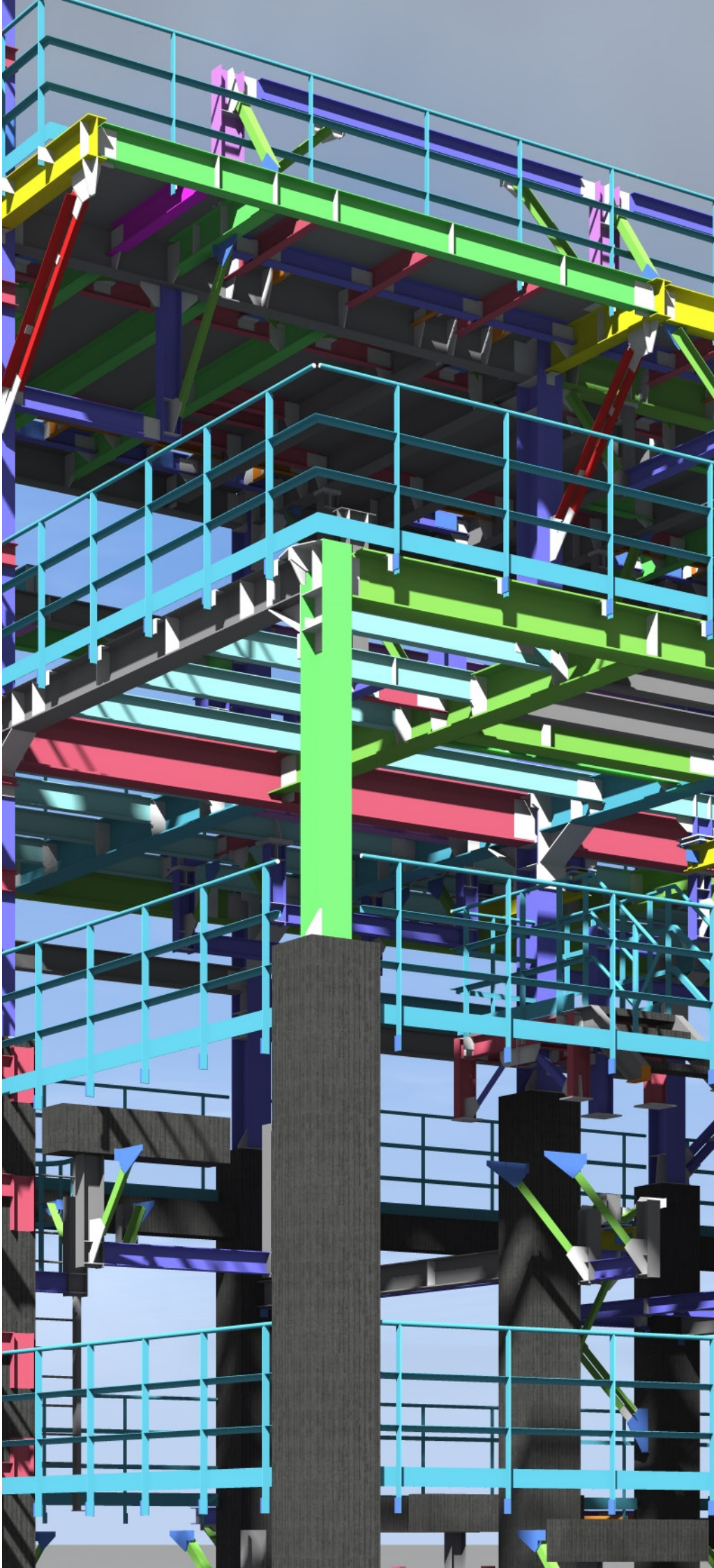
While benchmarking is not a new methodology, BIM facilitates it at a more accurate level as costs are broken down in more detail in the models, so by splitting the model, it allows us to benchmark

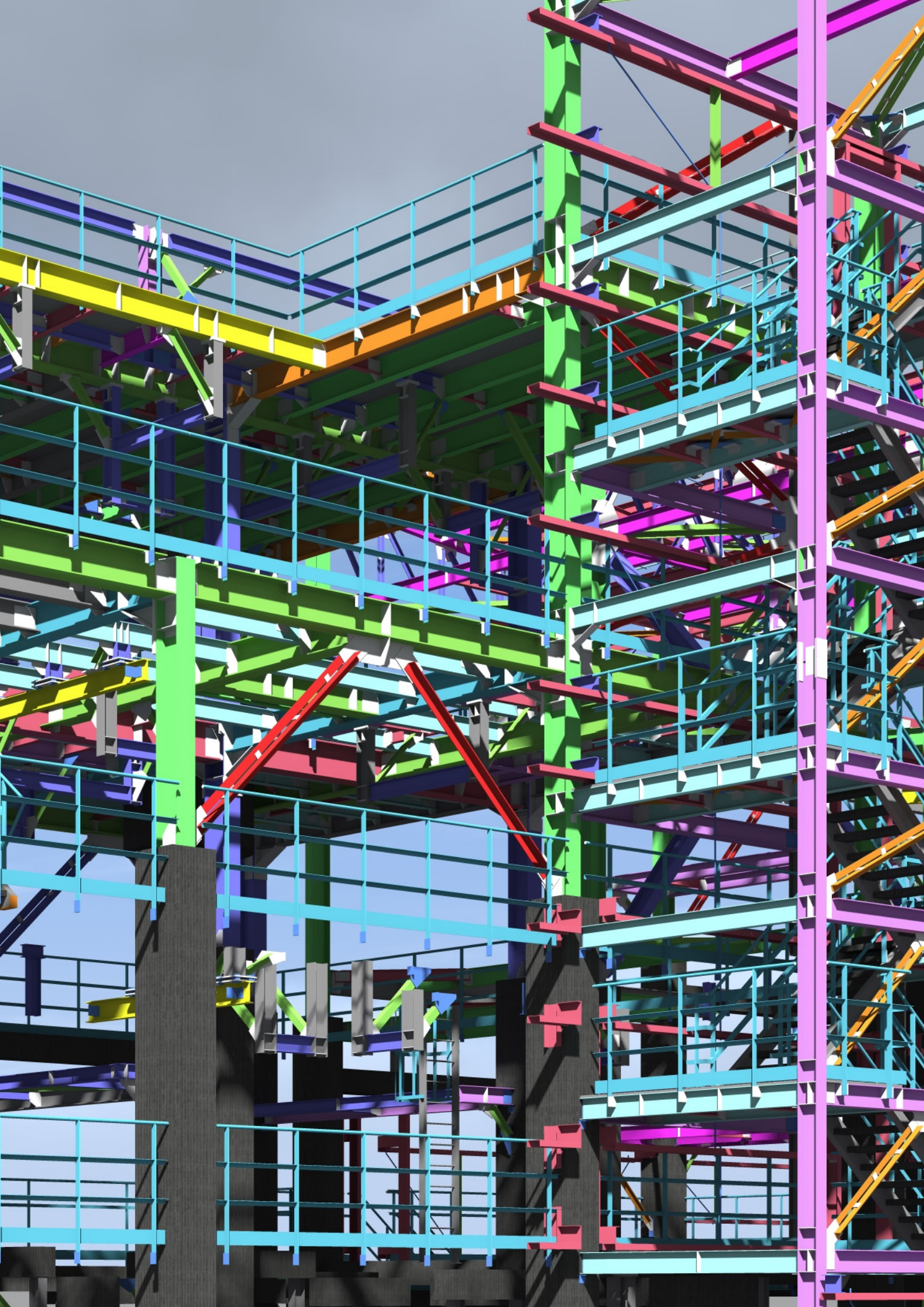
specifics. However, by using BIM to its full potential, it pushes this further, to what we refer to as cost intelligence. With a deluge of complex data associated with projects nowadays, utilising the latest data visualisation tools brings this data to life in a meaningful way – illustrating trends and concepts in a quick and easy-to-digest format, allowing project teams and clients to draw conclusions from large volumes of data and inform effective decision-making.

In summary

While the benefits of BIM are often well-covered, these are not often realised to their full potential due to implementation or adoption issues. Ultimately, the technology is there, but not the willingness to take the leap of faith to truly adopt and trust the use of BIM. At Linesight, we believe that clients and design teams should consider this sooner rather than later, as the rewards are rich. We've made the jump and seen significant benefits in the built environment for our clients – are you ready for the leap?

Information errors
cost the industry an estimated
5% of project value globally.





GLOBAL INSIGHT

PBSA - an updated cost analysis

Since the 2018 Linesight report on purpose-built student accommodation, the sub-sector has continued to evolve, as the pipeline remains strong in response to significant demand.

Eoghan Tangney,
Associate Director

In our 2018 Linesight report on purpose-built student accommodation, we carried out an in-depth analysis into the sub-sector across a range of different areas, from macroeconomics to planning. Since then, PBSA has continued to evolve in Ireland, as the pipeline remains strong in response to significant demand. In this article, we provide an updated cost analysis for the six distinct headings under which PBSA direct construction costs can be broadly categorised. The cost range highlighted in brackets in each section is expressed over the total building area (basement as applicable, superstructure including circulation areas).

Preliminaries

The cost of preliminaries is closely linked to the complexity, challenges and risks presented by particular projects. These can range from a low of 11% (of the construction costs) to a high (albeit less common) of 20%. As the industry has recovered, and as the volume of work has increased, contractors are looking in much more detail at the costs and risks associated with undertaking more complex and challenging projects. The effect of this has been a significant increase in the tender price included for project preliminaries, and even more so when looking at tight brownfield city centre sites. The impact of this increase is by no means insignificant, and can amount to anywhere between 11-16% for PBSA projects, dependent on the scale and complexity of the project and site selection (range €280 to €390+/sq.m.).

Site clearance

The cost of site clearance will vary greatly depending on site location – greenfield or urban renewal. There may be existing buildings to be demolished, or asbestos and ground contamination to be addressed etc. (range €45 to €65+/sq.m.).

Basement costs (where relevant)

Basement costs typically pertain to urban PBSA sites, where due to limited site area and building height restrictions, there is a requirement to maximise site utilisation with the construction of basement space for plantrooms and storage areas (e.g. bicycle storage) (range €300 to €500/sq.m.).

Basic building costs

Basic building costs excluding fixed and loose furniture vary enormously depending on the choices of façade treatment, core density, quality of finishes selected, choice of mechanical and electrical systems, and module size.

Abnormal costs, such as transfer structures relating to ground floor retail or upper floor area set-backs, contribute to this cost range (range €2,180 to €2,475/sq.m.).

Furniture, fixtures and equipment

Loose and fitted furniture fixtures and equipment costs can vary significantly, depending on the extent of common area fit-out, including gymnasiums, cinema rooms, group study areas, etc. (range €130 to €175/sq.m.).

Site works and landscaping

The range of site works and landscaping costs vary significantly depending on the extent of the site area that forms part of the development, for example, landscaping, surface car parking, boundary treatment, surface water attenuation etc. (range €65 to €95/sq.m.).

Summary of costs

PBSA is often expressed on a cost-per-bed-space basis; however, the primary driver of cost in any building is its size (gross floor area). Expressing PBSA costs by bed space can be misleading, as the bed space area varies significantly from one scheme to another, depending on density, bedroom arrangement (cluster size, hall of residences, studios), bedroom size (single-study bed space is 12 to 13sq.m. typically, including en suite) circulation efficiencies, social/reception area, retail and basement.

The table on the following page gives an indicative construction cost range for the development of PBSA, and is based on recently completed and live projects in the Dublin, Cork and Galway areas.

Aungier Street Student Accommodation, Dublin

Architect:
Stephen Marshall Architects

Linesight services:
Cost Management

Table 1 - Cost range for the development of PBSA

Ref	Project elements	Low range /sq.m.	High range /sq.m.
1	Preliminaries	€280	€390
2	Site clearance and preparation	€45	€65
3	Basic building cost	€2,180	€2,475
4	Furniture, fixtures and equipment	€130	€175
5	Site works	€65	€95
	Estimated total cost (excl. basement)	**€2,700**	**€3,200**

Notes: *The costs above exclude for works associated with basement construction and are based on a gross bed space area of 30sq.m. Should a basement be required this could mean an uplift of between €300 and €500 per sq.m.*

Table 2 – Spread of costs for PBSA projects

Cost range per room	Number of live Linesight projects	Number of rooms
€80,000 - €85,000	3	1,660
€85,000-€95,000	6	2,009
€95,000-€105,000	3	1,601
In excess of €105,000	3	567

Notes: *The above projects represent 5,837 PBSA rooms on which Linesight is working. With due regard to the wide-ranging variables, the above range would be from circa €81,000 to €96,000+.*

GLOBAL INSIGHT

The importance of institutional investment in real estate - Ireland

Institutional capital has become a significant component of both global and local markets. Its growth here in Ireland has been driven by a range of factors, and going forward, it is imperative that Government policy facilitates the positive impact that institutional investors are having.

Stephen Ashe,
Director

Institutional capital has become a significant component of both global and local markets. Thankfully Ireland has moved from a speculative, debt-based funding model to the current model, enabled by long-term institutional capital. These investors are vital to the delivery of the much-needed critical infrastructure within Ireland, and play a major part in the delivery of the required housing supply. Irish Institutional Property (IIP), launched last year, is the voice of the sub-sector seeking to increase the understanding of the positive role and impact of institutional capital in enabling economic growth and development. Critical in sustaining institutional investment is the need for public policy predictability and stability, as planning and investment decisions are based on a long-term view for such investors.

The mission statement of IIP

The mission statement of IIP is "to promote the development of a sustainable world class real estate sector in Ireland, which benefits members, the economy, communities and wider society". This will be achieved by focusing on the following key objectives:

- Foster proactive and open communication between members and with all key stakeholders on matters of common interest
- Leverage member insight to provide thought leadership which supports the development of a sustainable property sector
- Constructively engage with government, legislators, policymakers and other relevant stakeholders to maintain a stable and properly functioning property market
- Position Ireland as a preferred location for institutional capital investment, supporting economic growth and the development of sustainable communities and workplaces.
- Support the modernisation and professionalisation of the sector by continuously improving the quality of the built environment.

National Planning Framework

The Department of Housing, Planning and Local Government has prepared and published the finalised National Planning Framework under Project Ireland 2040. It will guide strategic planning and development for the country over the next 20+ years, so that as the population grows, the growth is sustainable (in economic, social and environmental terms).

The plan's objectives are to sustain growth, including the promotion of compact growth in Irish cities to avoid urban sprawl, as well as goals for sustainable mobility and regional accessibility. Key aspects include:

- Population growth of over one million through 2040
- 550,000 new houses to house the growing population
- 660,000 new jobs to employ the population
- 22 new road projects, in addition to 23 road projects currently in planning, design and construction

In order to pay for this, significant public capital expenditure is required with €116bn earmarked for investment through to 2040. We note that the IIP estimates that private sector investment will need to be multiples of this (projected to be circa. €322bn) to provide the housing, office space, retail space and other amenities required. As such, it is vital to the future of our economy.

Key issue – viability of residential development

As noted above, institutional investors are playing a significant role in the delivery of much-needed housing supply, in particular within the rental market. It is a driving force behind the increase in the number of apartment units in planning and granted permission in Dublin. The recent change in planning regulations relating to build-to-rent (BTR) in Ireland has improved the viability. However, the viability of build-to-sell (BTS) is still under pressure, in particular for apartment development. Key reasons for this include:

- Land supply and cost
- Cost of finance
- Delays to planning and infrastructure delivery
- Government taxes and levies on new construction
- Overall increases in construction costs

The above, together with Central Bank borrowing limits and deposit requirements, means that actual sales at viable prices are very slow. All stakeholders must come together and focus on solving this problem.

It should be noted that the existence of institutional investors who are acquiring large blocks is facilitating the supply of apartments that may otherwise have been unviable to build. This is due to the fact that institutional investors can source finance at low rates, and also take a long-term view. The BTR model is a yield model, and is not reliant on sales to make it work.

Building at height and increasing density in key urban areas

Ireland is redefining the profile of its cities upwards, building and planning a new generation of taller buildings. This is necessary, against a backdrop of growing urban populations, increased traffic congestion and a shortage of development land.

The Department of Housing, Planning and Local Authority published its Urban Development and Building Heights Guidelines in August 2018. These guidelines "consider the role of building height as part of a broad strategy to increase housing delivery and choice, through more compact and diverse urban form, to assist in counteracting sprawl and promoting enhanced sustainability in meeting strategic development needs".

In our 'Building Taller in Ireland' report, published in October 2019, Linesight outlined some of the planning policy problems encountered with tall buildings and the inflexibilities around same. Difficulties are also being encountered with local authorities providing appropriate zoning and planning along key transport hubs, such as the LUAS.

Increased height and density in key hubs has many advantages, including:

- Helps alleviate growing congestion problems
- Restricts inefficient outward sprawl
- Provides more space for people to live near where they work or on an efficient transport link
- Provides a greater return on investment in public transport
- Enhances work-life balance
- Attracts foreign direct investment and local investment
- Provides for more efficient use of land, which is a finite resource

Capacity to deliver pipeline

Major challenges continue in Ireland around the availability of construction resources and skills shortages. This in turn is contributing to construction price inflation. The industry has taken steps to address the skills shortage by employing greater numbers of apprentices, and also by recruiting more people from abroad, both returning emigrants and new immigrants.

Construction tender levels are continuing to increase at a pace well ahead of general inflation, and this is affecting the viability of some construction projects. However, while prices are still rising significantly, the pace of the increase is slowing, and this is to be welcomed.

To counteract some of this strain on resources, a number of our clients are looking at the benefits of off-site manufacturing (OSM). OSM is a more efficient form of construction than traditional build, benefiting from digitisation and leveraging available technologies to streamline the design and construction process. Key benefits of OSM include:

- Build time on-site is fast (circa. 60% quicker than traditional construction)
- Speed to site of a finished product, as modules are complete internally when delivered
- Pushes the client and design team to design the full project in advance of commencement in the factory, thereby reducing overall design development risk
- Construction works are undertaken in a controlled factory environment, with improved working conditions and efficiency, health and safety, and quality standards
- The labour force on-site is significantly reduced, requiring a small, experienced crew to locate the modules, and a similarly small fit-out crew following on to connect services

Institutional investors generally have both the funding models in place and the development pipeline to address the requirements of OSM. At Linesight, we feel it is imperative that large developers embrace OSM.

Summary

In summary, and as outlined by the Department of Finance paper 'Institutional Investment in the Housing Market' in February 2019, "The growth of institutional investment is the result of a structural change in the market. The change has come from a combination of post-crisis capacity constraints in the financial and construction sectors; long-term societal changes such as increasing urbanisation and changing tenure profile; and the desire to avoid previous mistakes by improving spatial and urban planning".

Looking forward, it is imperative that Government policy facilitates the positive impact institutional investors have in Ireland.

GLOBAL INSIGHT

The rise of institutional investment in purpose-built BTR in the UK

Institutional capital has become a significant component of both global and local markets. But how is it specifically impacting the UK market, as structural change towards renting-only further reinforces demand for purpose-built BTR?

Giles Heather,
Associate Director

In the space of just a few years, the UK build-to-rent (BTR) sector has come into its own. While not a new phenomenon globally, it has cemented its position in the UK as a distinct asset class, evolving away from the pre-existing private-rented sector.

Triggered by the introduction of buy-to-let mortgages in the 1990s, owning rental property has been a popular investment for small businesses and individuals for decades. However, a lack of investable assets at scale, the absence of investment vehicles with a robust track record, and the intensity of day-to-day management tasks have historically held back institutional investment.

Why the institutional approach?

Today's landscape for rental investment has significantly changed. Demand has continued to increase, with 1.7 million more rental households in 2017 compared to 2007, according to the ONS. This means that rental homes need to be built at scale, something that smaller landlords cannot do meaningfully. Tax and regulatory changes have also started to bear down on amateur landlords, leaving a gap in the market that has been seized upon by long-term institutional investors.

This has come in the form of purpose-built BTR: a distinct investment type, with different physical and operational characteristics compared to converted stock. Large, multi-unit blocks offer the scale to attract large investments, which ensures schemes are built to meet tenant needs and designed to the most operationally efficient specification possible.

Economies of scale reduce overall running costs while increasing net income flows. This allows operators to provide a variety of facilities and amenities, such as free WiFi, private cinema, gyms, a 24-7 handyman service and resident lounges, giving residents access to lifestyle services that home ownership and rental of converted stock cannot. Operators also retain tenants by offering a customer-focused service and running developments in a way that encourages tenants to build networks and establish roots, for example offering social clubs or having a communal roof terrace. This institutional approach means that the UK's rental sector is being professionalised, setting new industry standards in management.

As the sector has matured, it has attracted alternative sources of capital into the residential market. Unlike traditional house building, typically adopting a short-term investment approach, BTR focuses on long-term income streams. This has made it attractive to pension funds, helping to meet long-term liabilities, while providing a hedge against inflation. Greystar, for example, is planning to raise capital from major pension funds and insurers for its BTR fund, and will leverage Greystar's vertically integrated platform to establish a best-in-class portfolio focused on London.

Why BTR Schemes?

The investment rationale for purpose-built BTR is a strong one: investments are underpinned by stable occupancy rates, producing consistent cash flows; rental growth continues to outstrip inflation; and needs-based demand is decoupled from economic volatility.

Building large schemes has a number of advantages. Sites can be cherry-picked in areas of potential high growth and demand, maximising returns, while providing homes in areas that need it. Legal & General, for example, has focused on key regeneration areas, such as Salford, that have been transformed with improved services and infrastructure, attracting new residents.

Purpose-built BTR can also be delivered much faster than other forms of housing. Compared with 'For Sale' developments, investor capital can be deployed and start generating returns much more rapidly.

Addressing the supply-demand imbalance

The speed of delivery for purpose-built BTR means that the sector has received wide Government support as a means of tackling the UK's housing crisis.

In terms of new and upcoming construction starts, purpose-built BTR has 110,000 homes currently in the pipeline, according to the British Property Federation and Savills. The sector will inevitably make a powerful contribution towards delivering the 300,000 new homes needed each year in the UK. This should have knock-on effects on both rental and 'For Sale' home affordability, beginning to address the current supply-demand imbalance.

In summary

The continued structural shift towards renting-only further reinforces demand for purpose-built BTR. Long-term, transparent leases will continue to attract residents looking for flexibility and security, as well as those looking for a more lifestyle-led proposition. In a time of economic uncertainty, diversification benefits from more cyclical investments also continue to attract capital from an increasing number of alternative sources, meaning the future looks bright for purpose-built BTR.

There are currently
110,000
purpose-built
BTR homes
in the pipeline.

GLOBAL INSIGHT

Building taller in Ireland - a benchmarking exercise

Following on from the Linesight 'Building Taller' report, released in October 2019, we include an extract of the report, covering the benchmarking exercise that we conducted in order to provide a meaningful cost analysis.

John Finnegan,
Associate

As part of the Linesight 'Building Taller' report, released in October 2019, we conducted a benchmarking exercise in order to provide a meaningful cost analysis.

The benchmarking exercise was based on relevant data taken from a sample of 500,000sq.m. of commercial project experience, and 15,000 residential units on which Linesight is currently providing cost consultancy services.

This benchmarking information is used to present cost comparisons across a number of buildings, where Linesight has provided cost consultancy under their separate distinct use, between commercial and residential. We would note that the results of the benchmarking exercise demonstrate that differences unique to each project exist, and there is variety in terms of shape, size and design.

However, where similarities in terms of design are identified, the results of the benchmarking pinpoint the changes in the elemental costs that are commonplace to the project. This is demonstrated in the following charts.

Figure 3 compares the elemental shell and core, and CAT A costs over a number of commercial buildings that were benchmarked. The graphs track the buildings in their varying heights, from low-rise to taller buildings, and validate the introduction of new elemental costs (sprinkler) and the increase in the predominant elements (structure, façade, etc.) as the building height increases. The percentage increment in costs is also displayed at the top of each bar to provide clarity as to the overall cost increase.

Figure 1: Linesight commercial experience used for benchmark

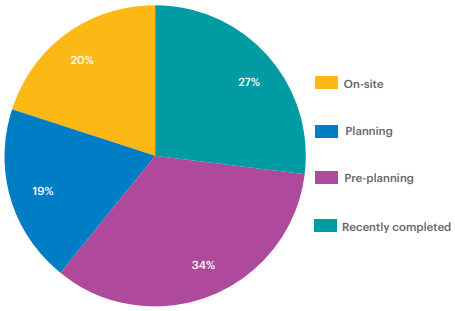


Figure 2: Linesight residential experience used for benchmark

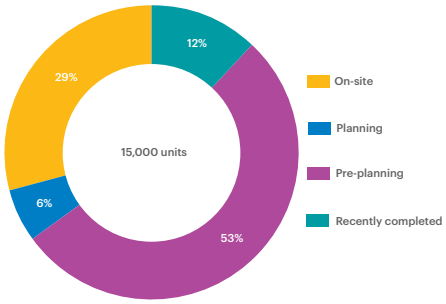
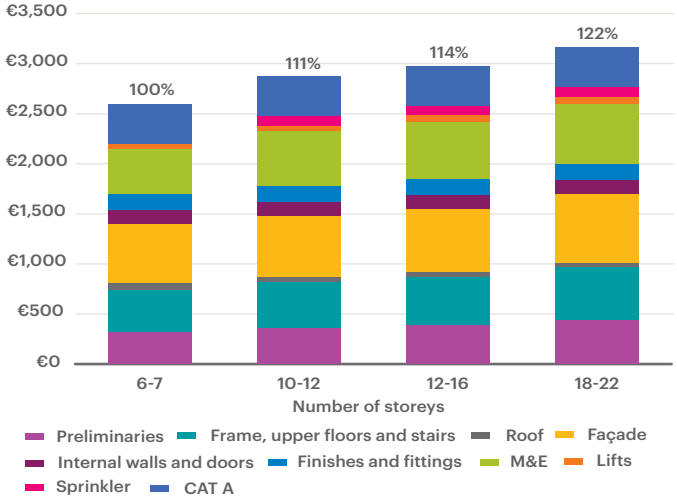


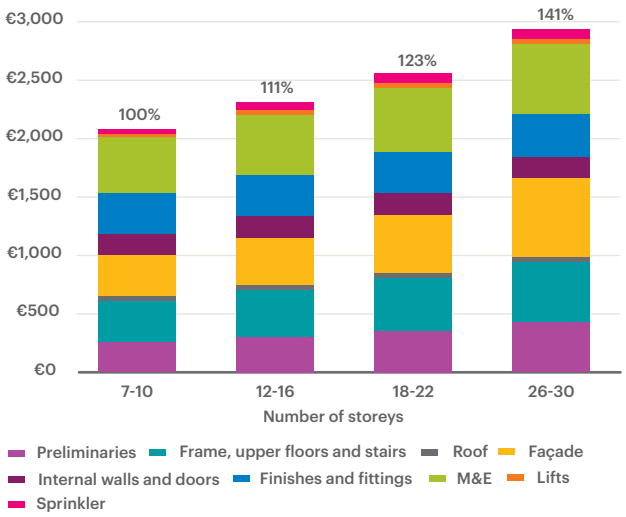
Figure 3: Commercial shell and core, and elemental CAT A benchmarking



Notes: *Substructure and basement construction costs are excluded from the above. External and site works are excluded for comparison purposes. Excludes shell and core enhancements such as twin-skin façades, interconnecting stairs, feature atria, etc.*

Exclusions*: Inflation, contingency, site acquisition, finance, VAT, local authority contributions, professional fees, demolition, any costs associated with ground conditions below ground, archaeology, marketing, works outside boundary of site. The above assumes a wall-to-floor ratio of 0.64 and net-to-gross varying from 83-75% (low to high-rise).*

Figure 4: Residential elemental shell and core benchmarking



Notes: *Substructure and basement construction costs are excluded from the above. External and site works are excluded for comparison purposes. Loose fixtures, fittings and equipment are excluded from the above costs. Excludes shell and core enhancements such as twin skin façades, interconnecting stairs, feature atria, etc.*

Exclusions*: Inflation, contingency, site acquisition, finance, VAT, local authority contributions, professional fees, demolition, any costs associated with ground conditions below ground, archaeology, marketing, works outside boundary of site. The above assumes a wall-to-floor ratio of 0.50 - 0.70.*

As per the commercial graph in Figure 3, Figure 4 tracks the buildings in their varying heights from low-rise to taller residential buildings, with the percentage increment in costs to provide clarity as to the overall cost increase.

Understanding cost drivers

To further determine the rise in costs due to the increase in the height of buildings, the following considerations, in addition to the waterfall charts on the following page, outline the point at which costs and design change as we start developing from a low-rise building into a taller structure. The increase in costs can be demarcated by the following:

1. Preliminaries – increase in heavier plant and equipment, working restrictions, welfare facilities distributed further up the building as work progresses, and health and safety measures
2. Structural increases – enhanced cores, to deal with structural and service requirements and occupation requirements, as well as increasing the number of fire escapes for evacuation strategies. Additional structural enhancements will be required to deal with loadings (lateral and vertical)
3. Façade – higher costs are due to increased aesthetics, less efficient wall-to-floor ratios due to slenderness, additional performance requirements, wind loadings, control of solar gain and façade maintenance measures
4. Sprinklers – the requirement for various sprinkler systems
5. Services – further cost to boost water supplies, pressurise heating and introduce interstitial plant floors
6. Balconies (residential) – expensive solutions, such as recessed balconies and winter gardens are introduced
7. Lifts – additional number of lifts, and the speed of the lifts begin to increase also

The waterfall charts on the following page for both commercial and residential developments display the demarcation in terms of the costs under the headings outlined above.

Figure 5: Indicative costs relating to commercial developments, increasing from low-rise to high-rise

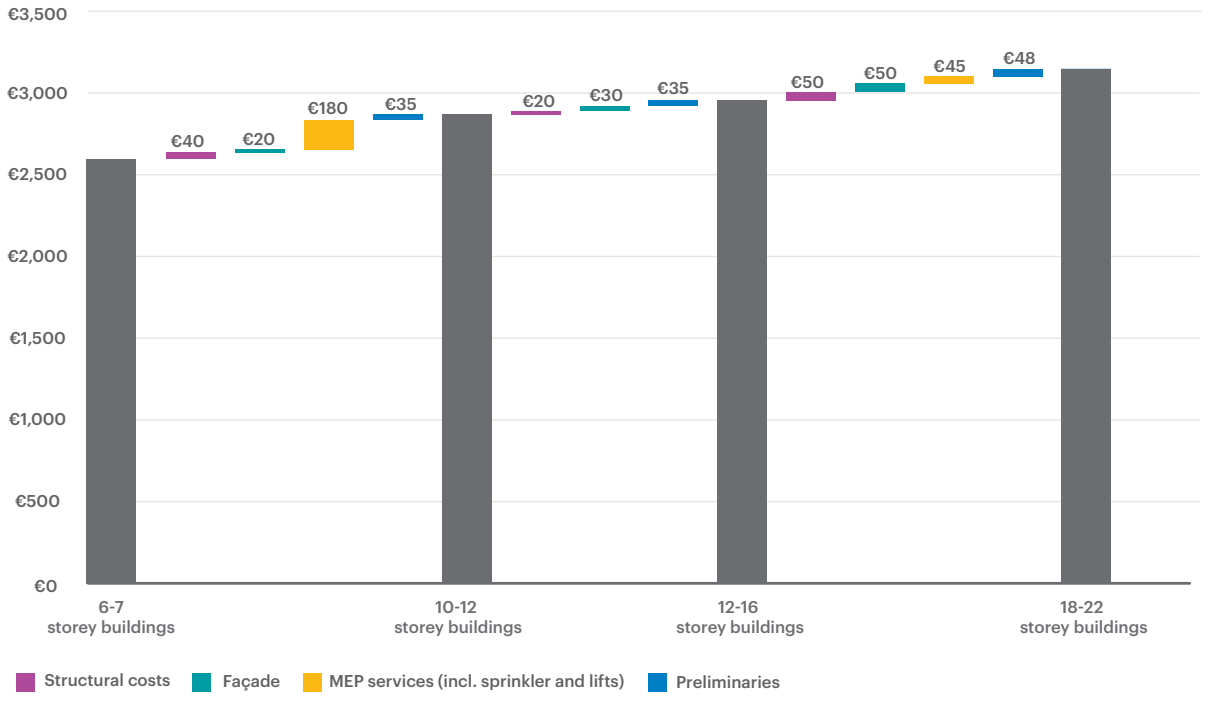
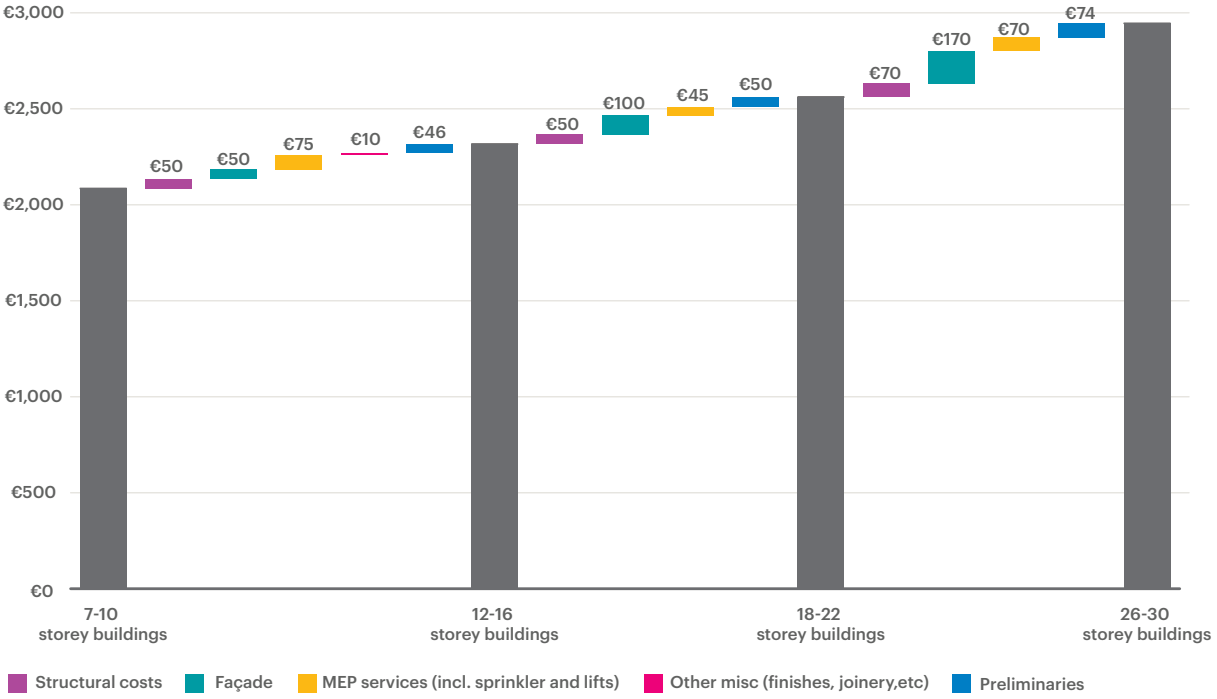


Figure 6: Indicative costs relating to residential developments, increasing from low-rise to high-rise



Notes: *Substructure and basement construction costs are excluded for comparison purposes, as are local external works and site works. Commercial costs exclude CAT B and tenant fit-out, including furniture, IT, AV equipment etc. Residential costs exclude floor finishes, as well as FF&E. General exclusions include inflation, contingency, site acquisition, finance, VAT, local authority and utilities contributions, consultant and professional fees, surveys, demolition, contaminated material disposal, abnormal ground conditions, archaeology, marketing, and work outside boundary of site. Figure 5 assumes a wall-to-floor ratio of 0.64 and net-to-gross varying from 83-75% (low to high-rise), while Figure 6 assumes a wall-to-floor ratio of 0.50-0.70.*

GLOBAL INSIGHT

Keeping it Lean and bringing contractors along for the journey

Lean concepts have been applied with much success in many industries and service provider organisations around the world. But how can it positively impact the built environment and why has its adoption amongst contractors been relatively slow to date?

Jeff Peragallo,
Director and Vice President
of Operations

Pat Unger,
Associate Director

With the ever-growing demands and complexities associated with the built environment, and the well-publicized productivity challenge within construction (more than 70% of all construction projects are completed late and over budget), it is evident that the industry requires some level of disruption to enable it to keep apace of the progress other industries are making in terms of efficiency. So, why is Lean Construction still not fully embraced by contractors, and what do you as an end-user need to be aware of that can lead to this reticence to adopt?

What is value, and how is it driven by Lean?

Value is defined as what the customer perceives as important and is willing to pay for. It comprises anything that moves the project closer to completion and that cannot be reworked. True value is the 'why' behind a project being undertaken and the desired outcome or objectives, and this typically extends beyond budgets and schedules. Lean focuses on the prioritisation of the operational needs and values of the users, while delivering on budget and schedule, promoting innovation that optimises value and eliminates waste.

Eliminating waste and inefficiency

Construction industry studies have shown that in excess of 50% of the effort required to deliver a project is typically non-value-added effort, or waste from the perspective of the client. By focusing on non-value-added activities, processes are constantly reviewed for any waste or inefficiency, and what the client-led value objectives are, to achieve true alignment. Ultimately, it leads to productivity gains, optimal ways of working and the optimisation of project outcomes.

Nurturing a collaborative culture

Traditionally, construction is a combative industry – teams work in silos, the built environment is increasingly challenging, and as referenced above, productivity is stagnant. A combative culture will derail Lean, and will often have tangible impacts on a project, both in terms of cost and schedule. The Lean concept turns this on its head, championing collaboration, trust and open communication between all members of the project team, streamlining the efficiency of the project team and giving the highest chance of collective project success.

Streamlining the workflow and project delivery

Not only does Lean remove waste and inefficiency, while facilitating early engagement, consistent collaboration and constant communication, but these factors intuitively streamline the workflow. Furthermore, the use of methodologies, such as modular and prefabrication, support fast-tracked delivery, as well as optimising the capital spend.

Why are contractors slow to adopt Lean?

Contractors play a key role in the adoption of Lean, as they are responsible for the key facets of a project, including cost, schedule, safety and quality. And yet for the most part, general contractors have been somewhat slow to embrace it. Why is this the case?

A fundamental, organisational change

Lean is a significant change for any business, and can be perceived as a somewhat abstract methodology for those from a traditional construction background. It essentially changes the contractor's organisational approach at its core, and so it must be fully bought into and believed to be achievable to facilitate such a fundamental change.

Tight profit margins versus perceived cost

Construction contractors typically operate on a relatively tight net profit margin before tax, sitting around the 3% of revenue mark. Inevitably, the perceived costs associated with the necessary training and implementation of Lean will be a particularly important factor in this case, and may play a hand in its slow adoption as a result. Any potential adopter will need a good understanding of what level of productivity loss they should expect during the learning and implementation phase.

An elemental approach

Lean's main allure for the construction industry comes in the use of elemental and relatively inexpensive tools, which again taps into its inherent value. Breaking activities and


LEAN
START

tools down will be cost-efficient but effective. A platform like Last Planner is an example of one of these tools.

What is the value to the contractor?

Similar to the client, Lean offers a distinct value proposition to the contractor, and again, the value relates to productivity. In an industry in which productivity is poor and wages account for a substantial proportion of total revenue, a marginal increase in productivity arising from a methodology such as Lean will have a significant impact on profit. For example, a 10% uplift in productivity in a business, with 3% average profit where wages amount to 35% of total revenue, will double the profit.

Furthermore, achieving improved productivity helps to mitigate against risk in a business that is inherently risky and competitive, and so it is hard to understand why the adoption rate is still remarkably low. However, the general consensus is that these distinct benefits have been lost in translation along the way, and that hard facts and statistics are needed to address this in terms of which contractors will be receptive.

Conclusion

While we see Lean being readily adopted in some sectors, it is typically more widely accepted in manufacturing and industrial-type verticals. This is because the Lean concept is ingrained in their background, and as a result, it is second nature. For contractors, Lean can represent a daunting and costly investment, but it is evident that the derived benefits of adoption are worthwhile. There are many examples of contractors embracing the methodology to its full effect, and perhaps part of the solution lies in learning from peers and allies, exploring case studies of what has worked well in the adoption approach.

While overall, challenges to its widespread adoption remain, the benefits of Lean to projects and the construction industry as a whole are clear. It promotes the elimination of waste and inefficiency, nurtures a collaborative culture and streamlines the workflow and project delivery. In bringing the concept to the forefront, Lean becomes a client-led objective, with a clear statement of the intention to embrace the Lean approach to all members of the project team at an early stage. It must be implemented through a systematic, process-driven and program-based approach. Ultimately, there's a great deal to gain by innovating project delivery. The Lean methodology has a lot to offer, which begs the all-important question: where are you and your organisation on the Lean journey?

GLOBAL INSIGHT

Build-to-rent - an analysis of latest costs in the Dublin region

Since the publication of the Linesight report on the build-to-rent (BTR) sector in 2018, the sector has continued to evolve. We have updated our cost analysis to reflect current market conditions and more recent data.

Paul Brady,
Director

BTR has played a fundamental role in the residential market in Ireland in recent years, and continues to progress and demonstrate its viability as a more established sector, with investment in Dublin's BTR market expected to have reached €2bn in 2019. In our 2018 report, 'The Build-to-Rent Sector in Ireland', we explored the socioeconomic indicators that drive the sector, the town planning perspective, provided some detail on cost and the factors that affect cost, and detailed the results of our primary research exercise with key sector stakeholders.

Since then, the sector has continued to grow and establish itself as an attractive asset class. In this article, we provide an update on the cost aspect.

The data

We are currently providing cost consultancy services on over 12,000 units across 35 BTR projects in the Greater Dublin Area, on which this cost data is based. Figure 1 summarises this.

Residential average construction costs

In order to give context to the BTR sector, we have compiled data on the average construction costs for residential living projects in a range of locations and unit sizes in the Dublin Metropolitan area. The uses include build-to-sell (BTS), BTR and shared living, excluding basement parking and site works. The purpose of excluding parking and site works from the cost/sq.m. metric is that BTR projects may not require parking, and therefore should be analysed without it. Figure 2 below summarises these costs.

Figure 1: Linesight BTR data used for this exercise

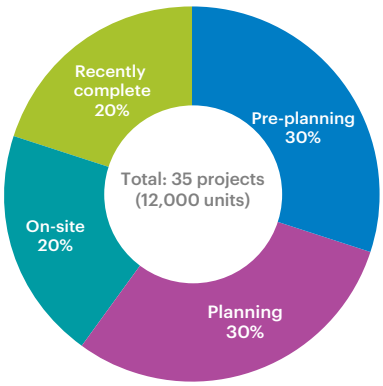
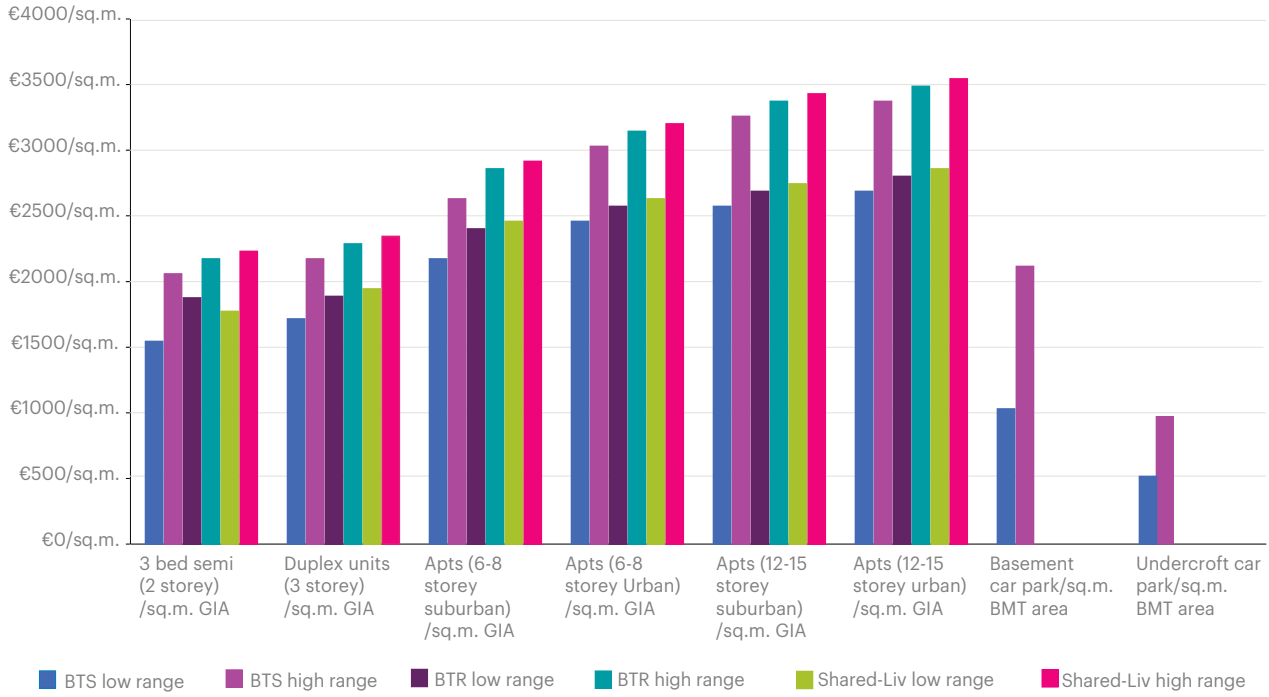


Figure 2: Residential BTS, BTR and shared living average construction costs/sq.m. GIA



Notes: *Substructure costs are included in unit costs and exclude basement construction.Local external works are included but site works (roads, paths, landscaping services, utilities) are excluded for comparison purposes. BTR costs include floor finishes and furniture, fittings and equipment. Services and amenity spaces and support facilities are included. Co-living costsinclude BTR costs plus reconfiguration to cluster format in accordance with shared accommodation design guidelines.*

Exclusions: *Inflation, site acquisition, finance, VAT, local authority contributions, professional fees, demolition, contaminated material disposal, abnormal ground conditions, archaeology, marketing, work outside boundary of site.*

BTR average construction costs

Figure 3 and 4 reflect just the BTR sector, again accounting for a range of locations and unit sizes, excluding basement parking and site works.

Figure 3: BTR residential average construction costs

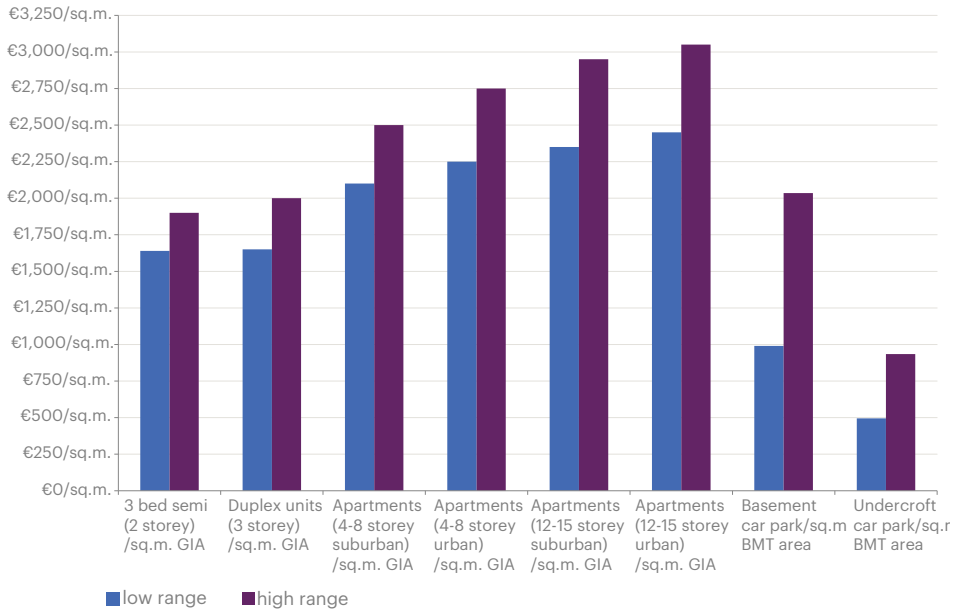


Figure 4: Average construction cost per unit

Average construction cost per unit	Studio	1B	2B	3B	Avg.
Gross internal area - sq.m. (incl. circulation and amenity)	48	60	94	117	84
Apts (4-8 storey suburban) - low range	€101,000	€127,000	€198,000	€246,000	€176,000
Apts (4-8 storey suburban) - high range	€120,000	€151,000	€236,000	€293,000	€210,000
Apts (4-8 storey urban) - low range	€108,000	€136,000	€213,000	€263,000	€189,000
Apts (4-8 storey urban) - high range	€132,000	€166,000	€260,000	€322,000	€231,000
Apts (12-15 storey suburban) - low range	€113,000	€142,000	€222,000	€275,000	€197,000
Apts (12-15 storey suburban) -high range	€142,000	€178,000	€279,000	€345,000	€248,000
Apts (12-15 storey urban) - low range	€118,000	€148,000	€231,000	€287,000	€206,000
Apts (12-15 storey urban) - high range	€147,000	€184,000	€288,000	€357,000	€256,000

Notes: *Substructure costs are included in unit costs and exclude basement construction. Local external works are included but site works (roads, paths, landscaping services, utilities) are excluded for comparison purposes. BTR costs include floor finishes and furniture, fittings and equipment. Services and amenity spaces and support facilities are included. Co-living costsinclude BTR costs plus reconfiguration to cluster format in accordance with shared accommodation design guidelines.*

Exclusions: *Inflation, site acquisition, finance, VAT, local authority contributions, professional fees, demolition, contaminated material disposal, abnormal ground conditions, archaeology, marketing, work outside boundary of site.*

Figure 5 includes an indicative cost summary of two BTR projects and a shared-living project in both urban and suburban locations. This identifies façade and internal completions as the main drivers of cost difference between the locations.

Figure 5: BTR benchmark project costs

Project reference	BTR project A 30K sq.m. urban 6-8 storey	BTR project B 44K sq.m. suburban 6-8 storey	Shared-Living Project C 35K sq.m. urban 6-8 storey
Description	Cost/sq.m.GIA	Cost/sq.m.GIA	Cost/sq.m.GIA
Substructure	€120	€80	€130
Frame	€355	€340	€310
External façade	€550	€460	€360
Roof finishes and completions	€45	€45	€50
Internal completions	€110	€85	€230
Internal finishes	€160	€160	€170
MEP services	€500	€420	€620
Sprinkler	€80	€35	€80
Lift installations	€25	€25	€30
Built in fittings	€100	€95	€140
External works	€55	€60	€60
Preliminaries	€290	€255	€305
Total construction	**€2,390**	**€2,060**	**€2,485**
FF&E	**€95**	**€95**	**€105**
Total incl. FF&E	**€2,485**	**€2,155**	**€2,590**

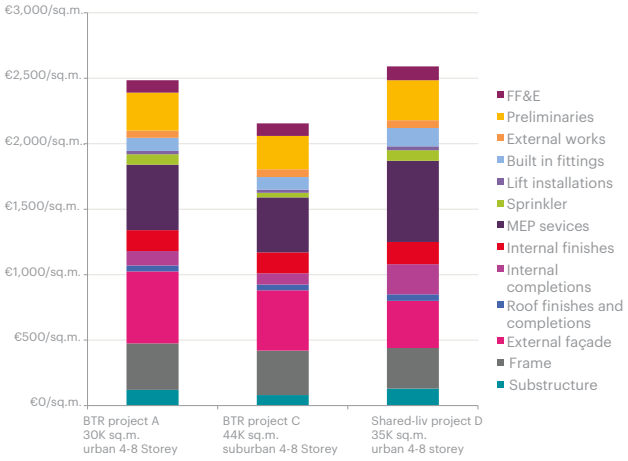


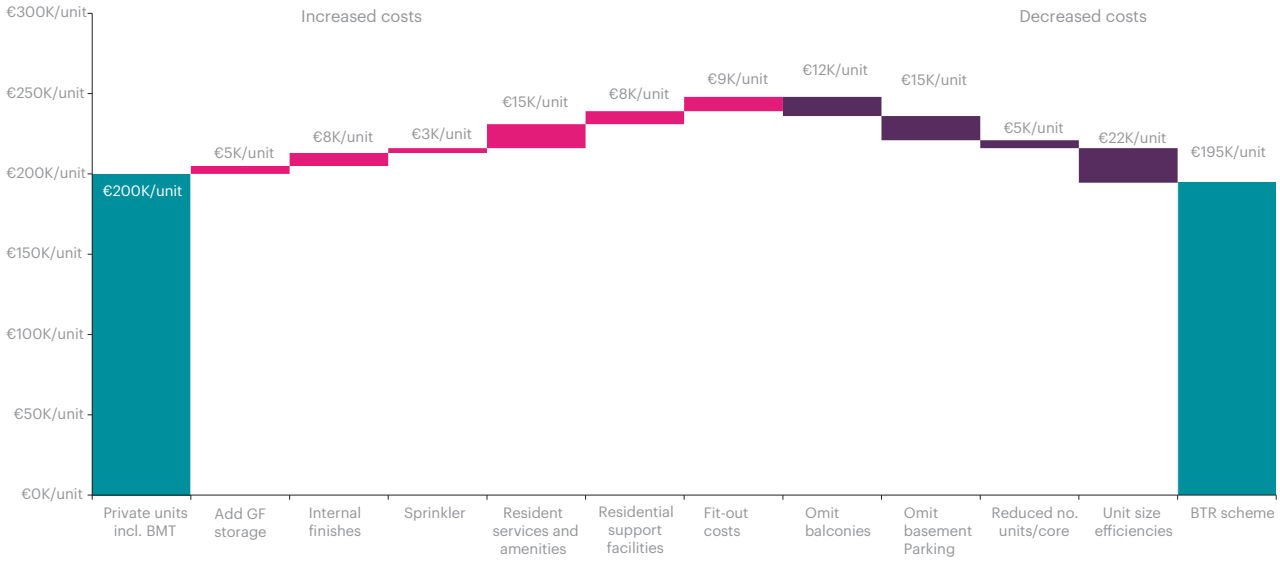
Figure 6 is an indicative analysis of BTR project costs, compared to private residential projects on a cost per square metre basis.
The analysis incorporates potential increased costs associated with specific BTR projects, whilst also including opportunities to decrease costs for elements that are required only for private residential.

The graph demonstrates that reduced requirements offer opportunities to mitigate the additional costs associated with the BTR Design Guidelines.

From a cost perspective, Linesight's experience identifies that BTR units can be constructed at a comparable cost to BTS units.

However, the cost of adding flexibility for future conversion of BTR apartments to BTS will result in a premium cost.

Figure 6: Waterfall graph of private residential costs to BTR



Key BTR considerations

- Successful BTR schemes are designed and built with the tenant in mind, as well as focusing on scale development and institutional owners
- Alternative design and construction methods require consideration, to alleviate the impact of the shortage of skilled trades and improve fast-tracked delivery
- Quality must be maintained within the constraints of a tight budget and strict programme deadlines
- The recent apartment design guideline amendments have improved the viability of BTR
- In particular, the removal of restrictions on unit mix and the relaxation of parking requirements (subject to conditions) is significant
- Exit strategy should be carefully considered
- BTR developments designed under the Design Guidelines must be held under the ownership and operation of the entity for not less than 15 years, with no individual units being sold or rented separately by legal agreement
- Compliance with planning guidelines to avoid delays in planning permissions is crucial
- A number of key design considerations should be accounted for, with emphasis on design layouts, efficiency, unit mix, amenity space and resident support services, and parking, amongst other factors that are outlined above
- Commercial tender prices rose by approximately 6.5% on average during 2019, with Linesight predicting that they will rise by 5-6% in 2020
- Residential tender price rises are at a lower level than commercial (circa. 4% to 5%) – attributable to residential projects being less reliant on the specialist packages associated with commercial projects (i.e. M&E, facades etc.) and the potential to utilise a different pool of contractors.

Operator-led key design considerations

- Engineered timber floor finishes to living rooms and carpet to bedrooms
- Robust kitchen unit design and materials with integrated class A+ appliances
- Robust white bathroom suites with shower tray or bath with clear glass screens
- Tiling to selected walls and selected heights
- Keyless door entry access control systems
- Video access control
- Integrated WiFi systems,
- Smart metering of power and heating use linked to BMS
- Roof activation
- Potential for 14 units per core
- Juliet balconies to north facing units in lieu of inset or projecting balconies
- Stacking of risers with access doors from corridors
- Amenity hubs - economic design amenity space with basic finishes and mechanical assisted ventilation to allow for increased occupancy, including resident lounges, entertainment suites and dry gyms
- Dedicated concierge facilities, including parcel collection areas, kitchenette, w/c, laundry facilities with tiled floor and wall finishes to 1100mm high
- Effective waste management systems at convenient locations

GLOBAL INSIGHT

The true cost of NZEB in practice

With NZEB now in practice, we are seeing the true cost and impact of it manifesting itself on Grade A commercial space and large-scale residential apartments. But in addition to the increased construction costs, we are also seeing the positive implications it is having for the developer.

Stephen O'Grady,
Senior M&E Surveyor

The background to NZEB

The EU Energy Performance of Buildings Directive which affirmed that all new building constructed in member states will be near zero energy buildings (NZEB) by December 31, 2020, and all new buildings owned and occupied by public authorities must be NZEB-compliant after December 31, 2018 has now been incorporated into Part L Building Regulations.

The key parameters for measuring NZEB compliance are the maximum permitted energy performance coefficient (MPEPC), renewable energy ratio (RER) and maximum carbon performance coefficient (MPCPC). Each method within the NEAP framework will calculate the EPC and CPC of the building being assessed, and clearly indicate whether compliance with regulations has been achieved:

- Where the MPEPC of 1.0 and MPCPC of 1.15 is achieved, an RER of 0.2 or 20% represents a very significant level of energy provision from renewable energy technologies
- Where the MPEPC of 0.9 and MPCPC of 1.04 is achieved, an RER of 0.1 or 10% represents a very significant level of energy provision from renewable energy technologies

Meeting NZEB

Commercial schemes

Since the revised Part L regulations have been introduced, Linesight has been involved in numerous commercial and residential projects, and the uplift to M&E installations is circa. 7-10% when benchmarked against historical projects. Ultimately, these new regulations are adding capital costs to developers.

In commercial office buildings in Ireland, there are numerous items to be undertaken to ensure compliance is achieved:

- Use of renewable sources – photovoltaics (PVs), air source heat pumps (ASHP) etc.
- Fabric insulation and reducing thermal bridging
- Enhanced building controls
- Limiting air infiltration
- Enhanced commissioning
- Specific fan power reduced for various systems

At Linesight, we are seeing the above having impacts across the mechanical installation in a standard four-pipe FCU CAT A development, and these include the following:

- Upsizing of FCUs to enable lower temperatures from ASHP
- Upsizing of pipework to enable lower temperatures
- Costs associated with specific fan power across all plant items
- Ductwork leakage testing mandatory on high-pressure ductwork
- Increase in costs of BMS to cater for additional building controls
- Increase in commissioning requirements to meet minimum standards

In most commercial office projects in city centre locations, it may be difficult to meet the RER 0.2 by changes to the above systems due to site constraints, so it is also advised to make the façade as efficient as possible, as this reduces the energy loss of the building. There is no one way to gain compliance with regulations, however. Whichever approach is taken, the M&E systems are affected and generally, when our benchmarks are looked at, the M&E element is increasing in cost by circa. 7-10%, as referenced earlier.

Residential projects:

Linesight is also involved in numerous large-scale apartment schemes, whereby various technologies are being used in order to meet the new NZEB requirements.

Where a building contains more than one dwelling, like a block of apartments, it has to be shown that every individual dwelling has an EPC and CPC no greater than the MEEPC and MPCPC respectively. Alternatively, it must be shown that the average EPC and CPC for all dwellings in the building is no greater than the MPEPC and MPCPC respectively.

The Part L regulation standards must be achieved for both apartment and landlord areas. The key client decision to make is the mechanical system to be installed, which can be summarised as follows:

1. EAHP (exhaust air heat pump) in each apartment for water heating, MVHR unit for

ventilation requirements, electric heaters for space heating, PV required on roof
2. EAHP for space, water heating and ventilation requirements, minimal PV panels required
3. District heating (ASHP) to HIU in each apartment for space and water heating, MVHR unit in each apartment, PV required on roof

Currently in the Irish market, the most common solution is the EAHP as a one-stop solution in each apartment for space, water heating and ventilation requirements. However, the most cost-effective solution to meet NZEB requirements is option 1 above, utilising electrical heaters, around which there remains a stigma, meaning that developers and agents are slow to commit to them.

Conclusion

In summary, the new NZEB regulations have a distinct impact on the clients developing Grade A commercial space and large-scale residential apartments, as it increases the cost of construction projects, so the developer may feel that they are not seeing a sufficient yield to warrant this additional cost. However, the flip side of the coin is that the developer is getting a higher quality building with a reduction in running costs, and also a higher specification of building services. This is down to the increased commissioning requirements, as well as the quality increase in monitoring and building management systems.

"I was initially attracted to Linesight by the project portfolio, in particular its diversity in both sector and region. It's a dynamic team of great people, with a positive work environment, a proactive approach to achieving optimum outcomes for clients, and plenty of opportunities to work on world-class projects."

John O'Sullivan
Associate Director

What we do

Our services are tailored for your project, delivering maximum efficiency from inception to completion. We specialise in key areas, to provide faster project delivery, greater cost efficiency and maximum value.

Project Management
Delivering project success through strategic planning and stringent controls.

Cost Management
Driving better value for money at every stage of the construction process.

Program Management
Managing a network of projects simultaneously in order to deliver program success.

Project Controls
Controlling every aspect of a project to deliver maximum performance and long-term success.

Procurement
Adopting the most appropriate strategy to suit both public and private sectors.

Supply Chain Management
Providing efficient logistic strategies to streamline the delivery of equipment and services.

Health and Safety
Securing compliance, and providing design teams and clients with expert advice and independent review.

Consultancy
Providing professional, hands-on advice and guidance throughout every stage of your project.

Planning and Scheduling
Providing an initial project overview, developing a detailed structure and identifying schedule controls.

Monitoring and Due Diligence
Examining project information independently, identifying issues, and ongoing project monitoring.

Our values

Over the years, we have developed a way of working that delivers quality and consistency in how we operate. Our five core values inform what we do and how we do it:

Partnership

We are focused on our clients' goals and work closely with them to achieve the best possible results. We believe in collaboration. When we share our experiences and combine our expertise, we can achieve great things.

Progress

We believe in always moving things forward and finding better ways of working. We're not just focused on what we do, but also on what we can achieve. We are driven by success – for our clients, our partners and each other.

Integrity

We are fair, open and ethical in everything we do. We challenge things we believe to be wrong and are open to being challenged by others. We take pride in the quality, accuracy and independence of our work.

Resourcefulness

We work around the world, in diverse sectors and for clients with distinct ambitions. This requires us to act effectively and creatively in new and complicated situations. We rely on our individual and collective abilities to resolve any challenges we may face.

Long-term view

We believe in working sustainably, and so we build enduring relationships with our clients and partners. We work together in a way that is respectful and considerate of each other and the wider society in which we live.

Our culture

Our **bold ambition, honesty** and **confidence to deliver,** together with our commitment to cultivating **meaningful relationships** is what sets us apart.

Our distinctive culture has always played a key role in our success. As a business we want to be intentional in maintaining and working within the principles of our distinctive culture.

Own and empower

We have a highly developed sense of responsibility for identifying problems, finding solutions and executing with excellence. As individuals and teams, we are free (and encouraged) to exercise our judgement to reach our goals.

Connect for good

We are team players, collaborating globally and locally to deliver exceptional results. We encourage and nurture relational rather than transactional business relationships, continuously building a totally inclusive working environment.

Embrace clarity

Our emphasis is on direct communication - our preference is always face-to-face, or to pick up the phone. We express ourselves clearly, honestly and effectively in our communication. We are proactive in inviting and providing actionable feedback.

Lead by example

We believe in mentoring as a way to strengthen and develop ourselves and provide the resources, environment and flexibility required. We practice 'reverse mentoring' between junior and senior employees - every single person in Linesight has something to teach.

Bold ambition

We continuously develop our global team, with a shared drive and ambition to deliver exceptional results. We believe success is winning unreserved recommendations for exceptional work and impact. We always work with an eye on the future, whilst delivering on our commitments and objectives.

Working with you, wherever you are

With staff located across Europe, MENA, Asia Pacific and the USA, our reach is truly global. We are delivering projects in over 40 countries and are always exploring new areas of opportunity. We offer first-class consultancy on major projects across 13 specialist sectors, and we have developed a broad portfolio of innovative projects in every region.

- Commercial Development
- Commercial Fit-Out
- Data Centres
- Education
- Food and Beverage
- Healthcare
- High-Tech Industrial
- Hospitality
- Life Sciences
- Residential
- Retail
- Student Accommodation
- Transportation and Infrastructure

Europe

London
2nd Floor
27-29 Cursitor Street
London EC4A 1LT
T: +44 20 7784 7330

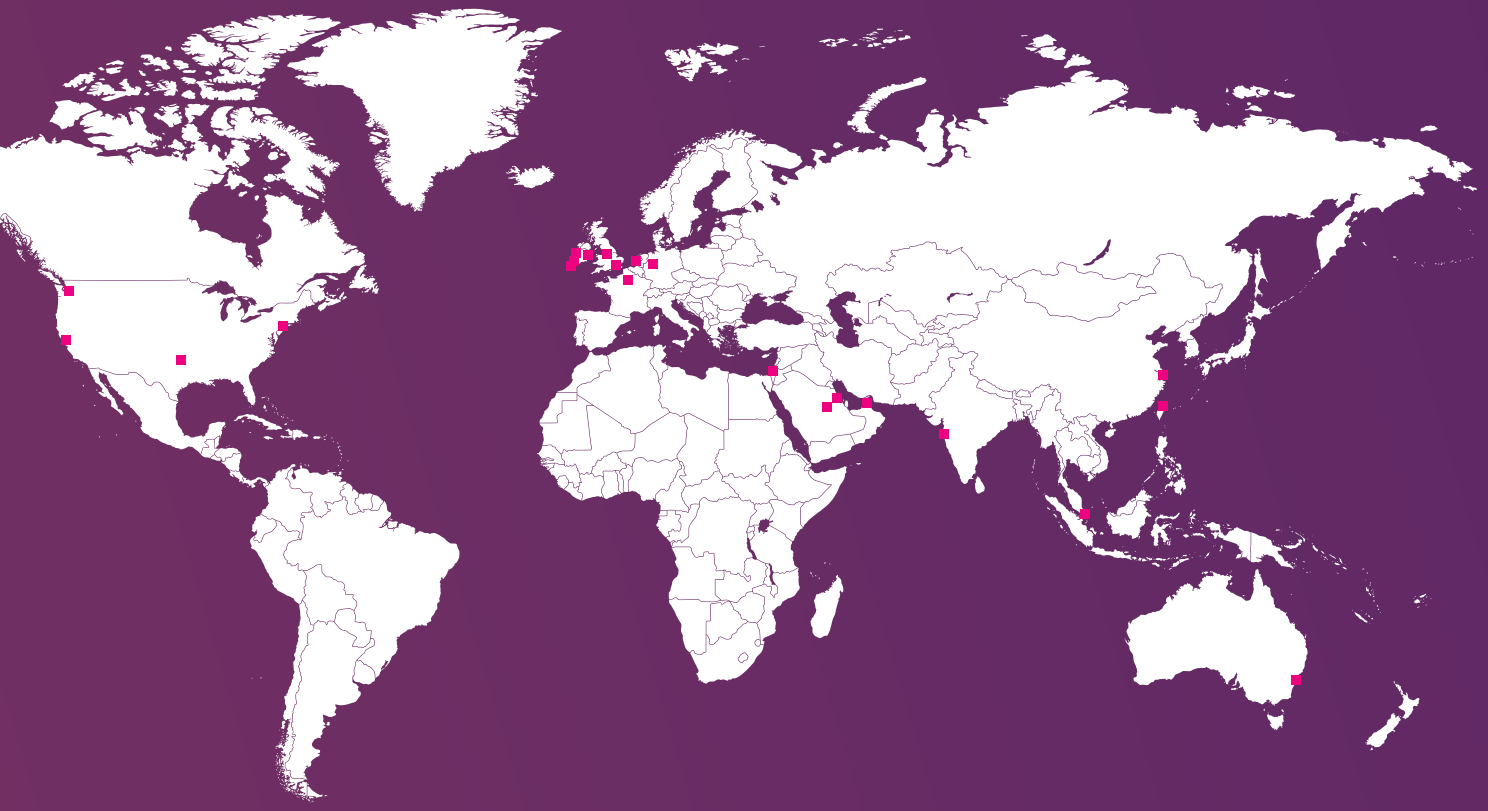
Manchester
Peter House
Oxford Street
Manchester M1 5AN
T: +44 161 618 1811

Paris
9/11 Allée de l'Arche
Paris La Défense
92671 Paris
T: +33 1 70 92 37 91

Dusseldorf
4th Floor
Konigsallee 92A
40212 Dusseldorf
T: +49 211 5403 9615

The Hague
11th Floor
Koningin Julianaplein 10
2595 AA The Hague
T: +317 08 918 467

Tel Aviv
12 Abba Hillel Street
Ayalon House
Ramat-Gan 5250606
T: +972 3 754 1289



Ireland

Dublin
Hoban House
Haddington Road
Dublin 4
T: +353 1 661 4711

Cork
VHI House
70 South Mall
Cork
T: +353 21 4274 474

Limerick
Linesight House
6 Hartstonge Street
Limerick
T: +353 61 493 515

Galway
Block 10
Galway Technology Park
Parkmore Galway
T: +353 91 734 005

Asia Pacific

Singapore
150 Cecil Street
#05-01
Singapore 069543
T: +65 6801 4540

Shanghai
Unit 819 8F Building 2
No 1196 Century Avenue
Shanghai 200120 PRC
T: +86 21 6043 3695

Taipei
11F-5 No 162 Sec 4
Zhongxiao E Rd Da'an Dist
Taipei City
106 Taiwan (ROC)
T: +886 906 179382

Sydney
Level 5
131 Macquarie Street
Sydney NSW 2000
T: +61 2 8278 9500

Mumbai
Unit No 902
Maithili Signet
Sector 30A Vashi
Navi Mumbai 400705
T: +91 22 49766744

The Americas

New York
286 Madison Avenue
Suite 602
NY 10017
T: +1 646 802 9900

San Francisco
582 Market Street
Hobart Building
San Francisco CA 94104
T: +1 415 343 2434

Seattle
2018, 156th Ave NE
Suite 310, Bellevue
WA 98007
T: +1 425 748 5147

Dallas
350 North Ervay Street
Suite 3105
Dallas
Texas 75201
T: +1 469 513 4113

MENA

Bahrain
Building No 655
Road 3614
Al Seef Area
T: +973 17 746 892

Dubai
24th Floor - Office 2403
1 Lake Plaza Tower
PO Box 11497 Dubai
T: +971 4 432 3831

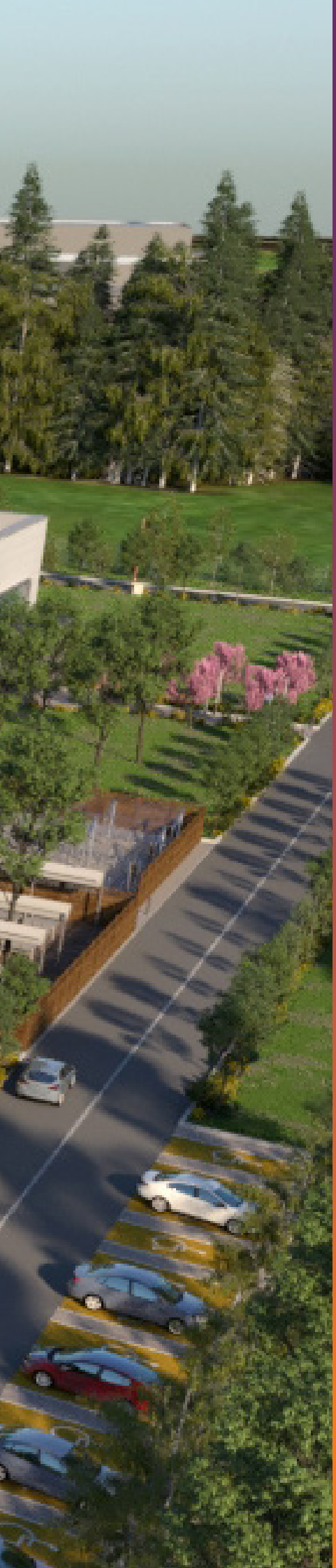
Riyadh
5th Floor Office 503
Olaya Street
Riyadh 11517
T: +966 11 460 4006

22
offices

Edwards Lifesciences, Castletroy, Limerick

Architect:
Jacobs

Linesight services:
Cost Management, Project Management and Health and Safety review



Acknowledgements

A special thank you to all those involved in this year's publication.

Editorial team:

Derry Scully, Alan Dunphy, Claire O'Broin, Hazel O'Donnell and Niamh Moore.

Contributors:

- Andrew Callaghan
- Des O'Broin
- Diarmaid Connolly
- Eoghan Tangney
- Eoin Byrne
- Gavin Flynn
- Hugh McElvaney
- Jeff Peragallo
- John Finnegan
- Kim Hegarty
- Michael Bonner
- Nigel Barnes
- Pat Unger
- Paul Brady
- Stephen Ashe
- Stephen O'Grady
- Terence Wolfe-Flanagan