An Roinn Breisoideachais agus Ardoideachais,
Taighde, Nuálaíochta agus Eolaíochta
Department of Further and Higher Education,
Research, Innovation and Science

National Framework for Meeting Priority Construction Workforce Needs

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Introduction and Background to Assessment

This report, submitted to the Department of Further and Higher Education, Research, Innovation and Science, presents research and analysis conducted by Indecon International Economic and Strategic Consultants (Indecon) to support the development of a national framework for meeting priority construction workforce needs.

The background to this report is that a suite of landmark Government strategies has highlighted the major demands to be met from Ireland's construction workforce to meet Government priorities in housing, climate action, and other infrastructure. The realisation of Government ambition in these areas is critically dependent on progress in creating and mobilising a construction workforce of a scale and skills level that is equipped to meet the challenging targets set out in these strategies.

Overview of Construction Workforce in Ireland

The Irish construction sector consists predominantly of small and medium-sized firms, with a handful of large companies. It has experienced two major shocks in recent decades: the 2008 financial crisis and the 2020–2021 COVID-19 pandemic, both of which sharply reduced construction activity. Construction output has rebounded since 2013 but is still lower than the levels reached in the mid-2000s, while productivity (measured in terms of real Gross Value Added (GVA) per hour) remains significantly below pre-2008 levels. Real GVA has been used to adjust numbers for inflation. While there are various possible measures of aspects of productivity including labour productivity, real GVA per hour is a standard internationally accepted measure of overall productivity for all sectors. Indecon notes that there are limits to any specific measures of productivity as well as different aspects of productivity.

As of Quarter 2 in 2025, approximately 190,300 people were directly employed in construction. The sector lost many skilled workers after 2008 to emigration and other industries, and while there has been a steady post-pandemic recovery, employment remains around 26% below its peak in 2007. This has resulted in persistent gaps between what is needed to meet the Government's ambitious infrastructure goals and the capacity of the workforce.

Key Challenges

Recent research highlights that Ireland's infrastructure ambitions are outpacing the construction sector's capacity to meet associated targets and goals. Key challenges include:

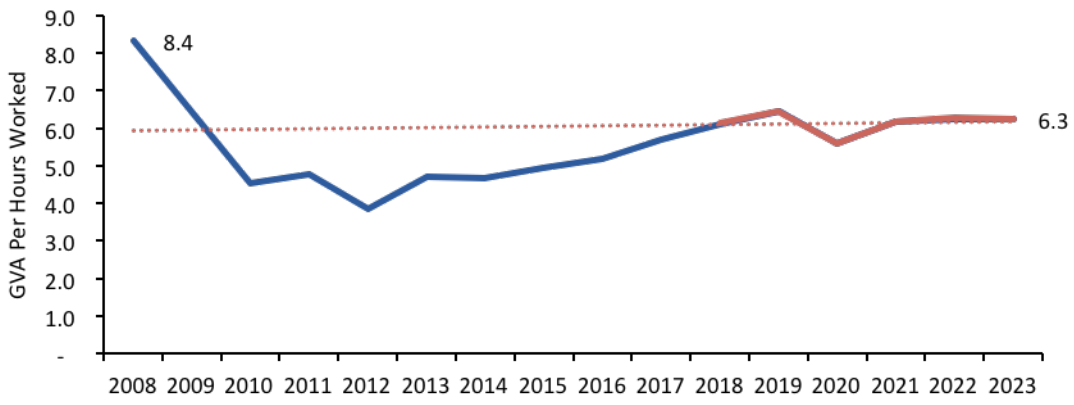
- Labour shortages: a limited pool of qualified tradespeople and professionals, leading to intense competition for talent. A range of factors affect the level of competition for these skills, including labour market conditions, labour mobility, and other factors impacting on the relative attractiveness of the construction sector.

- Recent cost increases: increased wages and materials expenses, which squeezed contractors' margins. The Government has recently introduced interventions to limit the rising cost of business, which are designed to lower cost pressures. However, the recent high inflation environment and the increase in wage levels both have contributed to increased cost of business.
- Project pipeline volatility: inconsistent project schedules and contractual delays create uncertainty and inefficiency.
- Under-adoption of technology: low uptake of digital tools and other Modern Methods of Construction (MMC) has kept construction sector productivity below European peers.
- Planning and infrastructure bottlenecks: complex permitting, limited utilities capacity, and logistics (e.g., port capacity) issues slow project delivery.

Productivity gap and lower adoption of MMC

The above factors, coupled with subdued investment in the previous recession period, financing issues and the fragmented nature of the sector, have resulted in an overall productivity gap. The figure below shows recent productivity trends in the Irish construction sector, underpinning the 1.8% assumption in the central scenario (trend-productivity), which is based on average productivity growth over the period 2018-2023. The red line depicts real GVA per hours worked, and the dotted line represents the average percentage increase in this variable in 2018-2023. In the central productivity scenario, it is assumed that recent productivity improvements, achieved in the context of structural sector changes will continue without any further acceleration in the adoption of MMC.

Productivity in the Irish Construction Sector, 2008-2024



Source: CSO and Indecon analysis.
Notes: GVA measured in €m, at 2022 constant prices. Hours worked calculated as average paid hours worked per annum in sector.

In addition, while Ireland performs close to or above the EU average in some MMC-related indicators, it continues to lag significantly behind the leading EU countries across most variables. On average, across a selected set of MMC-related indicators, Ireland's performance is approximately 283% below that of the top five EU performers (see table below). For example, in 2023, prefabricated wood buildings accounted for 2.8% of Ireland's construction workforce GVA, compared to an average of 8.65% among the top-performing countries. Similarly, while Ireland

performs above the EU average in areas such as prefabricated steel and concrete buildings, the gap relative to best-in-class countries remains substantial. This suggests there is considerable scope to enhance the adoption of MMC in the Irish construction sector although it is important to recognise the need for scale, repetitive units, and market density. Achieving the level of adoption of MMC which exists in the best performing market is therefore not feasible but significant improvements can be achieved over time. Productivity changes are not only about greater use of MMC such as building systems, but is also about site-level planning, scale economies, the use of prefabricated kitchens, bathrooms, and other elements of construction.

Ireland Compared to the EU Average and Best-in-Class Countries for Various MMC Variables (2023)

	Gross Capital Formation in ICT Equipment	Gross Capital Formation in Transport Equipment	Prefabricated Wood Buildings	Prefabricated Steel Buildings	Prefabricated Concrete Buildings	Prefabricated Structural Elements for Civil Engineering	Circular Material Use Rate
Ireland	1.53	13.60	2.80	3.27	0.87	4.15	2.30
EU Average	3.78	24.79	2.21	2.96	0.45	3.41	10.58
Average of 5 Best Countries	11.37	35.24	8.65	8.81	1.08	9.66	21.80

Source: Indecon analysis of Eurostat data

Empirical modelling enables the identification of the percentage change in productivity attributable to a X% change in MMC adoption. The box below outlines the empirical modelling approach.

Empirical Specification for Modelling of Relationship between MMC Adoption and Labour Productivity in Construction

The estimated equation is:

$$\ln(\text{Productivity}_{c,t}) = \alpha + \sum_{k=1}^{10} \beta_k \ln(\text{MMC\_Proxy}_{c,t}^{(k)}) + \gamma_c + \tau_t + \epsilon_{c,t}$$

Where:

- 'Productivity' is the gross value added per employee for country c and year t, specific to a given sector–occupation combination (as the regressions are run separately for each).
- 'MMC_Proxy' is the value of the k-th MMC proxy variable for country c and year t.
- □ is the elasticity of productivity with respect to the k-th MMC proxy.
- □ is the country fixed effect (to control for time-invariant differences across countries).
- □ is the year fixed effect (to capture common shocks across countries).
- □ is the error term.

Source: Indecon analysis

Note: The inclusion of country and year fixed effects in the model controls for structural differences across countries and common trends over time, such as variations in the residential output mix (e.g. apartment vs. house split). This ensures the estimated relationship reflects changes in MMC use and productivity within countries, rather than differences in underlying housing market structures.

The evidence suggests that to catch up with leading EU countries, Ireland would need to roughly triple its rate of adoption of MMC usage. Greater MMC uptake could reduce the labour intensity of construction and improve efficiency. The Government's MMC Action Plan 2025 emphasises MMC as a means to accelerate housing delivery, enhance quality, cut costs, and mitigate labour constraints. Against this backdrop, it is important to consider the current capacity of Ireland's off-site manufacturing sector and the number of certified building systems, as well as the viability challenges facing certain parts of the MMC sector.

As of July 2025, there are over 220 Offsite Manufacturers based on the island of Ireland (including Northern Ireland) with dedicated manufacturing facilities for MMC / Modular Construction. The NSAI MMC Certification Unit maintains a national database on these organisations. The list of Offsite Manufacturing firms spans multiple MMC categories and industry sectors, and not all are active in the construction sector. Some operate in the life sciences, data centre, and aviation sectors. There are also multiple MEP (Mechanical, Electrical & Piping) specialist trade contractors and specialist MEP subcontractors that provide modular solutions for the mechanical and electrical sector.

In terms of companies with certified MMC building systems, there are currently 20 building systems certified under the NSAI Agrément scheme (in addition to 39 timber-frame building systems certified by NSAI for use in dwellings and other structures).[1] Three Agrément systems are certified 3D-Volumetric MMC Building Systems, of which only two are certified for residential construction. The NSAI indicates that demand for these has been limited so far. Nevertheless, a significant number of 3D-volumetric companies are at an advanced stage in obtaining certification. Several have completed Technical Assessment Specifications (TAS) and Factory Production Control (FPC) audits with NSAI, and some are expected to have certificates published in the coming months, subject to the submission of all required supporting documentation. NSAI anticipates that between two and six additional NSAI-certified 3D-volumetric building systems could be published in 2025, depending on the progress made by each company in finalising its technical documentation.

To further support Ireland's ability to expand MMC adoption, NSAI has launched an MMC Certification Toolkit[2] to guide SMEs and off-site manufacturers through the certification process. The toolkit provides practical resources, including a certification guide, a readiness assessment tool, FAQs, an overview of the Agrément certification process, interviews with certified companies, and infographics outlining the certification pathway.

[1] This does not include the list of additional Timber Frame Building Systems certified by CATG Certification.

[2] https://nsai.ie/MMCtoolkit

Labour Force Composition

The construction workforce is demographically and occupationally imbalanced in several respects:

- Women are severely under-represented: Only about 8–10% of construction workers are female, compared to ~47% across the Irish economy. Ireland's rate is also below the EU average and significantly lower than the rates evident in countries such as the UK (15%) and Germany (14%). In addition, women account for just ~1% of craft apprenticeship enrolments and about one-quarter of higher-education construction-related students. This untapped talent pool represents a strategic opportunity.
- Another notable component is the reliance on foreign workers: Approximately 17–18% of those working in construction in Ireland are non-Irish nationals. Inward migration has become increasingly important for filling specialized roles (e.g., civil engineers, and 'wet trades' such as plasterers and bricklayers).

Occupational Profile

Indecon's analysis has identified 23 key occupations that make up the core of Ireland's construction workforce. These include managerial roles (e.g., construction project managers), professional and technical roles (civil and electrical engineers; architects and architectural technologists; surveyors), a wide range of skilled trades (carpenters, plumbers, electricians, bricklayers, plasterers, painters, glaziers, etc.), and operational roles (crane operators, general construction operatives, and elementary labourers). These occupations were selected based on their prevalence in construction and their specificity to the sector, and together account for approximately three-quarters of all construction employment. Some roles vital to construction, for example, engineers, are partly employed in other industries, so focusing on occupations (rather than only those working in construction firms) provides a holistic view of labour demand.

Workforce Size and Distribution

Indecon estimates a baseline of approximately 240,500 persons employed in these construction-relevant occupations, across all sectors of the economy, in 2024. Of these, about 133,500 are employed directly in the construction sector, with the remainder employed in sectors like manufacturing, utilities, or professional services.[3]

The largest occupational groups by headcount are: electricians (≈35,000 workers), elementary construction operatives (≈32,000), and carpenters/joiners (≈27,000). Other sizeable groups include plumbers (16,000+), other construction trades (e.g., supervisors, painters, bricklayers – each in the 6,000–12,000 worker range), and engineering professionals. This baseline employment matrix provides a starting point for forecasting future demand in each trade and profession.

[3] The 133,500 people employed in these selected construction-relevant occupations represent 76% of total employment in the construction sector.

Assessment of Labour Supply in Construction

The annual supply of new construction labour comes from three main channels:

- Domestic education and training channels;
- Inward migration; and
- Labour-market dynamics such as labour force participation and intersectoral flows.

Indecon's 'status quo' scenario suggests that annual flow of new construction workforce entrants out to 2030 is likely to be of the order of 9,500-10,000 persons per annum (see next table).

Summary of Estimated Annual Supply Inflows to Construction Sector

		2025	2030
Further and Higher Education (excluding Apprenticeships)	*HEA courses*	1,380	1,380
	FET courses	155	155
	QQI Awards	752	752
	Sub-total	2,287	2,287
Selected Relevant Apprenticeships		4,117	4,250
Migration		3,303	3,303
	Total	**9,707**	**9,840**

Source: Indecon analysis

Note: Figures presented are estimated completion levels based on latest registration and completion rates data. Quality and qualifications Ireland (QQI) awards are primarily made in respect of graduates from private and independent higher education institutions.

The projected increase in annual inflow by 2030 is mainly attributable to a pipeline of additional apprenticeships, driven by an increase in registrations in recent years. Absent any new interventions, the estimated 9,500-10,000 overall annual inflow represents the labour available to meet both replacement needs (retiring workers) *and* any expansion in demand.

The analysis in this report reveals that this supply falls well short of what will be required. Ireland's domestic education and training system produces only 6,400-6,500 construction-skilled workers each year, and even with migration adding to the pool, current supply levels are not sufficient to achieve the ambitious building targets on the horizon. Radical policy measures will be needed to boost these supply channels and close the looming workforce/skills gap, including increasing apprenticeship and overall education and training output, leveraging inward migration, accelerating the adoption of modern construction methods, and attracting more women and career changers to take up opportunities in construction. It is also important to maintain quality: expanding the workforce must go together with appropriate training, certification, and safety standards.

Scenarios and Projections for Workforce Demand

To estimate future construction workforce needs, Indecon developed a rigorous and dynamic demand model that projects employment for the 23 key construction-related occupations across all sectors of the economy. The model has two main components:

- Expansion Demand: new jobs created by growth in construction activity, driven by government investment targets and private sector developments. This captures the additional workforce needed to deliver on policy goals in housing, climate action, infrastructure, etc.
- Replacement Demand: job openings arising as existing workers leave the labour force (through retirement, illness, career change, or other permanent exits).

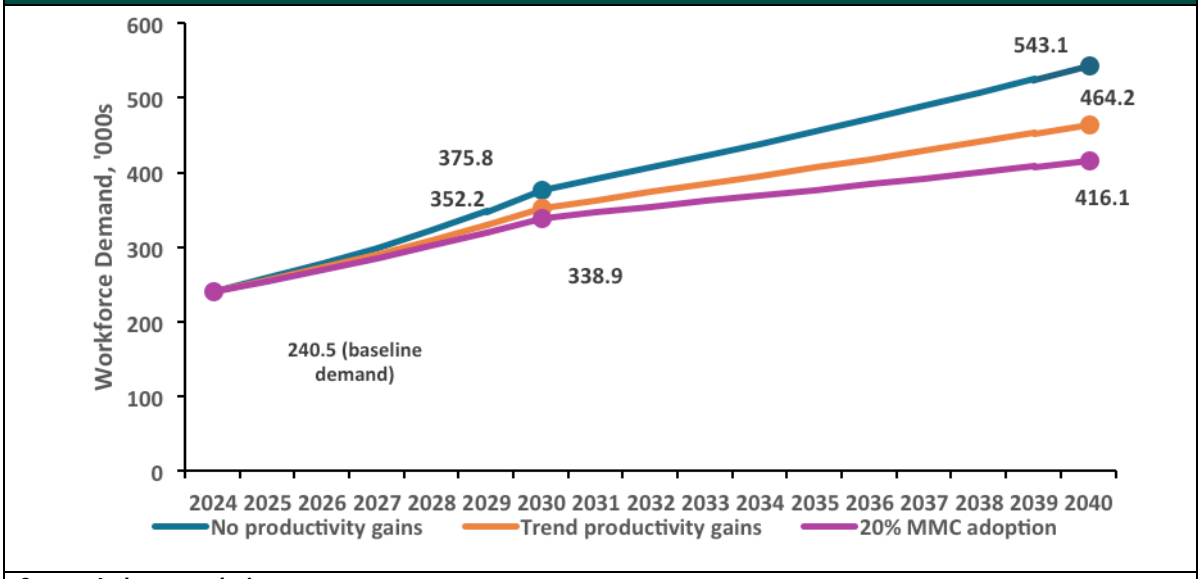
'Workforce Demand' is calculated as 'Expansion Demand' plus 'Replacement Demand,' and this represents the total level of workforce recruitment required to both grow the workforce to the needed size and fill vacancies left by those departing.

Indecon's modelling framework has examined three workforce demand scenarios, reflecting alternative assumptions regarding how productivity improvements may reduce labour demands as implied by the policy targets:

- No Productivity Gains (Baseline Scenario): Assumes no improvement in output per worker.
- Trend Productivity Scenario (Moderate Gains): Assumes productivity grows at ~1.8% per year, reflecting the average annual improvement observed in 2018–2023.
- MMC-Driven Productivity Scenario (High Gains): Assumes an accelerated productivity boost due to widespread adoption of MMC.

The following figure depicts the outcome of each of these scenarios, in terms of projected construction-relevant occupation demand between 2024 and 2040. It should be noted that some of the MMC scenarios presented in the report represent projections of what might be best possible outcomes for Ireland subject to optimal conditions. These would require sectoral and policy changes and the full recommendations set out in this report. The challenges in achieving these outcomes should not be underestimated and should be considered an upper bound projections of what could be achieved and should be read in conjunction with our central case scenario.

Construction Occupation Workforce Demand Projections by Scenario 2024-2040 – '000 Persons



Source: Indecon analysis

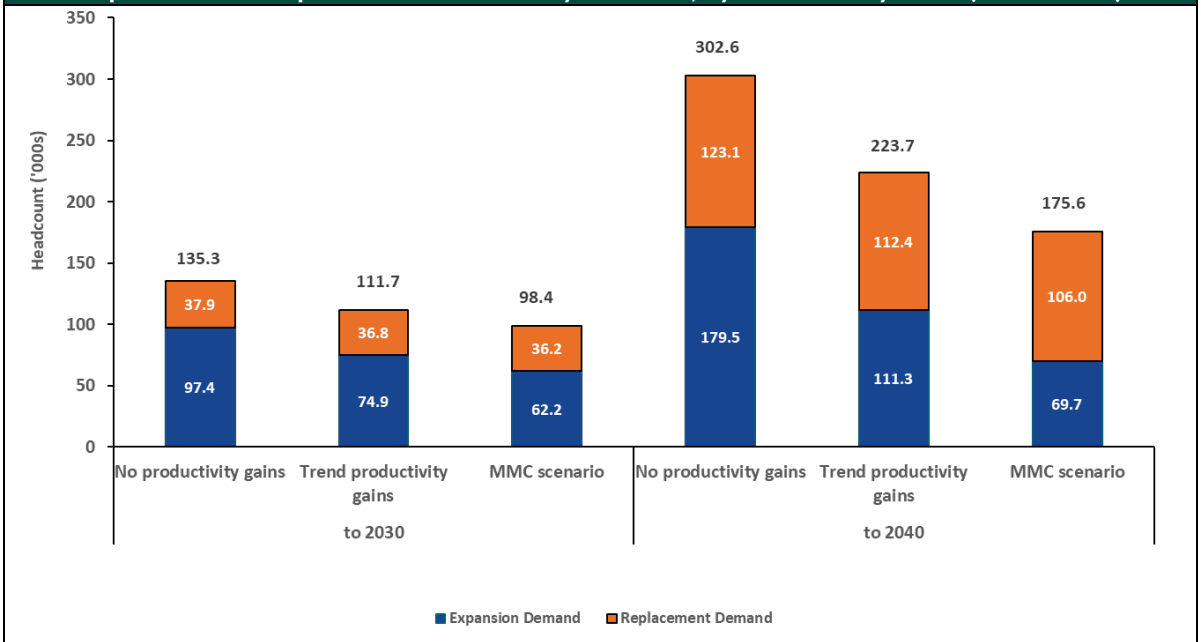
Each of the scenarios projects a substantial increase in demand for construction workforce over current levels. By 2030, total demand (comprising employed workers plus unfilled vacancies) is projected at approximately:

- 375,800 workers under 'No Productivity Gains' – an increase of around +135,300 from 2024.
- 352,200 workers under 'Trend Productivity' – about +111,700 compared to 2024.
- 338,900 workers under 'MMC High Productivity' – about +98,400 on the 2024 level.

Even with moderate productivity growth, the industry needs roughly 41% more workers by 2030 than it has today. Without further productivity gains, it would need nearly 56% more workers.

A breakdown of expansion versus replacement demand shows a shift in the composition of labour needs between 2030 and 2040. By 2030, additional requirements range from 98,400 in the MMC scenario to 135,300 under the no productivity gains scenario. Of this, between 63% and 72% is due to expansion demand, reflecting activity growth to meet policy targets. By 2040, replacement demand becomes the dominant driver, accounting for the majority of additional headcount across all scenarios. The long-run weight of replacement demand across scenarios highlights the impact of the earlier expansion, as the increase in workforce entries during the later part of this decade leads to a corresponding rise in exits in the subsequent decade, resulting in elevated replacement needs by 2040 irrespective of scenario.

Expansion and Replacement Demand by Scenario, by 2030 and by 2040 (Headcount)



Source: Indecon analysis

Occupational Composition of Demand

The projected increase in construction-related workforce demand is not uniform across occupations. As highlighted in the figure below, skilled trades will account for the largest share of new jobs needed.

Projected Additional Workforce Requirements by 2030, by Demand Scenario and Occupational Group – Additional '000 Persons viz. 2024 Levels

Source: Indecon analysis

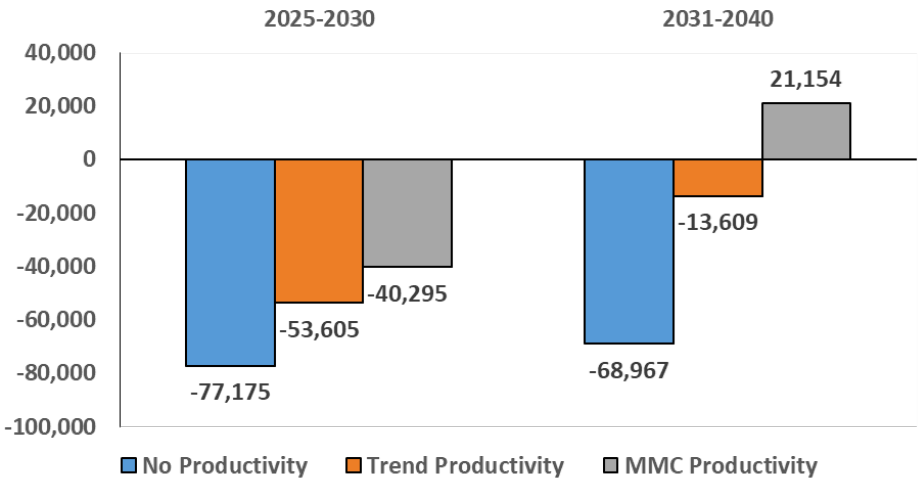
By 2030, around 49-50% of the additional workforce required will be in skilled manual trades (carpenters, electricians, plumbers, plasterers, etc.). These roles are labour-intensive and less easily substituted even with MMC. However, while the overall share of trades is projected to remain relatively stable across productivity scenarios, the nature of work within some trades (particularly bricklaying, carpentry, plastering, and painting & decorating) is expected to evolve. As noted in 'An Update to the Report on the Analysis of Skills for Residential Construction and Retrofitting' (2024), technological advances, and higher productivity in MMC may reduce demand for standard methods, requiring some reskilling and adaptation within these occupations. Professionals and managers (engineers, architects, site managers) make up roughly 31–33% of the demand growth. The remaining ~20% are operatives and elementary workers.

The demand for skilled trades is the most sensitive to the productivity scenario: under the no productivity gains scenario, an extra ~67,800 trade workers are needed by 2030, whereas under accelerated MMC this reduces to ~49,100. Even in the optimistic case, however, nearly half of all new jobs are for tradespeople, indicating that higher productivity and prefabrication will reduce but not eliminate on-site labour needs. Standard building activities (especially in housing and retrofit) remain significant in all scenarios.

Assessment of Workforce Supply–Demand Gap

Integrating the status quo supply scenario, the findings confirm an urgent and sizeable shortfall. Under the central, trend productivity scenario, the model projects an overall construction occupation workforce gap of 53,605 workers by 2030, and a subsequent gap of 13,609 between 2031 and 2040 (see figure below). Even in the most optimistic scenario – which assumes a step-change in the adoption of MMC – the shortfall remains very substantial, at 40,295 by 2030.

Supply-Demand Gap if no Changes Made to Supply, 2025-2030 and 2031-2040



Source: Indecon analysis

Key Conclusions from Assessment

The analysis in this report underlines the scale of challenge facing Ireland's construction sector and policymakers. Several key conclusions are highlighted below.

Multi-sector demand pressures

The scale of the challenge is amplified by overlapping infrastructure agendas. Ireland's housing crisis, climate action plan, and economic development goals are all converging into a single timeframe. This means that housing, retrofitting, renewable energy, transport infrastructure[4], and social building projects are competing for a finite pool of construction labour. This broader policy context means that resolving the workforce issue is not just about numbers but also about prioritisation and sequencing of projects.

Unprecedented workforce shortfall

In the absence of radical and accelerated interventions, as demonstrated by Indecon's modelling, the State, over the coming decade, is likely to face an unprecedented shortfall in construction labour relative to what will be required to meet priority housing, energy, climate change, and other infrastructural investments. Crucially, the assessment indicates that, even under very optimistic scenarios where Ireland achieves a step-change in adoption of MMC and other efficiency measures, a deficit of 40,295 workers by 2030 remains.

Trades and apprenticeships

The most acute shortages are expected in skilled trades that rely on multi-year apprenticeships. By 2030, roughly 32,932 of the shortfall in required workforce (under Indecon's central scenario) are forecast to be carpenters, electricians, plumbers, and similar trades – comprising the bulk of the gap. The predominance of the skilled trades in the projected deficit means that Ireland's apprenticeship system would require radical expansion and reform to meet demand. Meeting this scale of demand solely through the domestic apprenticeship route would be very challenging.

Domestic training

Closing the projected workforce supply-demand solely through domestic education and training channels would require dramatic and sustained increases in output, which will be challenging to achieve. Even with strong Government investment and promotion, expansion of capacity and output will take time to yield fully qualified workers. It would also require a massive shift in post-school education and training preferences. Even with expanded capacity and a shift in preferences, the finite supply of domestic labour means that, in the near term, workforce shortfalls will persist unless alternative sources of labour are mobilised concurrently.

[4] It should be noted that the National Transport Authority has initiated work on a Transport Construction Workforce Capacity Strategy. The findings from that work can be expected to show a further need for construction workforce expansion.

Productivity

Levels of low productivity remains a fundamental issue in the Irish construction sector. This reflects a combination of factors as previously mentioned, tripling MMC usage (to reach peer benchmarks) could materially reduce labour intensity and partially narrow the workforce gap. However, as noted above, even aggressive modernisation would not eliminate the shortfalls. Productivity improvements must therefore be paired with measures to increase the absolute number of skilled workers.

Successfully Addressing the Challenge

Notwithstanding the scale of the challenges outlined above, Indecon is of the view that the adoption of a multi-prong cross-government strategy, with buy-in from departments, agencies and industry, can make a substantial contribution towards addressing these challenges if supported by clear prioritisation of investment and delivery efforts. Given the importance of the construction workforce to meeting government investment priorities and other private sector demands across a range of sectors, the strategy should be developed in a way that engages the support and commitment of all relevant public and private stakeholders: this includes DETE and DHLGH driving enhanced productivity in the construction sector, as well as skills development supports implemented by DFHERIS. The targeted phasing of prioritised infrastructure investment by Government and investment in skills supply are also key factors. An approach that recognises the constraints facing construction labour but that employs all available policy levers can yield significant benefits. Indecon is confident that substantial progress can be made through an integrated delivery framework along the lines of that outlined overleaf.

Integrated Delivery Framework to Meet Priority Workforce Needs

To respond to the workforce challenge, Indecon have proposed an integrated, cohesive, and coherent framework for meeting priority construction workforce needs across key government strategies and known investment plans. The framework is designed to respond to the scale of the challenge as evidenced by Indecon's detailed demand-supply modelling and gap analysis. It also builds upon the foundations of relevant DFHERIS and wider government action plans.

Addressing the scale of the challenge identified will require a radical, multi-faceted and urgent approach, underpinned by a clear prioritisation of investment and implementation actions. Four broad supply responses will be required, with the prioritisation and focus of these responses shaped by an agreed sequencing of investment priorities:

1. Expanding domestic capacity and accelerating adoption of MMC, including for panellised and particularly modular construction and other technological and structural changes. Also important is site level planning, achieving scale economies and the application of best practice technologies.
2. Driving a substantial increase in apprenticeship and wider training capacity, take-up, and output.
3. Boosting the attractiveness of construction and MMC careers and entry from other sectors, including among women.
4. Attracting skilled labour in the short term, through accelerated inward migration.

Recommendations
The table below presents an overall summary of recommendations to support the delivery framework for meeting priority construction workforce needs.

Summary of Overall Recommendations	
Rec.	**Recommendation**
Rec. 1	Establish robust mechanisms to monitor workforce trends and evaluate the effectiveness of initiatives and actions for meeting national construction-related priorities.
Rec. 2	Modernise and strengthen the construction industry's productivity performance
Rec. 3	Decide on prioritisation and sequencing of investment and associated construction plans for different sectors
Rec. 4	Pursue options to expand apprenticeship and wider education and training capacity
Rec. 5	Boost attractiveness of construction and MMC careers, and promote entry from other sectors and occupations
Rec. 6	Prioritise leverage of skilled inward migration to help address immediate skill shortages
Source: Indecon assessment	

Recommendations 1 to 6 are supported by 27 proposed specific actions/measures. These are outlined in the table below and described in further detail in Section 6 of the main report. One of the proposed actions is for the Government to agree ambitious timelines for implementation of each of the measures.

Summary of Supporting Actions for Recommendations 1 to 6	
Rec.	**Recommendation / Supporting Action**
Rec. 1	**Establish robust mechanisms to monitor workforce trends and evaluate the effectiveness of initiatives and actions for meeting national construction-related priorities**
	▪ Working group to be established to review requirements to boost construction workforce and skills, aligned to previous reports on skills needs and the recent report of the Accelerating Infrastructure Group.
	▪ Define appropriate Key Performance Indicators
	▪ Conduct dynamic forecasting to continuously update construction labour demand forecasts
	▪ Leverage EU and international data to benchmark Ireland's performance on construction sector innovation and productivity, MMC adoption and other metrics
	▪ Updates to appropriate Governance and oversight groups to include ongoing progress on MMC Action Plan and Careers in Construction Action Plan, etc.
Rec. 2	**Modernise and strengthen the construction industry's productivity performance**
	▪ Set additional targets for MMC adoption
	▪ Integrate MMC and digital training
	▪ Promote construction R&D and innovation
	▪ Improve employment practices to increase retention of workforce, incl. enhancing on-site working conditions
Rec. 3	**Decide on prioritisation and sequencing of investment and associated construction plans for different sectors**
	▪ Review of NDP to identify appropriate phasing of investment plans
	▪ Strengthening of ex-ante assessment of skills needs for capital plans and projects. Sectors to set out estimated workforce need in establishing plans and in bringing forward project proposals through the project lifecycle
Rec. 4	**Pursue options to expand apprenticeship and wider education and training capacity**
	▪ Accelerate Apprenticeship reform and examine options to expand construction and MMC-related Apprenticeship uptake
	▪ Establish national 'build up skills' program to fund short, targeted upskilling courses for construction workers
	▪ Expand pathways for under-represented groups, including women and girls
	▪ Facilitate transitions from adjacent sectors to attract experienced workers from related industries
	▪ Expand second-level curriculum
	▪ Invest in training infrastructure and staff
	▪ Accelerate adoption of blended and flexible learning models to speed up training and ensure continuous curriculum renewal
	▪ Develop on-site training hubs on construction sites
Rec. 5	**Boost attractiveness of construction and MMC careers and promote entry from other sectors and occupations**
	▪ Implement Careers in Construction Action Plan
	▪ Launch "Building Your Future" multimedia campaign
	▪ Organise construction careers roadshows and enhance career guidance at 2nd and 3rd level
	▪ Continue and extend 'Building Heroes' and similar initiatives to promote greater participation of women
	▪ Develop longitudinal monitoring and tracking of women in the construction workforce to help analyse identified structural challenges, including retention and career development
	▪ Develop a construction sector diversity & inclusion charter
Rec. 6	**Prioritise leverage of skilled inward migration to help address immediate skill shortages**
	▪ Launch an international recruitment campaign targeting both Irish diaspora and foreign talent
	▪ Fast-track Employment Permits for construction sector
	▪ Pursue bilateral agreements with countries that have compatible skills
	▪ Provide integration supports for skilled migrant construction workers
Source: Indecon assessment	

Overall Conclusions

Indecon's analysis has rigorously quantified the scale of Ireland's construction-skills gap. Based on the scenarios examined, the modelling estimates that between 40,295 and 77,175 additional construction- and MMC-related workers will be required by 2030. Accelerating all aspects of MMC remains essential, but this will not fully bridge the projected skills supply gap unless accompanied by other radical and urgent actions. A step-change in apprenticeship and wider training provision is imperative, supported by policy reforms that shorten time-to-qualification and boost participation. In the immediate term, a managed programme of skilled inward migration will be critical to safeguarding delivery schedules for housing, climate/energy, and other infrastructural investments. There is also a need to prioritise the phasing of construction plans for different sectors. Taken together, these findings call for decisive, whole-of-government action – including the strategic reallocation of some public resources towards targeted workforce development – to ensure that labour constraints do not impede Ireland's national investment targets/priorities. A larger available skilled workforce will assist in moderating the cost of construction in Ireland. This will contribute to improved value for money in public expenditure on construction projects and will ease viability constraints facing the building sector. This will, in turn, support the Government's housing output and other targets. Given the importance of these impacts, introducing the proposed new measures to change skill availability should be given priority.

1 Introduction, Background and Approach to Study

1.1 Introduction

This report is submitted to the Department of Further and Higher Education, Research, Innovation and Science by Indecon International Economic and Strategic Consultants ('Indecon'). The report presents research and analysis to support the development of a national framework for meeting priority construction workforce needs.

1.2 Policy Background and Context

DFHERIS funds and creates policy for the higher and further education and research sectors. It also oversees the work of the state agencies and public institutions operating in these areas. The Department's role is to make sure that these sectors support and encourage Ireland's social and economic development. It works to ensure that public investment and policy in these areas give opportunities to everyone, including the most vulnerable in society. The Department's Construction and Green Skills Unit has a particular remit regarding the skills requirements for meeting national targets in these areas

A suite of landmark Government strategies has highlighted the major demands to be met from Ireland's construction workforce to meet Government priorities in housing, climate action – in particular, off-shore wind and retrofit – and infrastructural developments, with a particular focus on regional development. These Government strategies, which are critical to Ireland's economic, social, and environmental sustainability, include but are not confined to:[5]

- The National Development Plan.
- Housing For All.
- The Climate Action Plan.
- The Offshore Wind Energy Programme.

The realisation of Government ambition in these areas is singularly dependent on progress in creating and mobilising a construction workforce of a scale and skills level that is equipped to meet the challenging targets set out in these strategies. As noted in the most recent report of the National Competitiveness and Productivity Council:[6]

> "Capacity constraints continue to limit the output of the Irish construction sector, and its ability to meet demand. The impact of capacity constraints can also be clearly seen in a comparison of the planned NDP capital envelope against actual public expenditure, with capital expenditure in 2023 coming in below that which was planned in the National Development Plan (2021) – at 4% of GNI* compared to 5.2% as planned. Resolving construction capacity constraints is the primary path to addressing Ireland's infrastructural deficits. The most direct route to easing this constraint is through significantly increasing the supply of labour flowing into the construction sector." (Page 61)

[5] The National Transport Authority has initiated work on a Transport Construction Workforce Capacity Strategy. The findings from that work can be expected to show a further need for construction workforce expansion.

[6] Ireland's Competitiveness Challenge 2025. Report of the National Competitiveness and Productivity Council, June 2025.

A range of important assessments have previously been undertaken by various Government Departments and State Agencies, which have assessed and forecasted construction workforce requirements, each focusing on specific elements of Ireland's infrastructural delivery needs. The associated reports have included:

- Updated Report on the Analysis of Skills for Residential Construction and Retrofitting, 2023 to 2030 (2024)
- Building our Potential: Ireland's Offshore Wind Skills and Talent Needs (2024).
- Build 2024 - Construction Sector Performance and Capacity (2024).
- Skills for Modern Methods of Construction - An Assessment of the Current and Future Skills Requirements for the Transition to Modern Methods of Construction (2024).
- Labour Demand Estimates for Ireland's National Housing Targets, 2021-2030 (2021).
- Detailed Description of Needs for the Irish Construction/Built Environment Sector covering Technology and Innovation, Digital Adoption and Modern Methods of Construction in the context of productivity improvement and sustainability (2021).
- Skills for Zero Carbon – The Demand for Renewable Energy, Residential Retrofit and EV Deployment Skills to 2030 (2021).
- Building Future Skills – The Demand for Skills in Ireland's Built Environment Sector to 2030 (2020).
- Green Skills 2030 – The 1st National Further Education & Training (FET) Strategy for the Green Transition (2024).

These reports have underpinned substantial workstreams and significant actions several led by the Department of Further and Higher Education, Research, Innovation and Science aiming to address the specific workforce requirements to support the delivery of the broader Government infrastructural priorities. In addition, there are various high-level structures in place across Government that play a major role in overseeing progress in driving the delivery of the construction workforce agenda. These include:

- The Cabinet Committee on Housing.
- The NDP Delivery Board, chaired by the Minister for Public Expenditure, NDP Delivery and Reform.
- The Construction Sector Group, chaired by the Department of Public Expenditure, Infrastructure, Public Service Reform and Digitalisation.
- The Housing for All Industry Capability Group, chaired by DFHERIS.
- The Offshore Wind Delivery Taskforce, chaired by the Department of Climate, Energy and the Environment.
- The MMC Leadership Integration Group, chaired by the Department of Enterprise, Tourism and Employment.

Much of the current analysis was developed and is being implemented in isolation from examination of the broader national workforce and skills policy ecosystem. An integrated examination of the relationship and interplay between often competing and sometimes overlapping construction skills and workforce demand is therefore essential, to best ensure delivery on national ambition for housing, climate action, and the NDP.

1.3 Objectives and Scope of Assessment

Reflecting the above policy context and previous research, this study is designed to address the Government's aim of adopting a substantially more joined-up and 'macro' approach to meeting future construction workforce and skill needs across all the key dimensions of Government priorities in relation to housing, energy, and other infrastructural priorities through systematic analysis.

Therefore, the overall objective of this study is to provide an evidence base and modelling framework to assess the overall demand for construction-related workforce arising from priority infrastructural needs, identify current skills supply pipelines and assess the likely skills supply-demand gap. This informs development of an integrated, cohesive, and coherent national framework for meeting these priority construction workforce needs. Specifically, the delivery framework is grounded in the following evidence-based assessment components:

1. An integrated assessment cohering and synthesising the workforce forecasts and other reliable and validated sources of data and other evidence on future workforce requirements.
2. An analysis of labour supply scenarios for the construction sector in the period to 2040 anchored in labour market and construction sector employment projections based on a limited number of plausible scenarios in terms of labour force participation and migration scenarios.
3. A detailed consideration of how other relevant factors might impact on labour demand needs, including:
    - Improved recruitment into and retention by the construction sector that could contribute to an expanded and enhanced construction workforce.
    - Stronger innovation and productivity performance in particular reflecting technological developments, including from digitisation and Modern Methods of Construction.
4. Identification of any significant gaps in the current assessment of labour demand for the construction sector, to inform understanding of future workforce needs that would need to be addressed as a priority.

1.4 Approach to Completion of Study

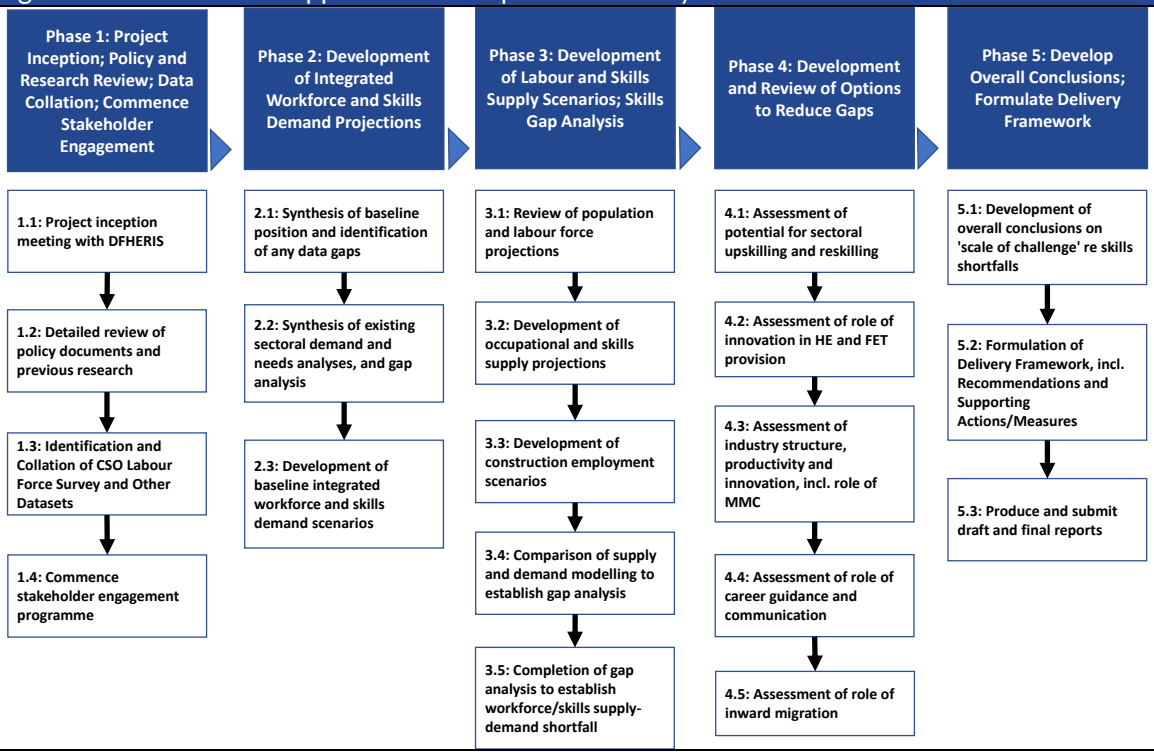
To address the above aims and scope of research, Indecon implemented on a rigorous, multi-dimensional approach and work programme, completed over five phases. A schematic description of the methodology and work programme is presented in the figure below. The methodologies applied in completing the demand and supply modelling, and associated gap analysis, are set out in sections 3, 4, and 5.

Stakeholder Engagement Process

This study has been informed by an extensive stakeholder engagement process, which took the form of both one-to-one interviews with, as well as written submissions provided by, various consultees. A listing of the wide range of organisations consulted as part of the research process is provided in Annex 1. Among the areas where consultees provided valuable inputs to the research included in relation to the following aspects:

- Labour demand shortages in the construction workforce;
- The type of skills required to facilitate growth and the extent to which stakeholders are concerned about an insufficient supply of the skills required;
- Proposed actions to address these shortages;
- Progress on existing plans and initiatives to deliver additional capacity in the sector;
- Potential scenarios for the future, and how different assumptions might impact the construction workforce.

Figure 1.1: Overview of Approach to Completion of Study



Source: Indecon analysis

Data Sources

In addition to the extensive consultation process, Indecon also utilised various datasets to facilitate the study. These included data from the following key sources:

- Central Statistics Office (CSO);
- SOLAS Skills and Labour Market Research Unit (SLMRU);
- Higher Education Authority;
- Eurostat;
- Labour Force Survey (LFS);
- National Apprenticeship Office (NAO);
- Quality and Qualifications Ireland (QQI).

1.5 Structure of Report

The remainder of this report is structured as follows.

- Section 2 provides an overview of the construction workforce in Ireland, including a synthesis of existing analyses and projections.
- Section 3 examines the supply of labour to construction occupations.
- Section 4 outlines Indecon's demand model and projects the requirement for construction occupations across a range of scenarios.
- Section 5 integrates the modelling to quantify the workforce supply-demand gap.
- Section 6 presents overall conclusions and sets out an integrated delivery framework of recommendations and priority supporting actions.

1.6 Acknowledgements and Disclaimer

Indecon would like to acknowledge the co-operation, assistance and inputs provided by a range of individuals and organisation during course of completion of this study. We would firstly like to thank senior officials at the Department of Further and Higher Education, Research, Innovation and Science, including William Beausang, Sarah Miley, Aoife Byrne, Raymond Grace, Damien Henehan, Shauna O'Leary, and Sinead Daly, for their inputs and guidance throughout the assessment.

We would also like to express our gratitude to members of the study Oversight Group, as well as colleagues in their respective Government Departments, for their valuable guidance, inputs, and feedback. In addition to DFHERIS officials, these included: Kevin Meaney and James Shaw (Department of Public Expenditure, Infrastructure, Public Service Reform and Digitalisation); Éadaoin Ní Fhearghail, James Dowling, Liam Harding, Averil Gannon, Louise Purcell, Jacqui Donnelly, and Nessa Roche (Department of Housing, Local Government and Heritage); Sandra O'Reilly, Linda Kane, Céline McHugh, Ciara Cowap, Rhodri Lloyd, Emily De Grae, and Gerard Curran (Department of Enterprise, Tourism and Employment); and Ian Price and Luke Binns (Department of Climate, Energy and the Environment).

In addition, we would like to thank senior staff within State agencies/bodies and the wide range of education and training bodies, and industry organisations and companies, who participated in

interviews and/or provided valuable inputs via submissions to the Indecon team. These included: Neil Kerrigan (Enterprise Ireland); Joan McNaboe (SOLAS); Martin Searson (NSAI); PJ Rudden (Construction Sector Group Innovation Sub-Group); Jeanette Mair, Sean Downey, and Denise Tuffy (Construction Industry Federation); James Lonergan (Society of Chartered Surveyors Ireland); Pranash Ramanundh (Royal Institute of the Architects of Ireland); Sean O'Leary (Irish Planning Institute); Sinéad Hughes (Irish Green Building Council); and Susan Carroll and Jamie Gallagher (Cairn Homes).

Last but not least, Indecon would like to express our appreciation to John McGrath (former Director of the SOLAS Skills and Labour Market Research Unit and author of the DFHERIS 'Report on the Analysis of Skills for Residential Construction and Retrofitting') for his guidance, and Indecon's adviser, Islam El-Adaway (Hurst-McCarthy Professor at the Department of Civil, Architectural and Environmental Engineering, and Director of the Civil Infrastructure System-of-Systems Interdependency Laboratory at the Missouri University of Science and Technology, Missouri, U.S.) for his valuable work on the modelling of MMC adoption and productivity.

The usual disclaimer applies and the analysis and findings in this independent report are the sole responsibility of Indecon.

2 Overview of the Construction Workforce in Ireland

2.1 Introduction

This section begins by presenting an overview of the profile of the construction-related workforce in Ireland, including identifying key challenges currently facing the industry. A crucial step in this piece is the identification of relevant occupations in the construction workforce, as these occupations form the underlying structure of our supply and demand model. Having identified the relevant occupations, we provide an estimate of the baseline (2024) employment in these occupations.

After, we present a synthesis of the existing analyses and projections that have recently been undertaken for individual workstreams for the Irish government, in terms of construction workforce needs. This provides an important point of reference for Indecon's integrated workforce demand modelling. This sub-section includes an overview of the role of modern methods of construction (MMC) in the Irish construction, and the role that MMC will play in meeting workforce needs.

2.2 Profile of Construction-Related Workforce

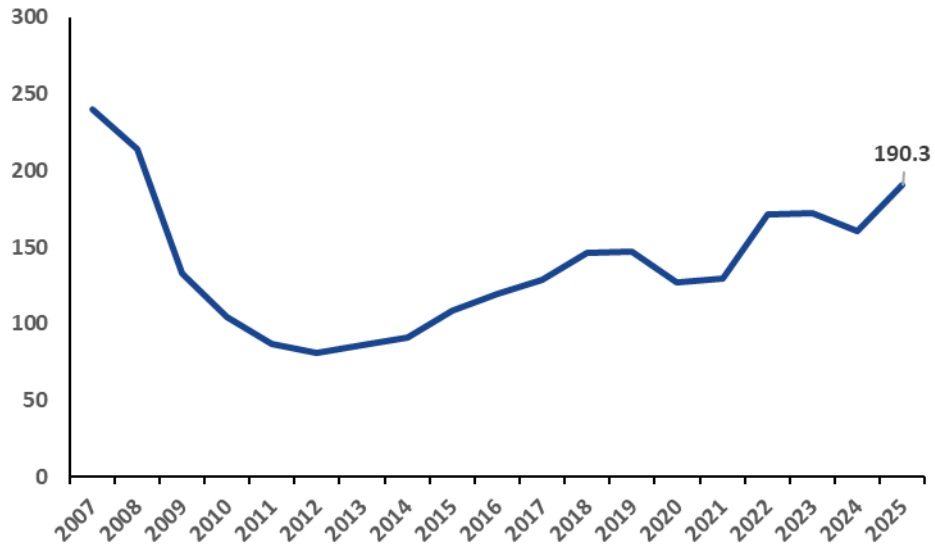
Structure and Activity of the Construction Sector

The Irish construction industry is made up of a large number of small and medium-sized enterprises, with a few large companies also operating in the market. As with many countries, COVID-19 had a major impact on the construction sector, effectively shutting down almost all output at the height of the crisis, except for a limited number of essential projects. The pandemic represented the second significant negative economic shock to hit the industry in the 21st century, where Ireland was greatly impacted by the 2008 Great Recession, with hugely detrimental impacts on employment and output in construction.

According to the CSO, total gross value added (GVA) in the Construction sector in Ireland was €14.3 billion in 2024, representing a 66% increase on 2018 levels.[7] The latest available labour force data indicates that, as of Quarter 2 in 2025, approximately 190,300 people were directly employed in the construction sector. Though this figure reflects steady growth in employment in the industry (apart from during the COVID-19 pandemic years), it is still around 26% lower than the last peak in workforce levels attained in 2007 shortly in advance of the Great Recession in 2008, which had significantly detrimental impacts for the Irish economy, particularly within the construction industry. In the post-crisis period, the construction sector lost a substantial proportion of its skills base to emigration and movements of labour into other sectors. The trend in employment in the construction sector can be seen in Figure 2.1.

[7] See: https://www.cso.ie/en/releasesandpublications/ep/p-naova/outputandvalueaddedbyactivity2023/grossvalueaddedgva/ and https://www.cso.ie/en/releasesandpublications/ep/p-ana/annualnationalaccounts2024/gdpbyproducers/outputbyactivity/

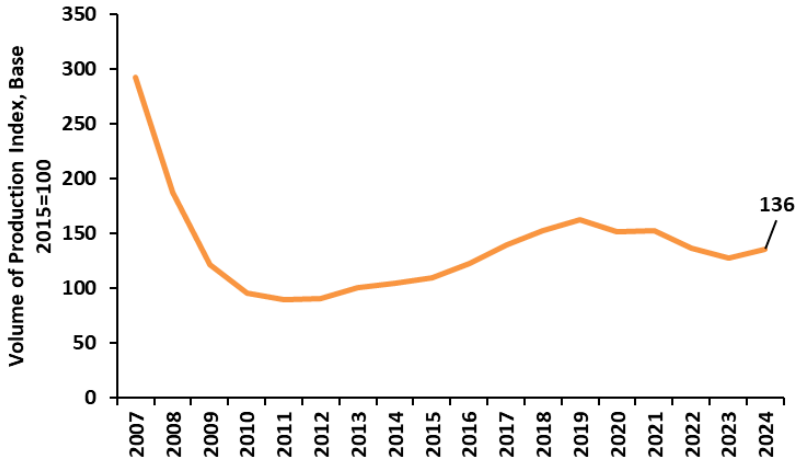
Figure 2.1: Total Employment in the Irish Construction Sector, 2007-2025



Source: Central Statistics Office Ireland (CSO)

Figure 2.2, meanwhile, shows the trend of the sector in terms of production volume, which shows a similar pattern to total employment, noting the high volumes of production prior to the Great Recession, and the negative adjustment impacts of that shock, as well as the pandemic.

Figure 2.2: Total Production Volume in Irish Construction Sector, 2007-2024 (Base 2015=100)



Source: Eurostat

It is important to recognise that the 2007 peak should not be seen as a desirable or sustainable benchmark for future sectoral growth. While that peak demonstrated that there is capacity within Ireland to expand both the construction workforce and output, the levels reached at that time were fuelled by excessive credit expansion and a disproportionate concentration of activity in the residential construction sector. These conditions created significant imbalances that left the sector and the wider economy vulnerable to a severe adjustment once the bubble burst.

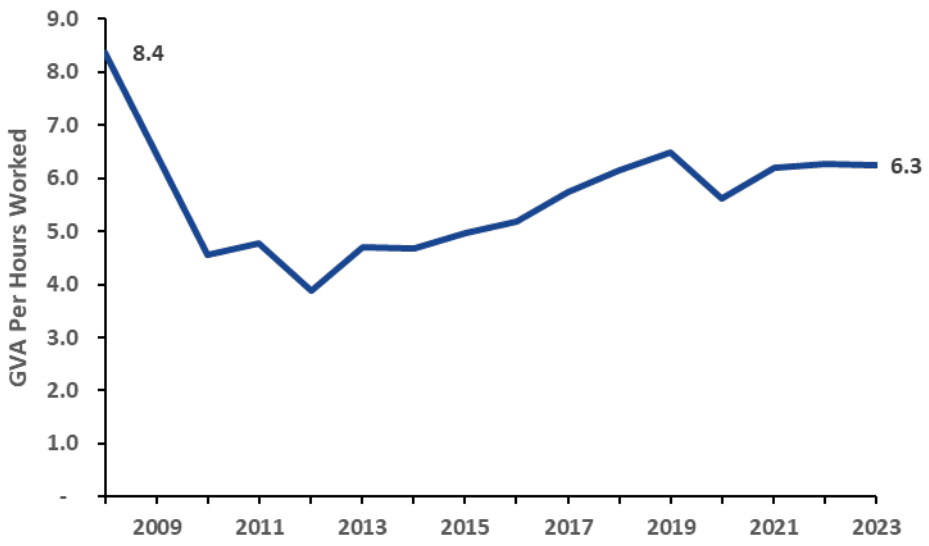
Challenges in the Industry

The challenges facing the construction workforce, in the context of meeting government targets, have been documented in recent reports, pointing to the fact that Ireland's infrastructure ambitions are misaligned with some resource constraints, and many contractors have problems due to:

- Skilled labour shortages.
- Growth in expenses.
- Inconsistencies in project schedules and contracts.

These challenges, coupled with subdued investment in the previous recession period, planning and financing issues and the fragmented nature of the sector, contribute to an overall sense of low productivity for the construction industry in Ireland. Figure 2.3 shows that the industry, despite showing a generally positive trend in recent years, is still significantly lower than its pre-Recession productivity peak, when measured in terms of Gross Value Added per hours worked. Real GVA has been used to adjust numbers for inflation. While there are various possible measures of aspects of productivity including labour productivity, real GVA per hour is a standard internationally accepted measure of overall productivity for all sectors. Indecon notes that there are limits to any specific measures of productivity as well as different aspects of productivity.

Figure 2.3: Gross Value Added per Hours Worked, 2008-2023



Source: CSO

Table 2.1 summarises potential contributing factors for Ireland's low productivity in the sector, as identified in a recent report examining productivity in the industry.[8] The challenges discussed in this section provide context for the analysis in this report, in accordance with the delivery framework described in the concluding section.

[8] See: KPMG Ireland, Future Analytics Consulting, Murphy, R., & Behan, A. (2020). Economic analysis of productivity in the Irish Construction sector. Technological University Dublin. DOI: 10.21427/WG66-QR57

Table 2.1: Factors Affecting Productivity in Irish Construction Sector	
Initiation and Planning Stage	**Execution Stage**
Cyclical nature of construction sector	Under-investment in technology and innovation
Uncertainty regarding pipeline of projects	Under-utilisation of off-site production
Complex planning system	Limited certification of training skills
Fragmented structure of sector	Precarious working conditions
Complexity of procurement and contracting process	Inefficient treatment and management of construction waste
	Poor recruitment and upskilling
Source: Murphy and Behan (2020)	

In addition, the country's energy infrastructure is under considerable strain due to the increasing demand for significant upgrades to accommodate renewable energy. This is further exacerbated by the growth of data centres and other large energy users, which are projected to account for 28% of all energy demand by 2031.[9] Additionally, Ireland has committed to increase its share of renewable electricity to 80% by 2030.

The country also continues to work towards achieving an ambitious set of green transition targets, with the overall objectives of reducing greenhouse gas emissions by 51% by 2030, and achieving net-zero emissions by 2050, to deliver a 'climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy', as articulated in the most recent Climate Action Plan (CAP24[10]). The portfolio of specific targets and actions covers almost all sectors in the economy, including electricity, renewable energy, transport, buildings, agriculture and food. The scale of the challenge puts further pressure on an already undersupplied construction workforce to support the green transition.

Recent strategies have highlighted specific gaps in skills to meet these climate targets. For example, the DHLGH's *Built and Archaeological Heritage Climate Change Sectoral Adaptation Plan* (2019), published under the National Adaptation Framework, identifies shortages of knowledge and skilled labour for traditional building skills and energy-renovation skills essential to improving the longevity and energy performance of historic buildings. More recently, DHLGH's *Improving Energy Efficiency in Traditional Buildings* (2024) has detailed the types of skills and occupations required for this critical area of construction activity.

These challenges highlight the issue of bottlenecks such as skills shortages, port capacity, utilities management, and digital adoption, which impact on construction delivery and timelines. These bottlenecks have significant implications for the construction industry. Delays in project delivery, increased costs due to supply chain disruptions, and reduced profitability are common challenges.

In terms of labour, a number of factors affect the level of competition for the relevant skills, including labour market conditions, labour mobility, and other factors impacting on the relative

[9] See: https://www.constructionawards.ie/news/industry%20insights/construction-boom-collides-with-critical-infrastructure-crisis-in-ireland#:~:text=Delays%20in%20project%20delivery%2C%20increased,housing%20affordability%20and%20transport%20connectivity.

[10] See: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/climate-action-plan-2024/

attractiveness of the construction sector. The construction industry's ability to attract skilled workers is impacted negatively by factors like housing affordability and transport connectivity. In recognition of the detrimental impacts of the housing crisis, the Irish government has initiated various infrastructure projects and policy reforms, which include increased investment in public transport and efforts to streamline planning processes. Addressing these challenges is critical for unlocking the full potential of the construction sector and driving sustainable economic growth. The Construction Industry Federation stated that their members are reporting difficulties in sourcing civil engineers and people with skills in 'wet trades' (i.e., bricklayers, painters and decorators, and plasterers). The CIF states that overall construction workers need to be supported to adapt from standard activities and processes of a construction site to more manufacturing/production floor skills, with an emphasis on digitalisation. This will assist in implementing modern methods of construction in the sector, which is an area of focus that is discussed in more detail elsewhere in this report.

A key institutional mechanism established to address the challenges facing Ireland's construction sector is the Construction Sector Group (CSG), which brings together representatives from both the construction industry and the Irish Government. It provides a structured forum for dialogue aimed at enhancing the sector's capacity and performance, to support the delivery of the National Development Plan and other strategic policy objectives.

Inward Migration

Given the persistent skills shortages facing the construction industry, inward migration has become an increasingly important component of workforce planning. While domestic initiatives aim to attract and retrain workers, the sector's immediate labour needs—particularly in specialised roles such as civil engineering and wet trades—require complementary measures to source talent internationally. As such, migration policy plays a critical role in ensuring that the construction sector has access to the skills it needs to deliver on national infrastructure and housing priorities.

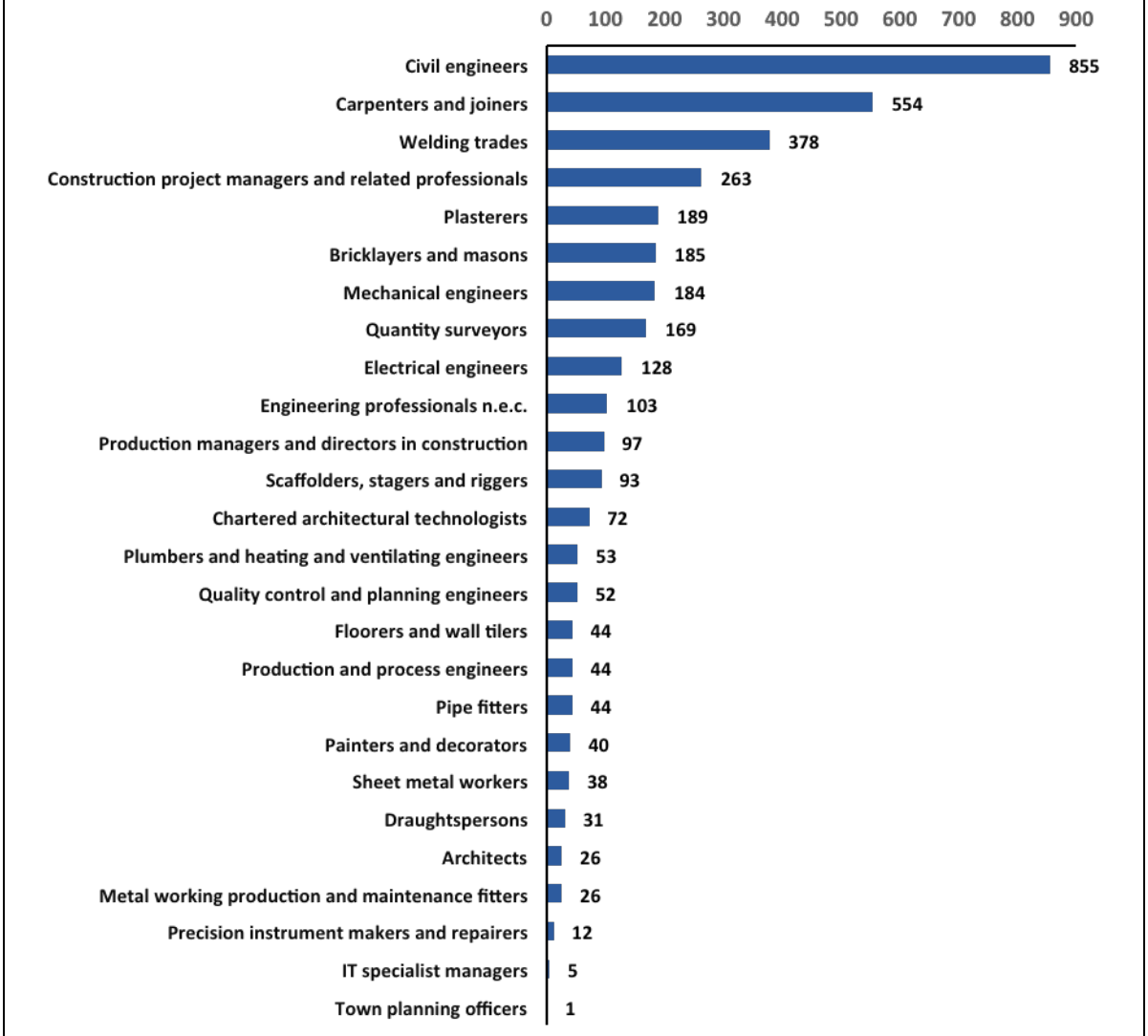
Ireland's non-EEA (European Economic Area) employment permits system aims to maximise the benefits of economic migration, while minimising the risk of disruption to the labour market. Most permits are issued in the form of 'Critical Skills Employment Permits' (CSEP) and 'General Employment Permits' (GEP).

The Critical Skills Occupations List is determined in line with analysis of the EGFSN research with regard to the labour market requirements in respect of strategically important skills, while a GEP allows all the occupation not in the ineligible list to be employed in the State under certain restrictive conditions. Unlike the CSEP, where eligible occupations are specified, a General Employment Permit assumes all occupations are eligible unless otherwise specified. Apart from general operative roles, all construction roles are eligible for either a GEP or a CSEP and are not subject to quotas. Figure 2.4 highlights the total number of employment permits in construction-related occupations issued to non-EEA applicants between 2022 and 2024. The figure shows that 855 permits were issued to civil engineers – the highest number of permits across any occupation, while craft trades such as welders and plasterers were also issued a high number of permits. The year 2024 saw a 13% increase in employment permits issued to the construction sector over 2023, with over 1,500 employment permits issued to support the construction industry in 2024. This growth has thus far continued into 2025, with 850 employment permits granted to the sector as at July 2025, a 25% increase on the same period the previous year. The top five roles in receipt of employment permits for the construction industry to date in 2025 are carpenters, civil engineers, welders, bricklayers, and scaffolders.

In recognition of the urgent demand for construction-related skills – particularly in modern methods of construction – the critical skills list has recently expanded to include the following construction-related occupations:

- Project Engineers;
- Building Information Modelling (BIM) managers;
- BIM coordinator/technicians; and
- Town Planning Officers.

Figure 2.4: Annual Number of Employment Permits Issued to Non-EEA Applicants (2022-2024)



Source: Indecon analysis

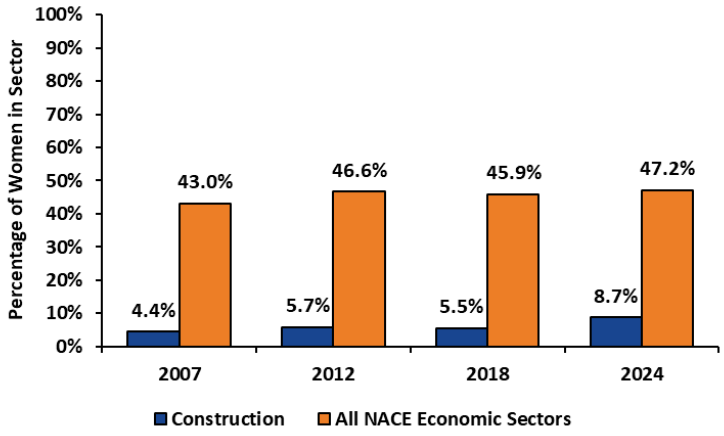
In addition to international migration, internal mobility and the geographic distribution of the workforce are also important considerations in addressing construction sector labour needs. The development of off-site manufacturing facilities offers an opportunity to support more balanced regional employment. By locating manufacturing hubs outside of urban centres, it is possible to stimulate local labour markets and contribute to the National Planning Framework's objective of more balanced regional development.

Gender Balance

DFHERIS' 'Careers in Construction Action Plan'[11] includes a series of recommendations across a number of thematic areas. A consistent theme in the action plan is the urgent need to increase the number of women in the industry, as it notes, *"Young girls, women and the unemployed remain an untapped resource and again many tend not to consider a career in the industry as they view the sector through the narrow lens of on-site work."*

Figure 2.5 shows that approximately 8.7% of the Construction sector workforce in 2024 were women. Though this represents an increase of the equivalent figure of 4.4% in 2007, it is lower than the 10% share seen in 2022. This gender imbalance is particularly striking when compared with the statistics for the overall economy, in which the average share of women employed in all sectors was around 47% in 2024 – an increase of four percentage points compared to 2007.

Figure 2.5: Share of Women in Workforce, Construction vs All NACE Economic Sectors



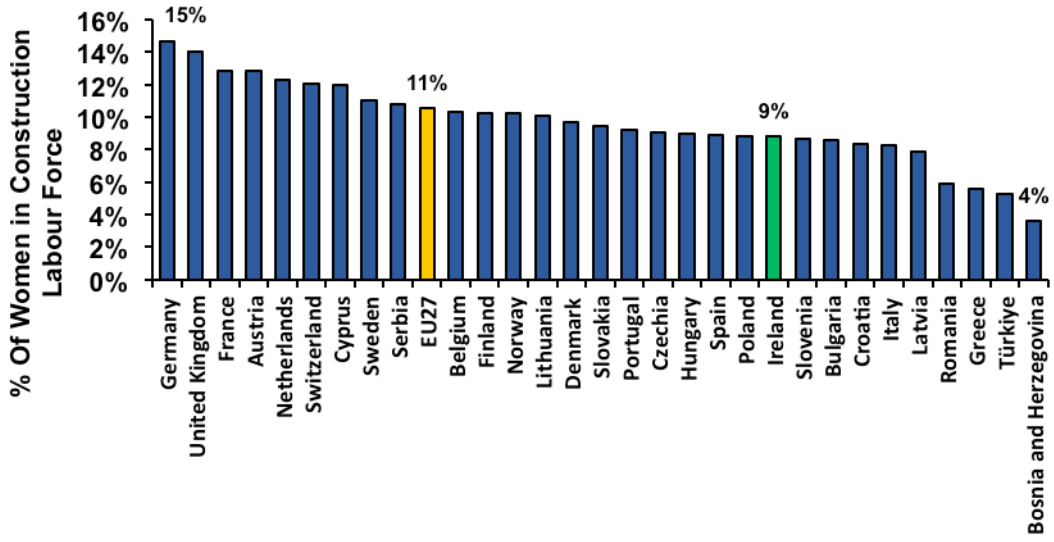
Source: Indecon analysis of CSO data

Figure 2.6 compares the participation rate of women in construction in Ireland with the rates across EU countries and the UK. The analysis indicates that, in 2024, Ireland's rate of 9% was below the EU average of 11% and significantly lower than the rates evident in countries such as the UK (15%) and Germany (14%). In the UK, organisations such as the Diversity and Inclusion in Construction have supported higher female participation by providing mentoring and guidance for under-represented groups, promoting construction careers through outreach in schools and community groups, and coordinating initiatives to attract women and minorities into STEM and construction-related roles.[12]

[11] See: https://assets.gov.ie/static/documents/careers-in-construction-action-plan.pdf

[12] https://diic.org.uk/

Figure 2.6: Share of Women in Construction Sector, Ireland vs EU/ UK (2024)



Source: Eurostat and UK Office of National Statistics (ONS) data

Modern Methods of Construction (MMC)

The increase in the use of modern methods of construction (MMC) is seen as a crucial step to addressing many of the challenges faced by the industry, including issues around productivity. MMC is a term used to describe a range of offsite manufacturing processes and onsite techniques that provide alternatives to standard construction. By offering alternative solutions to standard construction practices, MMC can enhance efficiencies and productivity in construction.

The UK's Ministry of Housing, Community and Local Government (MHCLG)'s Joint Industry Working Group on MMC established a seven-category definition of MMC[13]. It comprises:

1. Pre-manufacturing (3D primary structural systems)
2. Pre-manufacturing (2D primary structural systems)
3. Pre-manufacturing components (non-systemised primary structure)
4. Additive manufacturing (structural and non-structural)
5. Pre-manufacturing (non-structural assemblies and sub-assemblies)
6. Traditional building product led site labour reduction / productivity improvements
7. Site process led site labour reduction / productivity / assurance improvements

The extent of MMC uptake in Ireland is mixed, but evidence suggests that the market is growing. Indeed, some MMC practices – such as the use of timber frames – have been embedded in the construction industry for decades and continue to grow. Other technologies – such as 3D primary manufacturing, including the use of robotics and automation – represent more novel technologies in the industry.[14]

[13] See: https://www.buildoffsite.com/content/uploads/2019/04/MMC-I-Pad-base_GOVUK-FINAL_SECURE-1.pdf

[14] See: https://www.egfsn.ie/media/bjqdgjq0/mmc-report-final.pdf

As of July 2025, there are over 220 Offsite Manufacturers based on the island of Ireland (including Northern Ireland) with dedicated manufacturing facilities for MMC / Modular Construction. The NSAI MMC Certification Unit maintains a national database on these organisations. The list of Offsite Manufacturing firms spans multiple MMC categories and industry sectors, and not all are active in the construction sector. Some operate in the life sciences, data centre, and aviation sectors. There are also multiple MEP (Mechanical, Electrical & Piping) specialist trade contractors and specialist MEP subcontractors that provide modular solutions for the mechanical and electrical sector.

In terms of companies with certified MMC building systems, there are currently 20 building systems certified under the NSAI Agrément scheme (in addition to 39 timber-frame building systems certified by NSAI for use in dwellings and other structures).[15] Three Agrément systems are certified 3D-Volumetric MMC Building Systems, of which only two are certified for residential construction. The NSAI indicates that demand for these has been limited so far. Nevertheless, a significant number of 3D-volumetric companies are at an advanced stage in obtaining certification. Several have completed Technical Assessment Specifications (TAS) and Factory Production Control (FPC) audits with NSAI, and some are expected to have certificates published in the coming months, subject to the submission of all required supporting documentation. NSAI anticipates that between two and six additional NSAI-certified 3D-volumetric building systems could be published in 2025, depending on the progress made by each company in finalising its technical documentation.

Further supporting Ireland's ability to expand MMC adoption, NSAI has launched an MMC Certification Toolkit[16] to guide SMEs and off-site manufacturers through the certification process. The toolkit provides practical resources, including a certification guide, a readiness assessment tool, FAQs, an overview of the Agrément certification process, interviews with certified companies, and infographics outlining the certification pathway.

As such, though there appears to be some strong movement towards the supply of MMC in the industry, there also appears to be significant scope for enhanced demand for these methods, a fact which is underpinned in our demand modelling scenarios outlined later in the report.

DFHERIS' recently published MMC Action Plan[17] underscores the importance of increased adoption of MMC in the industry, in so far as the technologies can:

- Accelerate housing supply;
- Improve quality and efficiency;
- Address labour shortages; and
- Reduce industry costs.

Hence, there is a clear motivation at both industry and government level to accelerate the uptake of MMC within the industry, and to increase the level of skills and competencies required to enhance MMC provision.

[15] This does not include the list of additional Timber Frame Building Systems certified by CATG Certification.

[16] https://nsai.ie/MMCtoolkit

[17] See: https://assets.gov.ie/static/documents/P16561_-_DFHERIS_MMC_Action_Plan_English_Web_.pdf

2.3 Identification of Relevant Construction Occupations

Indecon's quantitative supply and demand modelling is developed at the **occupational** level, based on the identification of relevant occupations for construction. Census data classifies employment into 327 distinct 'occupations', according to seniority, education and skills. In turn, the census attributes a person's employment to their sector of work, resulting in a large dataset of the working-population's occupation and sector of employment. Analysing demand at the occupational rather than sectoral level enables us to account for concurrent demand for construction roles across other sectors of the economy and not just in the construction (built environment) sector. For example, although civil engineers are employed in the NACE construction sector, they are also employed in the NACE manufacturing sector. Focusing only on civil engineers employed in the construction sector could potentially significantly underestimate the actual demand for civil engineers across the entire economy in the context of government targets. To identify the occupations necessary for the model, our analysis targets the most relevant occupations for the construction sector, classified according to two criteria:

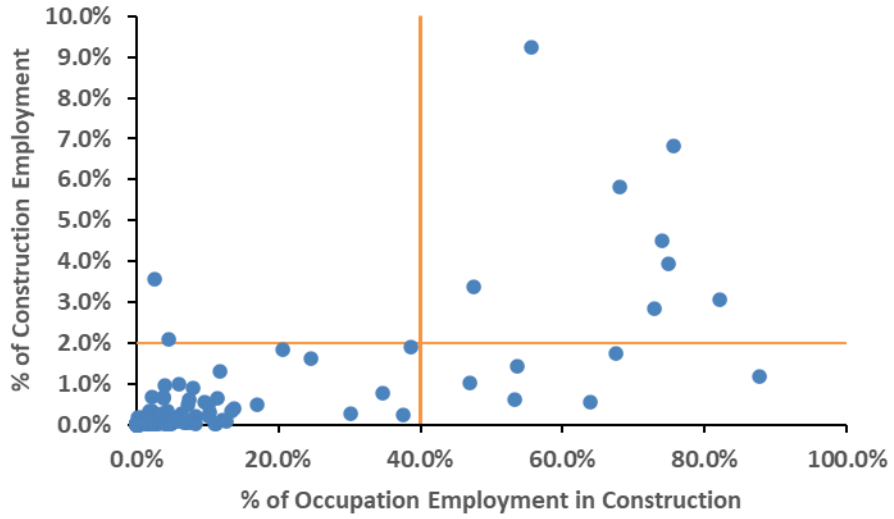
- Prevalence: How common an occupation is to the construction sector. These occupations are considered core occupations in the sector. This metric is measured as a percentage of each occupation's employment as a share of the total construction employment. Occupations which have a share of 2% or more in the construction sector are considered 'core' occupations.
- Specificity: How unique an occupation is to the construction sector. These occupations are considered niche occupations. This metric is measured as a percentage of each occupation's employment in the construction sector, relative to all sectors. Occupations with a specificity level above 40% are considered as 'niche' occupations.

This approach follows a similar method undertaken in EGFSN's 'Building Future Skills' report, which used 2016 Census data, but we updated the analysis using 2022 Census data. A key difference is that we select the occupations most relevant to the construction sector, whereas the EGFSN's report bases its selection on the broader built environment sector. Of importance is that our model considers workforce demand across the built environment as well as the wider economy; however, the selection of relevant occupations was carried out with specific reference to the core construction sector.

In addition to the occupations selected through this approach, we included a number of roles that are critical to the construction sector but are classified under professional services in the NACE classification, such as architects and civil engineers. Many of these occupations were also close to the threshold for the prevalence and specificity criteria.

Of the 212 occupations with at least one individual employed in the construction sector, 23 were selected. Together, these account for 74% of total construction employment in 2022. It is important to note that the remaining occupations include roles such as chefs and other professions that, while present in the construction sector, do not represent core construction skills. Figure 2.7 shows the mapping of all construction sector occupations, to easily identify those that meet either the prevalence or specificity thresholds.

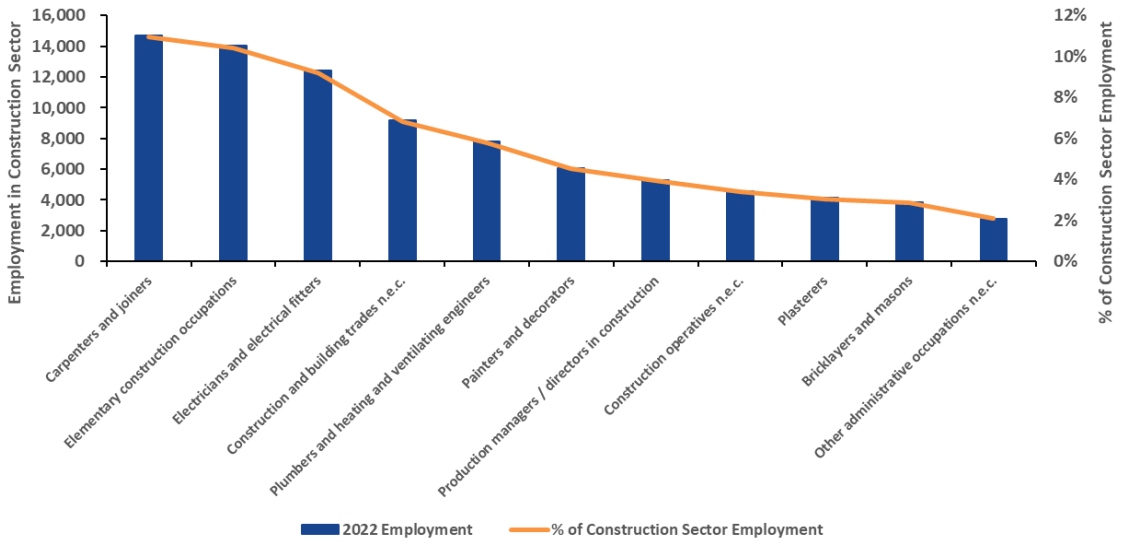
Figure 2.7: Identification of Core and Niche Occupations in Construction Sector



Source: Indecon analysis

Figure 2.8 shows employment levels, alongside the share of employment in the construction sector, for the identified core occupations.

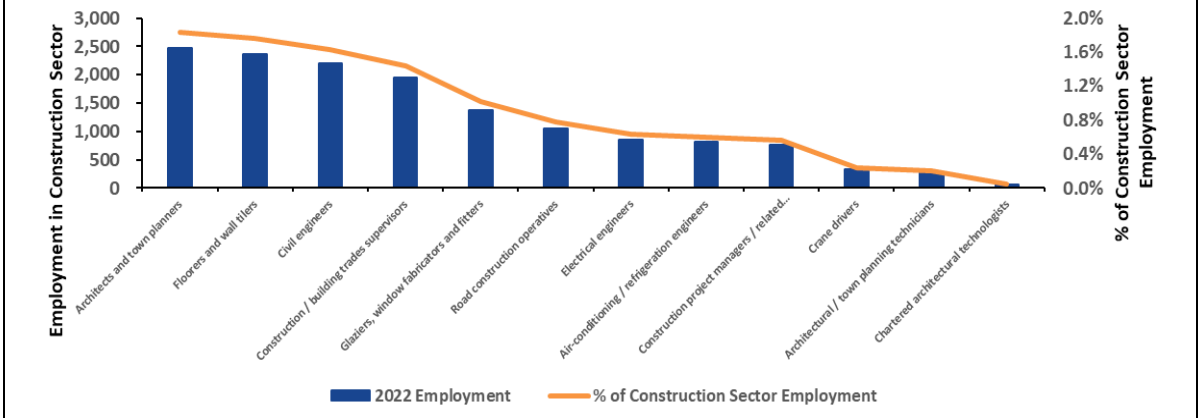
Figure 2.8: Core Skills Employment



Source: Indecon analysis

Figure 2.9 shows employment levels, alongside the share of employment in the construction sector, for the identified niche occupations.

Figure 2.9: Niche Skills Employment



Source: Indecon analysis

Table 2.2 lists the occupations selected by broad occupational group. It is important to recognise that NACE taxonomies as classified in Census statistics and used in this modelling do not provide sufficient detail to distinguish heritage-related activities from other construction sub-sectors. Because cultural heritage activities are spread across several NACE divisions and SOC groups and levels, the CSO data cannot be used to produce accurate forecasts of labour demand specifically for heritage employment. The forthcoming NACE Rev.□2.1 (2025) is expected to improve data collection and occupational monitoring, as it introduces greater granularity; for example, *43.99 Other specialised construction activities n.e.c.* now explicitly includes "renovation, renewal, reconstruction and retrofitting of historical and archaeological sites and buildings.

Table 2.2: Selected Construction Occupations by Broad and Detailed Occupational Groups	
Broad Occupational Group	**Detailed Occupational Group (SOC)**
Managers, professionals and technical	Production managers and directors in construction
	Civil engineers
	Electrical engineers
	Architects and town planners
	Air-conditioning and refrigeration engineers
	Construction project managers and related professionals
	Plumbers and heating and ventilating engineers
	Architectural and town planning technicians
	Architectural technologists
Skilled trades	Carpenters and joiners
	Glaziers, window fabricators and fitters
	Construction and building trades supervisors
	Electricians and electrical fitters
	Construction and building trades n.e.c.
	Painters and decorators
	Plasterers
	Bricklayers and masons
	Roofers, roof tilers and slaters
	Floorers and wall tilers
Operatives	Road construction operatives
	Crane drivers
	Elementary construction occupations
	Construction operatives
Source: Indecon and Standard Occupational Classification (SOC)	

Estimation of Baseline (2024) Employment

Having identified the occupations that will inform the report's supply and demand modelling, it is important to establish a baseline level of employment for 2024. To do so, we combine detailed information from two datasets:

- Labour Force Survey (LFS) data for Q4 2024, comprising sectoral employment at the major occupational group level.
- Census data for 2022, comprising sectoral employment at the detailed occupational level.

Since the LFS data provides employment figures only for the major occupation groupings, we have combined this dataset with detailed occupational data from the 2022 Census, which contains detailed occupation-level data for each sector of the economy. To estimate baseline employment data for the detailed occupations in 2024, we applied the following methodology:

- Using Census 2022 data, we derived each detailed occupation's share within the major occupation group by sector.
- This percentage share was applied to total employment for each major occupational group by sector using the 2024 LFS data.

In this way, the latest 2024 LFS employment data is used, with the Census determining only the share of detailed occupations in the major occupation group within a sector.

It is estimated that **240,500** persons were employed in the identified construction occupations in 2024 across all sectors of the economy. Of these, electricians and electrical fitters comprised the largest individual occupational group (almost 35,000), followed by elementary construction occupations, and carpenters and joiners. This employment distribution matrix demonstrates that, although these occupations have a sizeable level of employment in the Construction sector, there is also a considerable level of employment in other sectors that must be accounted for to provide a more holistic assessment of concurrent demand for occupations.

The employment distribution matrix in Table 2.3 provides the baseline data necessary for determining the future demand for the detailed occupations, as presented in section 4 of this report.

Table 2.3: Baseline (2024) Employment by Detailed Occupation, '000s

Relevant SOC Detailed Occupation	Construction	Manufacturing (C)	Wider built environment	All other sectors	Total
Electricians and electrical fitters	17.0	2.9	10.4	4.4	**34.7**
Elementary construction occupations	14.2	2.6	5.4	9.7	**31.8**
Carpenters and joiners	20.2	2.9	0.1	3.6	**26.8**
Electrical engineers	1.3	2.7	15.3	3.0	**22.3**
Plumbers and heating and ventilating engineers	10.7	0.5	3.0	2.1	**16.4**
Construction and building trades n.e.c.	12.6	0.7	0.2	2.1	**15.5**
Construction operatives n.e.c.	7.0	1.1	0.6	3.5	**12.2**
Production managers and directors in construction	9.1	0.4	0.4	1.1	**11.1**
Painters and decorators	8.3	0.3	0.0	2.0	**10.6**
Architects and town planners	3.7	0.4	1.6	4.6	**10.2**
Civil engineers	3.3	0.4	2.8	3.5	**10.0**
Bricklayers and masons	5.3	0.5	0.0	1.1	**6.8**
Plasterers	5.7	0.1	0.0	0.8	**6.6**
Floorers and wall tilers	3.2	0.1	0.0	1.1	**4.5**
Construction and building trades supervisors	2.7	0.3	0.3	1.2	**4.5**
Glaziers, window fabricators, and fitters	1.9	1.3	0.0	0.3	**3.5**
Road construction operatives	1.6	0.3	0.0	1.6	**3.5**
Architectural and town planning technicians	0.8	0.6	0.4	0.7	**2.4**
Roofers, roof tilers, and slaters	2.1	0.0	0.0	0.2	**2.4**
Air-conditioning and refrigeration engineers	1.1	0.2	0.0	0.5	**1.8**
Construction project managers and related professionals	1.1	0.1	0.2	0.3	**1.7**
Crane drivers	0.5	0.1	0.1	0.4	**1.1**
Chartered architectural technologists	0.1	0.0	0.0	0.1	**0.2**
Total of Above Occupations	**133.5**	**18.6**	**41.0**	**47.5**	**240.5**

Source: Indecon analysis of CSO and LFS data

Table 2.4 shows how this baseline employment is distributed across major occupational groups. Managers, directors, and senior officials – the most senior occupational category – makes up around 11,000 of this baseline employment. The matrix shows the importance of skilled trades in the industry, namely that almost 116,000 persons (representing 48% of total employment in these occupations) are employed in skilled trades.

Table 2.4: Baseline (2024) Employment by Major Occupation, '000s

Relevant SOC Major Occupation	Construction	Manufacturing	Wider built environment	All other sectors	Total
1 Managers, directors and senior officials	9.1	0.4	0.4	1.1	**11.1**
2 Professional	21.3	4.3	23.0	13.9	**62.4**
3 Associate professional and technical	0.9	0.6	0.4	0.8	**2.6**
5 Skilled trades	78.9	9.2	11.1	16.6	**115.8**
8 Process, plant and machine operatives	2.1	0.4	0.1	2.0	**4.6**
9 Elementary	21.1	3.7	6.0	13.1	**44.0**
Total of Above Occupations	**133.5**	**18.6**	**41.0**	**47.5**	**240.5**
Source: Indecon analysis of CSO and LFS data					

Employment Distribution across Sectors

It is important to emphasise that the projections developed in Indecon's demand model reflect the demand for selected occupations *across the entire economy* and not just in the construction sector. Therefore, although the selected occupations are primarily employed in the construction sector, it is important to also account for concurrent demand for these roles across other sectors of the economy.

Furthermore, it is important to recognise that construction occupations that have been identified are not employed *within* the construction sector in equal proportions. It is therefore important to apply a further sub-sectoral breakdown within the construction sector, as shown in Table 2.5 (and in line with NACE standard classification).[18] This sub-sectoral breakdown is necessary for identifying the requirements associated with specific government targets.

[18] As with occupational classification, it should be noted that the historic building stock may span multiple categories of the construction work defined in Table 2.5.

Table 2.5: NACE Construction Sector Further Breakdown
Construction of residential and non-residential buildings
New housing
Retrofit
Repair, maintenance and improvements
Non-residential buildings
Civil engineering
Residential civil engineering
Transport, energy and other non-residential civil infrastructure
Specialised construction activities
New housing
Retrofit
Repair, maintenance and improvements
Non-residential buildings
Source: Indecon, based on review of relevant NACE sectoral codes

Bringing together the sectoral breakdown both within and outside of the construction sector, Table 2.6 illustrates the employment distribution by sector for each of the occupations included in the analysis.

Table 2.6: Employment Distribution by Sector, Selected Detailed Occupations								
	Construction Sector (NACE F)					All Sectors Except F		
	New Housing	Retrofit	Repair, Maintenance and Improvements	Non-Residential Buildings	Transport and Other Non-Residential Civil Infrastructure	Manufacturing (C)	Wider built environment (D, E, M)	All other sectors
Carpenters and joiners	26%	6%	19%	23%	1%	11%	0%	13%
Elementary construction occupations	13%	3%	9%	19%	1%	8%	17%	30%
Electricians and electrical fitters	17%	4%	12%	15%	1%	8%	30%	13%
Construction and building trades n.e.c.	28%	6%	20%	25%	2%	4%	1%	13%
Plumbers and heating and ventilating engineers	14%	3%	10%	16%	22%	3%	19%	13%
Painters and decorators	27%	6%	20%	24%	2%	3%	0%	19%
Production managers and directors in construction	21%	5%	15%	37%	5%	4%	4%	10%
Construction operatives n.e.c.	16%	4%	12%	24%	1%	9%	5%	29%
Plasterers	29%	7%	21%	27%	2%	2%	0%	13%
Bricklayers and masons	26%	6%	19%	24%	1%	7%	0%	16%
Roofers, roof tilers and slaters	31%	7%	22%	28%	2%	2%	1%	8%
Floorers and wall tilers	25%	6%	18%	23%	1%	3%	0%	24%
Construction project managers and related professionals	14%	3%	10%	17%	23%	5%	13%	15%
Construction and building trades supervisors	20%	5%	15%	19%	1%	7%	8%	26%
Air-conditioning and refrigeration engineers	13%	3%	9%	15%	21%	11%	2%	26%
Glaziers, window fabricators and fitters	18%	4%	13%	17%	1%	37%	1%	9%
Architects and town planners	8%	2%	6%	9%	12%	4%	16%	45%
Architectural and town planning technicians	7%	2%	5%	8%	11%	23%	15%	29%
Chartered architectural technologists	9%	2%	6%	11%	15%	8%	8%	42%
Civil engineers	7%	2%	5%	8%	11%	4%	28%	35%

Table 2.6: Employment Distribution by Sector, Selected Detailed Occupations								
	Construction Sector (NACE F)					All Sectors Except F		
Electrical engineers	1%	0%	1%	1%	2%	12%	69%	13%
Crane drivers	10%	2%	7%	14%	13%	10%	7%	37%
Road construction operatives	10%	2%	7%	14%	13%	9%	0%	45%
Source: Indecon analysis								

2.4 Synthesis of Existing Analyses

In recent years, a range of important research reports have been prepared by or on behalf of various Government Departments and State Agencies, which have assessed and forecast construction workforce needs. Each report focused on specific elements of Ireland's infrastructural delivery need, but in an isolated manner without a concurrent examination of the broader national workforce and skills policy ecosystem.

Table 2.7 summarises the quantitative findings from selected recent reports on skills demand and needs in the construction sector in Ireland. It is important to emphasise that these reports focus on only specific areas and sectors in the Irish economy, and thus differ from the present report which takes an integrated, holistic approach. Due to the significant degree of interplay and overlap that exists between occupational demand in the construction workforce, the overall demand in the economy is not simply an aggregate of the findings in the reports presented below. That said, the synthesis of findings provides a useful reference point for comparing the results of this research.

Table 2.7: Summary of Recent Construction Demand and Needs Analyses			
Report	**Author and Year of Publication**	**Industry / Area of Investment**	**Estimated Additional Demand (to 2030)**
'Ireland's infrastructure demands'	IFAC (2024)	*Housing*	50,000
		Green transition	25,000
		Transport investments	3,500
		Total Infrastructure	**78,500**
'Labour Demand Estimates for Ireland's National Housing Targets, 2021-2030'	EGFSN (2021)	Housing	27,500
'An Update to the Report on the Analysis of Skills for Residential Construction & Retrofitting 2023–2030'	DFHERIS (2024)	Residential construction, Repair Maintenance and Improvements (RMI), and retrofitting	68,869
'Building Our Potential: Ireland's Offshore Wind Skills and Talent Needs'	GreenTech Skillnet (2024)	Offshore Wind (also including manufacturing, operation, maintenance and service)	30,400 (for the preferred Intervention scenario)
'The National Development Plan in 2023: Priorities and Capacity'	ESRI (2024)	Offshore Wind, (excluding manufacturing, transport, logistics and operation)	10,280
		Onshore Wind	14,720
		Conventional generation capacity	1,300
'Building Future Skills – The Demand for Skills in Ireland's Built Environment Sector to 2030 (2020)	EGFSN (2020)	Wider Built Environment sector	124,795 (low population growth) 202,943 (central forecast) 281,060 (high population growth)
Source: IFAC, EGFSN, DFHERIS			

2.5 Summary of Key Findings

- According to the CSO, total gross value added (GVA) in the Construction sector in Ireland was €14.3 billion in 2024, with the latest data indicating that around 190,300 people were directly employed in the sector as of Q2 2025. Though this figure reflects steady growth in employment in the industry (apart from during the COVID-19 pandemic years), it is still around 26% lower than the last peak in workforce levels attained in 2007 shortly in advance of the Great Recession in 2008, which had significantly detrimental impacts for the Irish economy, particularly within the construction industry.
- In the post-crisis period, the construction sector lost a substantial proportion of its skills base to emigration and movements of labour into other sectors.
- The challenges facing the construction workforce, in the context of meeting government targets, have been documented in recent reports, pointing to the fact that Ireland's infrastructure ambitions are misaligned with some resource constraints, and many contractors have problems due to:
    - Skills and labour shortages;
    - Growing expenses; and
    - Inconsistencies in project schedules and contracts.
- Indecon's quantitative supply and demand modelling is developed at the occupational level, based on the identification of relevant occupations for construction. To identify the occupations necessary for the model, our analysis targets the most relevant occupations for the construction sector, classified according to two criteria:
    - Prevalence: How common an occupation is to the construction sector. These occupations are considered core occupations in the sector.
    - Specificity: How unique an occupation is to the construction sector. These occupations are considered niche occupations.
- By combining data from the 2022 Census and 2024 Labour Force Survey, it is estimated that 240,500 persons were employed in the identified construction occupations in 2024. Of these, electricians and electrical fitters comprised the largest individual occupational group (almost 35,000), followed by elementary construction occupations, and carpenters and joiners.

3 Estimating the Supply of Labour to Construction Occupations

3.1 Introduction

In this section, we examine the existing sources of supply of construction occupation skills which are available to the sector. In doing so, we have drawn on a range of data sources, including:

- Labour Force Survey (LFS);
- Higher Education Authority (HEA);
- DFHERIS graduates and apprenticeships data;
- CSO; and
- Quality and Qualifications Ireland (QQI).

This, in turn, enabled Indecon to identify the current and future gaps between skills supply and skills demand, presented in section 5.

3.2 Overview of Supply Model (Channels of Skill and Labour Supply)

The supply side of the model examines the potential inflows of labour into relevant construction sector occupations. Following a structure similar to the EGFSN's 'Building Future Skills' (2020) report, the supply model takes account of the different, often distinct, pathways of supply required for different job roles and skill types. As previously mentioned, supply to construction sector occupations can increase from a number of distinct sources:

- Domestic education and training channels:
  - Professional development;
  - Further and higher education (excluding apprenticeships); and
  - Apprenticeships.
- Other channels:
  - Labour-market dynamics such as labour force participation and intersectoral flows; and
  - Inward migration.

In assessing supply, it is important to recognise that this study is concerned with both skills and workforce availability. While skills gaps can be addressed through targeted education and training initiatives, workforce constraints are more immediately shaped by broader labour market conditions. In the current Irish context, near full employment presents a challenge as the overall availability of workers is limited. This underscores the importance of considering the potential to attract individuals into construction from other sectors, [19] increase participation rates, and leverage inward migration to meet demand.

[19] In this context, the just transition presents an opportunity to redeploy workers from sectors of the economy that may be experiencing decline or transformation.

Table 3.1 shows how Indecon have mapped the domestic education and training channels of supply to each construction occupation, demonstrating the distinct channels that would be needed to address demand gaps for each occupation. It should be noted that a number of additional apprenticeships exist for construction or construction-related occupations and those considered in this report are those relevant to the selection of occupations considered. Structuring the model in this way highlights how gaps between supply and demand may vary between the different domestic supply channels, and how policy may be required to boost the supply from individual supply channels, including the role that migration may play in addressing skills gaps. This level of nuance will strengthen the evidence base needed for the recommendations delivered later in the report.

Table 3.1: Supply Channels for Relevant Occupational Categories

Domestic Channel of Supply	Occupational Category
Professional Development	Construction project managers and related professionals
	Production managers and directors in construction
Higher and Further Education (excluding Apprenticeships)	Architects and town planners
	Architectural and town planning technicians
	Architectural technologists
	Civil engineers
	Electrical engineers
Apprenticeships	Bricklayers and masons
	Carpenters and joiners
	Electricians and electrical fitters
	Painters and decorators
	Plasterers
	Plumbers and heating and ventilating engineers
	Air-conditioning and refrigeration engineers
Other	Construction and building trades N.E.C.
	Construction operatives N.E.C.
	Crane drivers
	Elementary construction occupations
	Road construction operatives
	Construction and building trades supervisors
	Floorers and wall tilers
	Glaziers, window fabricators and fitters
	Roofers, roof tilers and slaters

Source: Indecon analysis

Note: N.E.C. means not elsewhere specified.

3.3 Estimating Output from Supply Sources

The focus of the supply analysis will be on the level of output from each supply source in 2024. This represents a 'status quo' supply scenario in which there is no further change to the level of output from each channel. In the gap analysis section, we also present a 'supply intervention' scenario in which the level of supply from these sources varies in order to meet the level of demand.

Further and Higher Education (excluding Apprenticeships)

The following occupations are considered to require a formal further or higher education qualification:

- Architects and town planners;
- Architectural and town planning technicians;
- Architectural technologists;
- Civil engineers; and
- Electrical engineers.

DFHERIS provided Indecon with a detailed overview of the number of recent graduates on a range of courses which are relevant to the construction occupations considered in the model, across the further education and training (FET) sector. The list of selected courses is included in the Annex to this report. Relevant courses are grouped according to their broad ISCED discipline,[20] namely:

- Building and civil engineering;
- Architecture and town planning;
- Environment not further defined or elsewhere classified; and
- Architecture and construction not further defined or elsewhere classified.

As well as the number of graduates on further and higher education courses at higher education institutions, we also include individuals who have obtained Quality and Qualifications Ireland (QQI) Level 6-8 awards. QQI higher education awards are primarily made in respect of graduates from private and independent higher education institutions, and therefore account for a small fraction of all higher education awards made in Ireland (less than 8% of all awards in the HE sector are made by QQI). HEA data (such as that supplied by DFHERIS and outlined previously), meanwhile, includes awards made by public institutions such as universities, technological universities, and institutes of technology. These institutions are awarding bodies and therefore graduates from these institutions are not included in any QQI data.

Data for QQI awards is at a less detailed level than the equivalent DFHERIS data, as graduates are grouped according to their broad field of study. In this case, we focus on QQI awards in the Engineering, Manufacturing, and Construction broad field of study, where 5,955 people received Level 6-8 awards. However, only a percentage of these recipients will enter the construction industry. Using CSO Graduate Outcomes data,[21] it is estimated that an average of 12.6% of graduates from Engineering, Manufacturing and Construction QQI courses will then go on to employment in the construction sector. By applying this percentage to the total number of graduates, we arrive at an estimated supply of 752 persons to the construction workforce who have obtained QQI awards.

As shown in Table 3.2, when combining the output from relevant degrees across relevant construction sub-sector, there were approximately 2,287 graduates in the relevant disciplines in 2024.

[20] See: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=International_Standard_Classification_of_Education_(ISCED)

[21] See: https://data.cso.ie/table/FEO03

Table 3.2: Number of Graduates from Relevant HE, FET and QQI courses		
	Sector	**2024**
Architecture and construction not further defined or elsewhere classified	HE	120
	FET	15
	Total	**135**
Architecture and town planning	HE	360
	FET	0
	Total	**360**
Building and civil engineering	HE	875
	FET	140
	Total	**1,015**
Environment not further defined or elsewhere classified	HE	25
	FET	0
	Total	**25**
QQI Award Graduates in Construction sector	**Total**	**752**
All Relevant Graduates	**Grand Total**	**2,287**
Source: DFHERIS		

Apprenticeships

A number of construction occupations require the completion of apprenticeships in order to acquire the requisite skills and experience needed for the role. This is typically the case for 'craft' trades, and our model includes the following core or niche occupations which currently require the completion of an apprenticeship[22]:

- Bricklayers and masons;
- Carpenters and joiners;
- Electricians and electrical fitters;
- Painters and decorators;
- Plasterers;
- Plumbers, and heating and ventilating engineers; and
- Air-conditioning and refrigeration engineers.

[22] The formal apprenticeships reflected in this section are generally at entrant, or mid-entrant, level. There is an absence of formal programmes providing 'master' qualifications or advanced technician qualifications to validate and advance on-the-tools expertise.

When considering data from DFHERIS and the National Apprenticeship Office (NAO), as shown in Table 3.3, there were approximately 2,597 apprenticeship completions during 2024, for those apprenticeships directly related to the identified occupations previously listed. The most popular course was the Electrical apprenticeship, followed by Plumbing, and Carpentry and Joinery.

Table 3.3: Number of Apprenticeship Completions for Construction-Relevant Occupations

Course	2024
Brick and Stone laying	23
Carpentry and Joinery	326
Painting & Decorating	9
Plastering	11
Plumbing	483
Stonecutting and Stonemasonry	1
Electrical	1,692
Refrigeration and Air Conditioning	52
Total (all)	**2,597**

Source: Indecon analysis of DFHERIS/ NAO data

Other Occupations

Finally, there are a number of important construction-workforce occupations that do not require the completion of a further or higher education qualification, nor an associated apprenticeship, but which nonetheless play a critical role in addressing skills needs in the industry. These occupations include:

- Construction and building trades;
- N.E.C. Construction operatives;
- N.E.C. Crane drivers;[23]
- Elementary construction occupations; and
- Road construction operatives.

In a similar method to the calculation of annual flows of non-Irish nationals, we estimated the change in employment in occupations not requiring formal qualifications between 2022 and 2024, using Labour Force Survey data. In this way, we estimate an annual inflow of 1,650 persons in occupations not requiring formal qualifications. Of this estimated inflow, around 1,482 individuals are attributable to inward migration.[24]

[23] We note that the employment figures here are not additional to those covered under the Construction Skills Certification Scheme (CSCS), as CSCS card holders are not treated as a distinct channel of labour supply in the modelling, as discussed later in this section.

[24] Given the very low level of inflows from within Ireland into these occupations over the 2022–2024 period, and the statistical unreliability associated with estimating such small numbers, we assume no additional domestic supply under the status quo scenario.

Table 3.4: Estimated Annual Supply to Other Occupations	
Total Annual Inflows	**1,650**
Inflows from Migration	**1,481**
Source: Indecon analysis of Labour Force Survey data	

An additional point relevant to the construction workforce is the Construction Skills Certification Scheme (CSCS). According to the CSCS website,

"[The] Construction Skills Certification Scheme (CSCS) programmes provide for the training, assessment, certification and registration of non-craft operatives, providing the knowledge and skills needed for occupations within the construction sector."

Under the Construction Regulations, certain safety-critical tasks may only be carried out by workers who have successfully completed the relevant CSCS training. On completion, the individual receives a CSCS card confirming competence in that specific task. The list of tasks requiring CSCS accreditation can be found on the HSA website; examples relevant to this project include:

- Tower crane operation.
- Self-erecting tower crane operation - where the employee has not been trained in Tower crane operation.
- Crawler crane operation.
- Roof and wall cladding/sheeting.

CSCS certification is task-based rather than occupation-based. It represents additional training for specific activities within existing roles rather than a separate route into those occupations. For this reason, CSCS cards are not treated as a distinct channel of labour supply in the modelling. While data on CSCS certifications can provide useful insight into the availability of specific skills within the workforce, it is not directly relevant for projecting the overall numbers required in each occupation, as workers may hold multiple certifications for different tasks within the same role, or may not hold a CSCS card at all depending on the tasks they perform.

Inward Migration

Non-Irish nationals play a critical role in meeting the demand for overall labour and skills needs in the construction and wider built environment sector in Ireland. Data from the Labour Force Survey suggests that the share of non-Irish nationals in the construction sector was 17.6% in 2024, a slight increase on the 2022 share, which was 15.9%. These figures are slightly lower than the share of non-Irish nationals in all sectors, which were 18.2% and 20.3% in 2022 and 2024, respectively. However, we have previously noted that focusing only on employment in the NACE construction sector means that demand and supply would be underestimated for those occupations providing critical inputs to the construction industry, but which may be counted under a different NACE sector. Hence, we focus instead on the share of non-Irish nationals across all sectors.

It is also important to recognise that the share of non-Irish nationals may vary according to skill or occupational level. Table 3.5 shows that the highest share of non-Irish nationals (relative to employment in that broad occupational group) was in the elementary occupational group, followed by process, plant, and machine operatives. However, there was only a modest degree of variation between groups in each year.

Table 3.5: Non-Irish Nationals in All NACE Sectors, 2022-2024

Broad Occupational Group	% non-Irish nationals, 2022	% non-Irish nationals, 2024
Managers, directors and senior officials	18.6%	15.4%
Professional	19.6%	21.2%
Associate professional and technical	19.1%	20.6%
Administrative and secretarial	10.0%	15.2%
Skilled trades	17.0%	17.4%
Caring, leisure and other services	16.7%	20.2%
Sales and customer service	15.5%	22.1%
Process, plant, and machine operatives	20.2%	23.2%
Elementary	24.3%	27.2%

Source: Indecon analysis of Labour Force Survey data

By applying the percentage shares in Table 3.5 to the estimated employment for each occupation, it is estimated that the number of non-Irish nationals in the construction occupations increased by 3,303 on average between 2022 and 2024.[25] This section of the workforce may be employed across the different types of occupations, i.e., those requiring educational qualifications or apprenticeships, as well as those occupations not requiring formal qualifications.

CSO data indicates that 34% of non-Irish nationals in the construction sector are from non-EEA countries in 2024. As shown in Table 3.6, combining these sources suggests annual inflows of approximately 2,196 EEA nationals and 1,107 non-EEA nationals in 2024. This figure underpins our assumption for migration inflows under the status quo scenario.

[25] This may include a small number of non-Irish nationals obtaining the qualifications through the domestic education and training system. We do not expect this number to be significant as only a small percentage of HEI graduates in the relevant courses choose to work in Irish construction after graduation, and the percentage is likely to be even lower for international students. As the data is not available to implement this small adjustment, the gap presented under the status quo scenario can be considered as an upper bound estimate. This does not affect the scenarios for addressing gaps presented in Section 0.

Table 3.6: Migration in Construction Occupations, yearly average (2022-2024)	
EEA Nationals	2,196
Non-EEA Nationals	1,107
All Non-Irish Nationals	**3,303**
Source: Indecon analysis of Labour Force Survey data	

Summary of Combined Supply Sources

Combining the different quantifiable sources of supply described in this section gives an estimated additional supply to the Construction sector of 9,707 in 2025 in the 'status quo' (i.e., projecting current flows forward with no policy intervention) supply scenario. This figure increases to 9,840 by 2030, mainly driven by an increase in apprenticeship registrations in recent years.

Table 3.7: Summary of Estimated Supply Flows to Construction Sector (2022-2030)			
		2025	**2030**
Further and Higher Education (excluding Apprenticeships)	*HEA courses*	1,380	1,380
	FET courses	155	155
	QQI Awards	752	752
	Sub-total	2,287	2,287
Selected Relevant Apprenticeships		4,117	4,250
Migration		3,303	3,303
	Total	**9,707**	**9,840**

Source: Indecon analysis

Note: Figures presented are estimated completion levels based on latest registration and completion rates data. Quality and Qualifications Ireland (QQI) awards are primarily made in respect of graduates from private and independent higher education institutions.

3.4 Summary of Key Findings

- The overall supply of individuals to work in construction occupations derives from three main sources:
    - Irish education system;
    - Training and apprenticeships; and
    - Inward migration.
- When combining the output from relevant degrees across relevant construction courses, there were approximately 2,287 graduates in the relevant disciplines in 2024.
- When considering data from DFHERIS and the National Apprenticeship Office (NAO), there were approximately 2,597 apprenticeship completions across relevant apprenticeships in 2024.
- CSO data indicates that 34% of non-Irish nationals in the construction sector are from non-EEA countries. This suggests annual inflows of approximately 2,196 EEA nationals and 1,107 non-EEA nationals in 2024. This may include a small number of non-Irish nationals obtaining the qualifications through the domestic education and training system.
- Combining the different quantifiable sources of supply described in this section gives an estimated additional supply to the Construction sector of 9,707 in 2025 in the 'status quo' (i.e., projecting current flows forward with no policy intervention) supply scenario.

4 Estimating the Demand for Construction Occupations

4.1 Introduction

This section outlines Indecon's demand model and presents estimates of the projected demand for construction-related occupations across a range of scenarios, in the context of sectoral and wider government targets. The model is designed to be dynamic and can be updated to reflect revised sectoral targets as they emerge.

4.2 Overview of Demand Model

This section presents the modelling approach used to estimate future construction-related occupational demand across the Irish construction sector and wider economy.

For the occupations selected, overall employment in all sectors is considered. The Indecon team estimated projected construction-related workforce demand across all sectors by combining:

- **Expansion demand**, representing the additional workforce required to meet the government targets specified in the Climate Action Plan, Housing for All, and the NDP; and
- **Replacement demand**, representing expected exits from the labour force (using CEDEFOP replacement rates as adjusted in the McGrath report). [26]

The model produces an estimate of total occupational demand by combining expansion and replacement demand. This captures both new jobs created by policy-driven growth and existing roles vacated by exits such as retirement, illness, or mortality. The model builds on the McGrath report for the residential sector, applying a similar method to the broader construction sector and incorporating other public (NDP, etc.) and private sector demand.

Expansion demand reflects projected growth in construction-related activity. The projected expansion in the Irish construction sector is based on a set of interrelated policy targets and macroeconomic assumptions. These include:

- New Housing Supply: A target of 60,000 new residential units to be delivered annually by 2030, reflecting national housing demand projections and commitments under Housing for All;
- Residential Retrofits: The equivalent of 500,000 homes retrofitted to a Building Energy Rating (BER) of B2/ cost optimal or carbon equivalent;
- Repair, Maintenance and Improvements (RMI): Modelled based on the age distribution of the existing housing stock, considering the latest Government targets for house completions;

[26] Report on the Analysis of Skills for Residential Construction & Retrofitting, 2023 to 2030

- Non-Residential Retrofit: Expansion modelled based on investment flows expected to reach approximately €500 million annually by 2030, supporting the decarbonisation of public and commercial buildings in line with Climate Action Plan objectives;
- Social infrastructure: Including investment in education and health, is assumed to increase in line with capital allocations under the latest National Development Plan (NDP). This reflects sustained demand for schools, healthcare facilities, and related public infrastructure;
- Transport, energy and other civil engineering infrastructure: Projected to grow in line with the NDP allocations to the Department of Transport, with additional growth linked to offshore wind infrastructure. The offshore wind projections are informed by modelling in the ESRI's *"NDP in 2023: Priorities and Capacity"*;
- Growth in non-construction sectors: Assumed to track the Department of Finance's projections for real Gross National Income (GNI)*, as outlined in Budget 2025; and
- Beyond 2040: the pace of construction sector growth is assumed to follow projections for real GNI*, maintaining alignment with overall economic performance.

The employment distribution matrix (outlined in section 2), detailing how individual occupations are spread across sectors and construction subsectors, determines expansion requirements of specific occupations. Expansion demand is estimated by means of the following equation:

$$\text{ExpansionDemand}_i \quad \sum_j \left(Share_{ij} \cdot \frac{1 + g_j}{1 + \pi_{ij}} \right)$$

Where:

- Expansion Demand(i) is Expansion demand for occupation i;
- Share (ij) is the share of occupation i's employment in sector j;
- g (j) is the output growth rate in sector (or subsector of construction) j; and
- π (ij) is the productivity improvement rate relevant to occupation i in sector j
  (This captures that different occupations in the same sector may experience different productivity changes).

This ensures that occupations most concentrated in growing sectors experience proportionally larger increases in demand. For instance, as carpenters are heavily employed in "New Housing" and that subsector is projected to grow rapidly, expansion demand for carpenters will reflect this.

Replacement demand accounts for workforce exits due to retirement, mortality, long-term illness, and other permanent exits from the labour market. The model uses occupation-specific replacement rates, based on CEDEFOP estimates and further adjusted in the McGrath report. These rates reflect differences in age profiles of occupational groups as well as differences in historical attrition patterns between occupations and may be driven by factors such as absence of progression routes, inaccessibility of upskilling opportunities, lack of accreditation for prior learning when seeking promotion or new jobs, or lack of pay increases on gaining new qualifications. For instance, high-replacement occupations such as "Elementary Construction Occupations" will see larger replacement demand compared to other occupations.

Replacement demand is estimated using the following equation:

$$\text{ReplacementDemand}_{it} = \text{Employment}_{it} \cdot r_i$$

Where:

- Replacement Demand (it) is the requirements for occupation i in period t due to replacement needs;
- Employment (it) is the employment level of occupation i in year t (including expansion demand); and
- r (i) is the replacement rate for occupation i.

Total occupational demand is then defined as the sum of expansion and replacement demand, capturing both new posts required to achieve government targets, and jobs vacated by those leaving the workforce:

$$\text{TotalDemand}_i = \text{ExpansionDemand}_i + \text{ReplacementDemand}_i$$

This provides a comprehensive estimate of recruitment needs over the projection period.

Breakdown by Sector

Recognising competing demands for labour, the model covers all the sectors of the economy, which are grouped into the following broad categories:

- Construction (NACE category F), broken down by subsector (see further below).
- Manufacturing (NACE category C).
- Wider Built Environment, comprising the following categories:
  - Electricity, Gas, Steam and Air Conditioning Supply (NACE category D);
  - Water Supply; Sewerage, Waste Management and Remediation Activities (NACE E); and
  - Professional, Scientific and Technical Activities (NACE category M).
- All other sectors.

The Construction sector (NACE category F) is further subdivided into the following:

- New Housing;
- Retrofit;
- Repairs, Maintenance, and Improvements (RMI); and
- Non-residential Buildings.
- Transport, energy, and other non-residential civil Infrastructure.

The NACE classification, while providing a structured basis for economic activity classification, does not offer sufficient granularity to directly map to the subsectors above. In particular, it provides a breakdown by:

- Construction of residential and non-residential buildings;
- Civil engineering; and
- Specialised construction activities.

This does not distinguish between construction of new housing, retrofit activity, social infrastructure development, or other policy-relevant categories. To bridge this gap, the following methods were employed:

- We used the 2024 LFS question on whether construction workers "mainly work on new housing developments/renovations" to identify the residential component of the workforce, allowing us to separate residential from non-residential activities. DCEE data provided estimates of the number of workers specifically involved in residential retrofit activity, enabling a further split within the residential category.
- In addition, data on production and capital formation by residential, non-residential, and civil engineering was used to inform the proportional distribution of employment across these key categories.
- Together, these sources allow for a reclassification that aligns with the detailed targets set out in Government policy, including distinct estimates for the relevant sub-sectors of construction. The result is a practical and policy-aligned segmentation that better reflects workforce demand across the evolving construction landscape.

Table 4.1 summarises our classification and how it maps to the NACE construction sub-sectors. This re-categorisation underpins the sectoral projections presented in Figure 4.5.

Table 4.1: NACE Construction Sector Further Breakdown
Construction of residential and non-residential buildings
New housing
Retrofit
Repair, maintenance and improvements
Non-residential buildings
Civil engineering
Residential civil engineering
Transport, energy and other non-residential civil infrastructure
Specialised construction activities
New housing
Retrofit
Repair, maintenance and improvements
Non-residential buildings
Source: Indecon analysis.

4.3 Demand Scenarios

The demand model incorporates three alternative scenarios, each reflecting different assumptions regarding future occupational productivity. These scenarios are designed to capture a range of plausible trajectories for workforce demand, depending on the extent to which productivity-enhancing practices and technologies are adopted across the sector.

Table 4.2 presents the estimated output growth rates by sector (represented by the letter g in the Expansion Demand equation shown above). For the construction sector, these rates reflect the level of growth required to meet the construction-related government targets presented in section 4.2, while for the other sectors, the figures are based on the Department of Finance's projections used for Budget 2025. In the period 2031-2040, all sectors are assumed to grow at a rate consistent with the Department of Finance's projections for the economy (adjusted to reflect the current international climate). This represents a deliberately conservative assumption. Should the actual rate of growth fall below this level, the associated labour requirements would be correspondingly lower. Given the current level of uncertainty in global economic conditions, a conservative approach is considered prudent and appropriate for the purposes of this analysis.

Table 4.2: Output Growth Rates by Sector, 2025-2030					
Construction Sector (NACE F)					All Sectors Except NACE F
New Housing	Retrofit	Repair, Maintenance and Improvements	Non-residential buildings	Transport, Energy and Other Civil Infrastructure	All Other Sectors
12.0%	15.8%	1.5%	3.2%	18.1%	2.2%
Source: Indecon estimates					

1. 'No Productivity Gains' Scenario

This scenario assumes that output-to-workforce ratios remain unchanged over the projection period. It reflects a situation in which construction activity expands but productivity levels across occupations remain constant. Under this assumption, all increases in output must be met through proportional increases in employment. It represents a conservative baseline, highlighting the upper bound of workforce demand in the absence of efficiency improvements.

Under the 'No Productivity Gains' scenario in the period 2025-2030, both activity and workforce are projected to grow at the rates outlined in Table 4.2 above. The equation for expansion demand then becomes:

$$\text{ExpansionDemand}_i \quad \sum_j \left(\text{Share}_{ij} \cdot (1 + g_j)\right)$$

2. 'Trend Productivity' Scenario

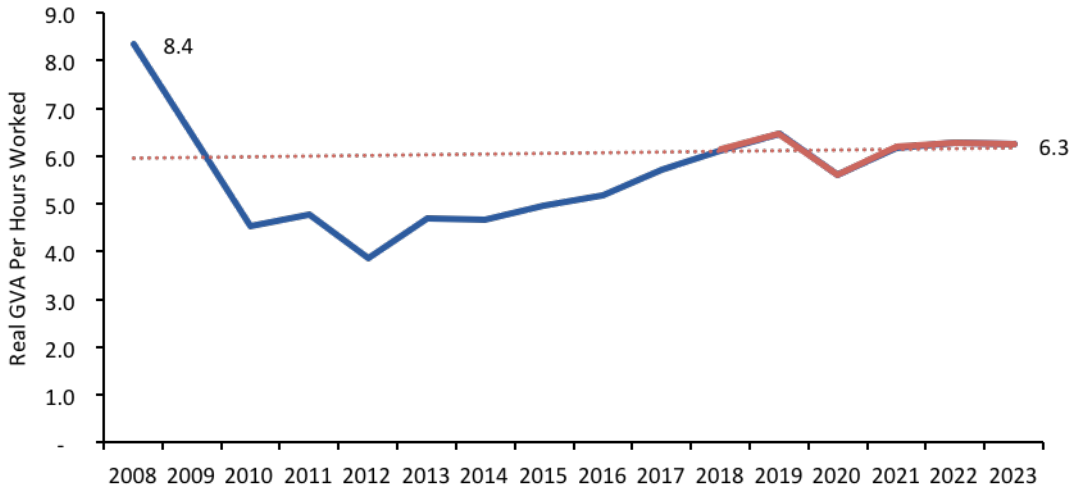
The 'Trend Productivity' scenario assumes continued, moderate improvements in productivity in the construction sector, consistent with recent historical trends. It reflects incremental gains achieved through gradual process improvements and incremental adoption of tools and practices, without widespread transformation of delivery models. Specifically, an annual productivity growth rate of 1.8% is applied uniformly across the construction sector, thereby reducing the workforce required to achieve the activity growth rates presented in Table 4.2. For the non-construction sectors, no productivity improvements are assumed, producing a conservative estimate of labour demand by 2030.

$$\text{ExpansionDemand}_i \quad \sum_{j \in F} \left(\text{Share}_{ij} \cdot \frac{1 + g_{j(F)}}{1 + 1.8\%}\right) + \sum_{j \in -F} \left(\text{Share}_{ij} \cdot (1 + g_{j(-F)})\right)$$

This scenario illustrates the extent to which productivity gains in line with recent trends could mitigate labour demand pressures.

Figure 4.1 shows recent productivity trends in the Irish construction sector, underpinning the 1.8% assumption in the central scenario (trend-productivity), which is based on average productivity growth over the period 2018-2023. The red line depicts real GVA per hours worked, and the dotted line represents the average percentage increase in this variable in 2018-2023. In the central productivity scenario, it is assumed that recent productivity improvements, achieved in the context of structural sector changes will continue without any further acceleration in the adoption of MMC.

Figure 4.1: Productivity in the Irish Construction Sector, 2008-2024



Source: CSO and Indecon analysis.
Notes: Real GVA measured in €m, at 2022 constant prices. Hours worked calculated as average paid hours worked per annum in sector.

3. 'MMC Productivity' Scenario

The 'MMC Productivity' scenario is designed to capture the potential for more substantial productivity gains associated with the accelerated adoption of Modern Methods of Construction (MMC), as well as broader uptake of digital including AI tools, industrialised processes, and off-site solutions. It reflects a more ambitious trajectory in which new technologies and innovative practices significantly alter construction processes and workforce deployment. Higher productivity assumptions under this scenario reduce projected workforce requirements relative to output, particularly in those construction-related occupations most exposed to MMC adoption.

Expansion demand under this scenario is computed according to the equation below. A detailed description of how the π's are estimated is provided in the following section.

$$\text{ExpansionDemand}_t \quad \sum_{i \in F} \left(\text{Share}_{i,t} \cdot \frac{1 + g_{i,(F)}}{1 + \pi_{i,t}} \right) + \sum_{i \in \neg F} \left(\text{Share}_{i,t} \cdot (1 + g_{i,(\neg F)}) \right)$$

4.4 Calibration of the MMC Productivity Scenario

The Modern Methods of Construction (MMC) productivity scenario is designed to reflect the potential labour demand implications of a significant shift towards all elements of MMC across the construction sector. Under this more optimistic scenario, Ireland accelerates its adoption of MMC to levels observed in Europe's leading countries.

In addition, while Ireland performs close to or above the EU average in some Modern Methods of Construction (MMC)-related indicators, it continues to lag significantly behind the leading EU countries across most variables. On average, across a selected set of MMC-related indicators, Ireland's performance is approximately 283% below that of the top five EU performers (see table below). For example, in 2023, prefabricated wood buildings accounted for 2.8% of Ireland's construction workforce GVA, compared to an average of 8.65% among the top-performing countries. Similarly, while Ireland performs above the EU average in areas such as prefabricated steel and concrete buildings, the gap relative to best-in-class countries remains substantial. This suggests there is considerable scope to enhance the adoption of MMC in the Irish construction sector although it is important to recognise the need for scale, repetitive units and market density. Achieving the level of adoption of MMC which exists in the best performing market is therefore not feasible but significant improvements can be achieved over time. Productivity changes are not only about greater use of MMC such as building systems, but is also about site level planning, scale economies, the use of prefabricated kitchens, bathrooms and other elements of construction.

Rationale and Benchmarking

Ireland currently lags well behind both the EU average and the best-in-class performers in terms of key MMC-related indicators

Construction sector variables:

- Gross Capital Formation in ICT Equipment (% of Total Gross Capital Formation (GCF)); and
- Gross Capital Formation in Transport Equipment (% of Total GCF).

Manufacturing sector variables:

- Prefabricated Wood Buildings (% of GVA);
- Prefabricated Steel Buildings (% of GVA);
- Prefabricated Concrete Buildings (% of GVA); and
- Prefabricated Structural Elements for Civil Engineering (% of GVA).

All sectors variable:

- Circular Material Use Rate (%).

Across these dimensions, Ireland exhibits an average gap of 283% compared to the leading five EU countries. For instance, in 2023, Ireland's use of prefabricated buildings stood at 2.8% of construction workforce GVA, versus an average of 8.65% among top performers. While Ireland underperforms relative to best-in-class countries, its position relative to the EU average is more mixed, with performance above average in certain categories such as prefabricated elements. Nonetheless, the overall gap underscores the need for accelerated progress if Ireland is to converge with international leaders. The MMC scenario assumes a ~200% increase in the

adoption of MMC practices by 2030, corresponding to an annual increase of 20% between 2025 and 2030. This would enable Ireland to move towards international best practice standards. This is a highly ambitious trajectory, exceeding the historical average annual increase of 12% in relevant MMC indicators. Achieving this ambitious scenario would require coordinated and sustained policy efforts.

Table 4.3: Ireland Compared to the EU Average and Best-in-Class Countries for Various MMC Variables (2023)

	Gross Capital Formation in ICT Equipment	Gross Capital Formation in Transport Equipment	Prefabricated Wood Buildings	Prefabricated Steel Buildings	Prefabricated Concrete Buildings	Prefabricated Structural Elements for Civil Engineering	Circular Material Use Rate
Ireland	1.53	13.60	2.80	3.27	0.87	4.15	2.30
EU Average	3.78	24.79	2.21	2.96	0.45	3.41	10.58
Average of 5 Best Countries	11.37	35.24	8.65	8.81	1.08	9.66	21.80

Source: Indecon analysis of Eurostat data
Notes: The full description of the variables is described earlier in this section.

Calibration of the Scenario

The productivity gains associated with accelerated MMC adoption are modelled as occupation- and sector-specific elasticities, i.e., percentage improvements in productivity associated with percentage increase in MMC adoption. These are based on the results of a set of ancillary regressions that estimate elasticities using a panel data approach across all EU Member States and the UK from 2008 to 2023. The regressions rely on robust modelling techniques (fixed-effects, random-effects, and mixed-effects) and employ ten different variables as proxies for MMC adoption (reported below). These statistical models enable a nuanced understanding of how productivity impacts vary across occupation–sector combinations, providing a data-driven foundation for the scenario assumptions. These reflect the differential potential of MMC across sectors and occupational groups.

In the regression analysis, productivity is measured by gross value added (GVA) per employee and is linked to the following proxies for MMC adoption:

— Value of prefabricated wood modules: a proxy for the adoption of offsite construction in residential projects;
— Value of prefabricated iron and steel modules: a proxy for the adoption of offsite construction in non-residential projects;
— Value of prefabricated structural elements (civil): a proxy for the adoption of offsite construction in civil infrastructure projects;
— Value of prefabricated concrete modules: a proxy for the adoption of offsite construction in both residential and non-residential projects;

— Gross capital formation in ICT and transport equipment: a measure of the investment in digital technologies in construction and investment in transportation equipment (required for off-site manufacturing);
— Gross investment in tangible goods (Construction): measure of the investment in machinery/equipment, which aligns closely with adoption of factory-based modular and prefabrication methods;
— Gross investment in tangible goods (Construction of buildings): specifically in relation to the construction of buildings;
— Gross investment in tangible goods (Civil engineering): specifically in relation to the civil infrastructure subsector;
— Gross investment in tangible goods (Specialized construction): specifically in relation to specialized construction such as repair and maintenance activities; and
— Circular material use rate: a proxy of sustainability-driven MMC practices.

Empirical modelling enables the identification of the percentage change in productivity attributable to a X% change in MMC adoption. The box below outlines the empirical modelling approach.

Box 4.1: Empirical Specification for Modelling of Relationship between MMC Adoption and Labour Productivity in Construction

The estimated equation is:

$$\ln(\text{Productivity}_{c,t}) = \alpha + \sum_{k=1}^{10} \beta_k \ln\left(MMC\_Proxy_{c,t}^{(k)}\right) + \gamma_c + \tau_t + \varepsilon_{c,t}$$

Where:

- $\text{Productivity}_{c,t}$ is the gross value added per employee for country c and year t, specific to a given sector–occupation combination (as the regressions are run separately for each).
- MMC_Proxy is the value of the k-th MMC proxy variable for country c and year t.
- β_k is the elasticity of productivity with respect to the k-th MMC proxy.
- γ_c is the country fixed effect (to control for time-invariant differences across countries).
- τ_t is the year fixed effect (to capture common shocks across countries).
- $\varepsilon_{c,t}$ is the error term.

Source: Islam El-Adaway

Note: The inclusion of country and year fixed effects in the model controls for structural differences across countries and common trends over time, such as variations in the residential output mix (e.g. apartment vs. house split). This ensures the estimated relationship reflects changes in MMC use and productivity within countries, rather than differences in underlying housing market structures.

Table 4.4 presents adjusted R^2 values as goodness-of-fit indicators for the 18 models, each estimating productivity across distinct occupation–sector pairs, capturing the statistical significance of the estimates, in terms of how well each model explains productivity variations.

Table 4.4: Goodness-of-fit of Econometric Regressions on Impact of MMC on Productivity

Model	Sector	Occupation	Adjusted R^2
1	Residential construction	Managers	0.39
2	Residential construction	Professionals	0.98
3	Residential construction	Associate professionals	0.30
4	Residential construction	Skilled trades	0.99
5	Residential construction	Process, plant, and machinery operatives	0.97
6	Residential construction	Elementary workers	0.98
7	Non-residential construction	Managers	0.96
8	Non-residential construction	Professionals	0.97
9	Non-residential construction	Associate professionals	0.44
10	Non-residential construction	Skilled trades	0.99
11	Non-residential construction	Process, plant, and machinery operatives	0.74
12	Non-residential construction	Elementary workers	0.98
13	Transport and other non-residential infrastructure	Managers	0.15
14	Transport and other non-residential infrastructure	Professionals	0.94
15	Transport and other non-residential infrastructure	Associate professionals	0.40
16	Transport and other non-residential infrastructure	Skilled trades	0.97
17	Transport and other non-residential infrastructure	Process, plant, and machinery operatives	0.52
18	Transport and other non-residential infrastructure	Elementary workers	0.96

Source: Islam El-Adaway (adviser to Indecon team)

Table 4.5 summarises the estimated productivity impacts from a 20% annual increase in MMC adoption based on the model results, offering a robust, evidence-driven foundation for scenario calibration.

Table 4.5: Estimated Productivity Impacts Associated with an Annual Increase in MMC Adoption of 20%

	New Housing	Residential Retrofit	Repair, Maintenance, Improvements	Non-residential Buildings	Transport, Energy and Civil Infrastructure
Managers, Directors and Senior Officials	3.70%	2.92%	2.34%	6.86%	2.80%
Professional	2.08%	3.96%	0.72%	3.34%	5.86%
Associate Professional and Technical	0.98%	1.40%	1.62%	5.08%	2.56%
Skilled Trades	2.56%	1.48%	0.80%	4.66%	4.86%
Process, Plant and Machine Operatives	3.24%	3.16%	0.10%	2.04%	6.98%
Elementary	2.20%	2.66%	1.30%	3.20%	8.80%

Source: Islam El-Adaway

The econometric analysis shows a strong positive link between MMC adoption and construction productivity. For example, greater usage of prefabricated concrete and steel modules – components of MMC – correlates with markedly higher output per employee in residential construction. These findings empirically confirm that modern methods (from modular components to digital tools) can significantly raise labour productivity in construction, including retrofitting activities.

The proxies for MMC used in the analysis have direct relevance for retrofit productivity. Prefabricated modules (e.g., insulated panels, pre-assembled structural or mechanical, electrical, and plumbing (MEP) units) enable more work to be done off-site in a controlled environment, thereby reducing on-site labour time. When retrofitting buildings, such as by installing external insulation or solar components, the use of pre-made panels and modular components can substantially cut installation time per home. In this way, greater reliance on modularisation increases the number of retrofits that a single team can complete. Similarly, ICT investments (e.g. BIM and digital project management and collaboration tools) reduce downtime and errors during retrofit projects. Investments in specialised transport and equipment improve logistics (cranes, lifting rigs, fleet for module delivery) that enable the swift installation of heavy components such as heat pump units or solar panels.

Based on the assumed definition of these MMC aspects and proxies, the adoption of MMC improves work processes involved in retrofitting and the associated value added. The panel data analysis, covering the period 2008–2023 across multiple EU countries including Ireland, quantifies these productivity impacts. Models specifically targeting retrofit-related occupations consistently yield statistically significant and substantial elasticities.

The McGrath update report projected that accelerating MMC in homebuilding could yield major productivity improvements. The report, however, cautioned that this productivity boost was assumed mainly for new builds, not for retrofitting activities. Importantly, the empirical evidence derived from the panel data analysis suggests that MMC adoption can mitigate this labour-intensity in retrofits. The difference in findings between the McGrath report and our analysis reflects our broader, more expansive definition of MMC proxies, including prefabricated wood, iron/steel and civil infrastructure modules, investments in ICT, transport and machinery, and circular material-use rates, many of which were not incorporated into McGrath's treatment of MMC.

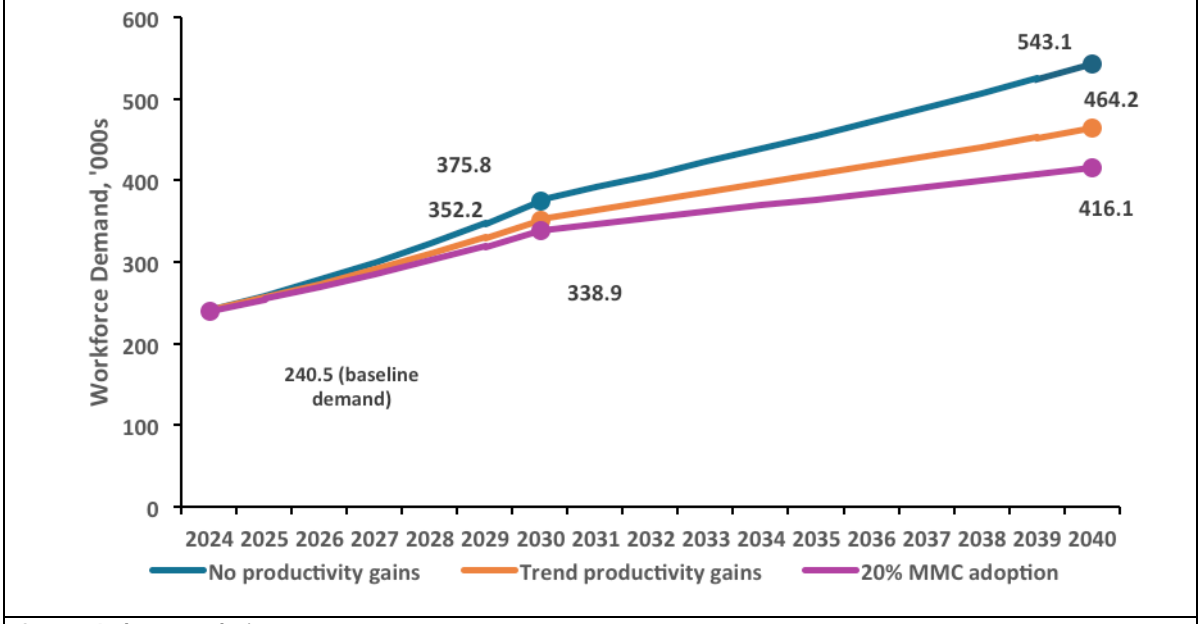
The modelling exercise incorporates these elasticities into the broader labour demand model, adjusting the required labour input per unit of output. As a result, the MMC productivity scenario demonstrates how innovation and investment in MMC technologies can ease projected labour shortages in the sector by enhancing productivity across occupational levels.

4.5 Summary of Demand Projections

Each scenario results in a distinct profile of occupational demand, enabling comparison of how different productivity pathways could shape the scale and nature of future labour needs. The resulting projections are presented in this section.

Figure 4.2 shows total projected demand across the three scenarios between 2024 and 2040. It should be noted that some of the MMC scenarios presented in the report represent projections of what might be best possible outcomes for Ireland subject to optimal conditions. These would require sectoral and policy changes and the full recommendations set out in this report. The challenges in achieving these outcomes should not be underestimated and should be considered an upper bound projections of what could be achieved and should be read in conjunction with our central case scenario. Total employment in these occupations is expected to increase from a baseline of 240,500 in 2024 to between 416,100 and 543,100 by 2040. If non-construction sectors grow in line with Department of Finance projections, construction-related employment will account for a larger share of the total workforce in 2040 than in 2024, reflecting the comparatively faster growth in construction occupations over the period. The lower estimate corresponds to the MMC adoption scenario, while the higher figure assumes of no productivity gains. The central trend productivity scenario results in a total of 464,200 employed in relevant occupations by 2040. These projections reflect the scale of additional workforce required to meet government targets. While in the new MMC adoption scenario, labour requirements are reduced, the scale of the problem remains sizeable.

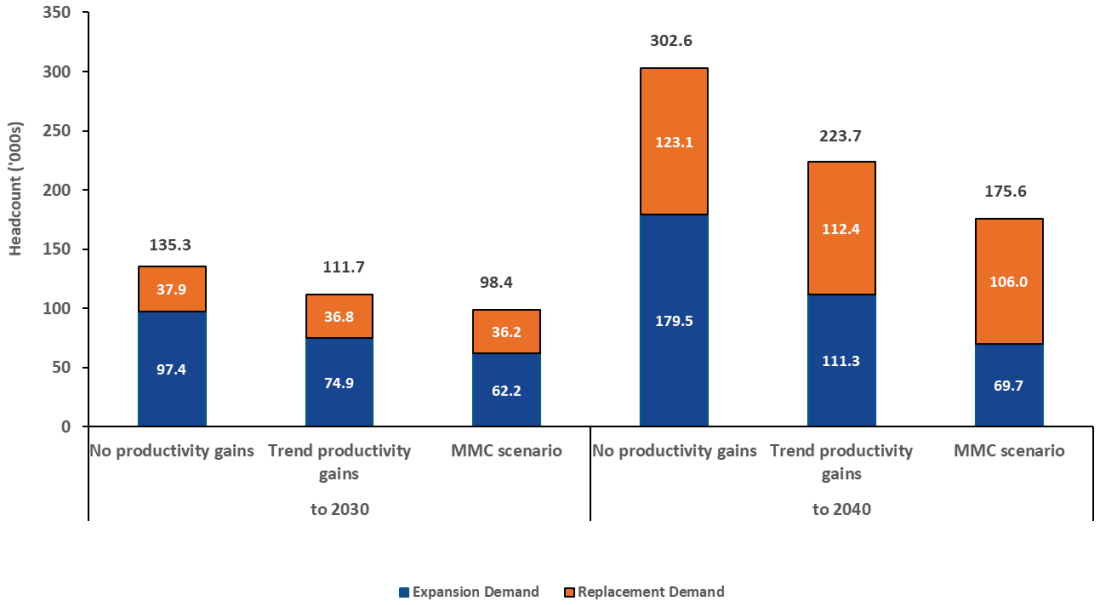
Figure 4.2: Total Workforce Demand Projections by Scenario, 2024-2040 – '000 Persons



Source: Indecon analysis.

A breakdown of expansion versus replacement demand shows a shift in the composition of labour needs between 2030 and 2040. Figure 4.3 separates projected workforce requirements into expansion and replacement demand by scenario for the periods 2024-2030 and 2024-2040. By 2030, additional requirements range from 98,400 in the MMC scenario to 135,300 under the no productivity gains scenario. Of this, between 63% and 72% is due to expansion demand, reflecting activity growth to meet policy targets. By 2040, replacement demand becomes the dominant driver, accounting for the majority of additional headcount across all scenarios. The long-run weight of replacement demand across scenarios highlights the impact of the earlier expansion, as the increase in workforce entries during the later part of this decade leads to a corresponding rise in exits in the subsequent decade, resulting in elevated replacement needs by 2040 irrespective of scenario.

Figure 4.3: Expansion and Replacement Demand by Scenario, by 2030 and by 2040 (Headcount)



Source: Indecon analysis

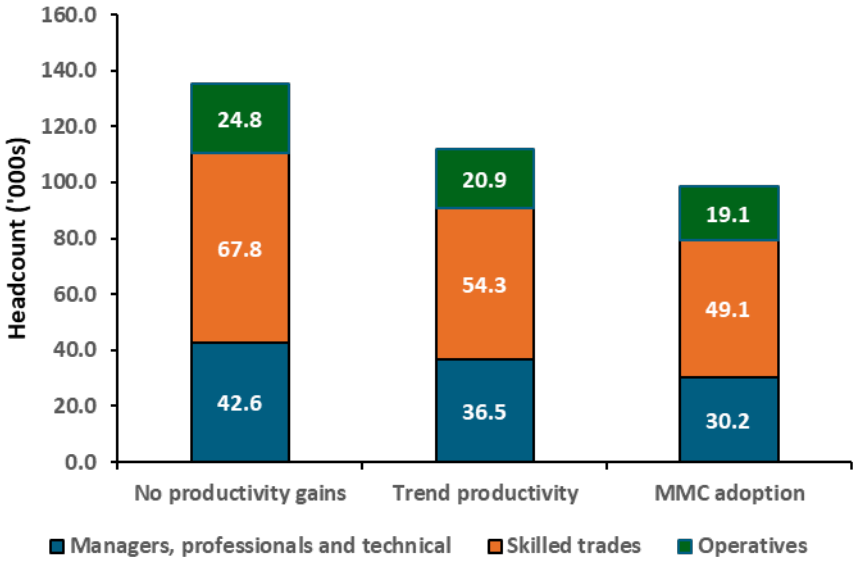
The composition of demand requirements by occupation across each scenario is shown in Figure 4.4. Across the three scenarios, skilled trades account for the largest share of the requirements (49-50%), followed by professionals and managers (31-33%) and operatives (18-19%). Skilled trades show the largest variation between scenarios, with additional needs falling from around 68,000 under no productivity gains to around 49,000 under MMC. While the overall share of trades is projected to remain relatively stable across productivity scenarios, the nature of work within some trades (particularly bricklaying, carpentry, plastering, Painting & Decorating) is expected to evolve. As noted in the Updated McGrath Report, technological advances and higher productivity in MMC may reduce demand for standard methods, requiring some reskilling and adaptation within these occupations.

Even under an ambitious increase in MMC adoption, the scale of requirements is only moderately reduced, with skilled trades still comprising close to half of the total demand. This reflects the continued need for on-site delivery capacity across housing, retrofit, and infrastructure projects. Traditional skilled trades will continue to play an important role in the green transition, as they comprise sustainable construction techniques. Recent policy[27] points to the importance of traditional construction knowledge and skills to specify and apply appropriate renovation measures that can impact on energy performance and human health, particularly when it comes to adapting vacant and derelict buildings or in maintaining important built heritage assets.

[27] See, for example, Green Skills 2030 (2024).

Overall, the figures suggest that MMC can improve productivity, though it does not eliminate the requirement for a substantial number of additional workers to meet national targets. This underlines the importance of Government proactively targeting the MMC adoption scenario as part of an integrated response, as set out in the Delivery Framework, in order to reduce labour intensity and help narrow the workforce gap while other supply-side measures are scaled up.

Figure 4.4: Additional requirements by 2030, by Demand Scenario and Occupational Group



Source: Indecon analysis

A more granular view is provided in Table 4.6, which presents projections for each individual occupation under the MMC scenario. By 2030, the occupations with the highest additional requirements include electricians and electrical fitters (+13,300), elementary construction occupations (+12,100), and carpenters and joiners (+11,800). There are also notable increases in the requirements for plumbers (+8,700), civil engineers (+4,000), and electrical engineers (+6,600). Many of these occupations also see significant further growth by 2040, reflecting the cumulative effect of sustained expansion in construction activity, and the need to replace a growing number of workers exiting the labour force over time.

Table 4.6: Additional Requirements by Detailed Occupation, MMC Scenario			
Relevant SOC Detailed Occupation	**2024**	**Increase (2024-2030)**	**Increase (2030-2040)**
Carpenters and joiners	26.8	11.8	6.0
Elementary construction occupations	31.8	12.1	12.8
Electricians and electrical fitters	34.7	13.3	11.9
Construction and building trades n.e.c.	15.5	7.0	3.1
Plumbers and heating and ventilating engineers	16.4	8.7	4.5
Painters and decorators	10.6	4.7	2.2
Production managers and directors in construction	11.1	3.5	2.7
Construction operatives n.e.c.	12.2	4.9	4.2
Plasterers	6.6	3.0	1.2
Bricklayers and masons	6.8	3.0	1.5
Roofers, roof tilers and slaters	2.4	1.1	0.4
Floorers and wall tilers	4.5	1.9	1.1
Construction project managers and related professionals	1.7	0.9	0.5
Construction and building trades supervisors	4.5	1.8	1.3
Air-conditioning and refrigeration engineers	1.8	0.9	0.5
Glaziers, window fabricators and fitters	3.5	1.4	1.1
Architects and town planners	10.2	4.3	4.0
Architectural and town planning technicians	2.4	1.1	0.9
Chartered architectural technologists	0.2	0.1	0.1
Civil engineers	10.0	4.0	4.0
Electrical engineers	22.3	6.6	11.5
Crane drivers	1.1	0.5	0.5
Road construction operatives	3.5	1.6	1.5
Total	**240.5**	**98.4**	**77.2**
Source: Indecon analysis			

For comparison, Table 4.7 shows the additional occupational requirements under the central, or trend productivity, scenario. As expected, the occupations with the highest additional demand by 2030 remain largely the same, but the level of demand has increased. The size of the increase in additional demand will be dependent on the modelled impact of MMC uptake for each occupation. For electricians and electric fitters, the additional demand is estimated to be 14,500, for elementary construction occupations it is estimated at 13,000, and for carpenters and joiners, it is estimated at 13,100. The overall additional demand across all occupations is estimated at 111,700 by 2030, and 112,000 by 2040.

Table 4.7: Additional Requirements by Detailed Occupation, Trend Productivity Scenario

Relevant SOC Detailed Occupation	2024	Increase (2024-2030)	Increase (2030-2040)
Carpenters and joiners	26.8	13.1	11.2
Elementary construction occupations	31.8	13.0	16.7
Electricians and electrical fitters	34.7	14.5	16.2
Construction and building trades n.e.c.	15.5	7.8	6.3
Plumbers and heating and ventilating engineers	16.4	11.0	7.6
Painters and decorators	10.6	5.3	4.3
Production managers and directors in construction	11.1	5.3	4.2
Construction operatives n.e.c.	12.2	5.3	6.1
Plasterers	6.6	3.4	2.6
Bricklayers and masons	6.8	3.4	2.8
Roofers, roof tilers and slaters	2.4	1.3	0.9
Floorers and wall tilers	4.5	2.1	1.9
Construction project managers and related professionals	1.7	1.2	0.8
Construction and building trades supervisors	4.5	2.0	2.0
Air-conditioning and refrigeration engineers	1.8	1.2	0.9
Glaziers, window fabricators and fitters	3.5	1.5	1.6
Architects and town planners	10.2	5.0	5.1
Architectural and town planning technicians	2.4	1.1	1.2
Chartered architectural technologists	0.2	0.1	0.1
Civil engineers	10.0	4.7	5.0
Electrical engineers	22.3	6.8	11.9
Crane drivers	1.1	0.6	0.6
Road construction operatives	3.5	1.9	2.0
Total	**240.5**	**111.7**	**112.0**
Source: Indecon analysis			

Table 4.8 shows the additional requirements by detailed occupation for the low productivity scenario, and demonstrates the significant additional demand across all occupations, in a scenario in which MMC uptake is low or non-existent, and overall productivity is low.

Table 4.8: Additional Requirements by Detailed Occupation, Low Productivity Scenario

Relevant SOC Detailed Occupation	2024	Increase (2024-2030)	Increase (2030-2040)
Carpenters and joiners	26.8	16.5	19.3
Elementary construction occupations	31.8	15.4	22.4
Electricians and electrical fitters	34.7	17.4	23.0
Construction and building trades n.e.c.	15.5	10.0	11.3
Plumbers and heating and ventilating engineers	16.4	13.2	12.8
Painters and decorators	10.6	6.7	7.7
Production managers and directors in construction	11.1	6.8	7.7
Construction operatives n.e.c.	12.2	6.5	8.9
Plasterers	6.6	4.4	4.9
Bricklayers and masons	6.8	4.3	4.9
Roofers, roof tilers and slaters	2.4	1.6	1.8
Floorers and wall tilers	4.5	2.7	3.2
Construction project managers and related professionals	1.7	1.4	1.3
Construction and building trades supervisors	4.5	2.4	3.1
Air-conditioning and refrigeration engineers	1.8	1.4	1.4
Glaziers, window fabricators and fitters	3.5	1.8	2.4
Architects and town planners	10.2	5.8	6.9
Architectural and town planning technicians	2.4	1.3	1.6
Chartered architectural technologists	0.2	0.1	0.1
Civil engineers	10.0	5.4	6.6
Electrical engineers	22.3	7.1	12.5
Crane drivers	1.1	0.7	0.9
Road construction operatives	3.5	2.3	2.8
Total	**240.5**	**135.3**	**167.4**

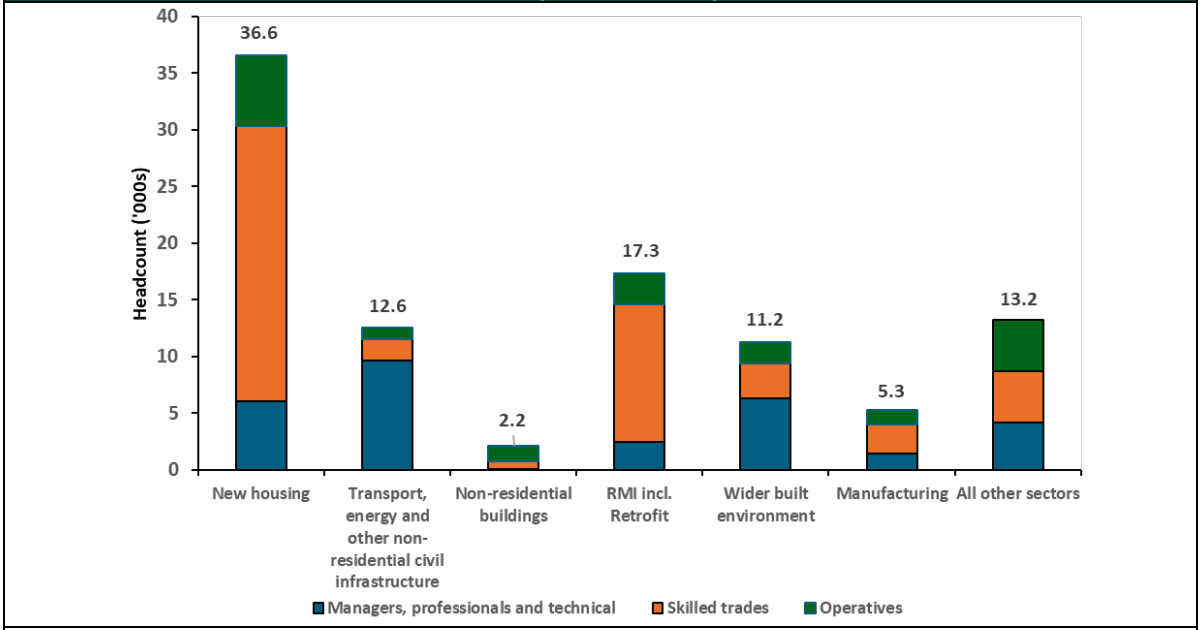
Source: Indecon analysis

Figure 4.5 illustrates that most of the projected workforce demand is concentrated in the construction of new housing. This is followed by requirements for transport, energy, and other non-residential civil infrastructure, driven in large part by requirements for offshore wind energy developments. In contrast, the workforce needs for non-residential buildings, as well as repair, maintenance, improvement (RMI) and retrofit activities, are comparatively modest, reflecting the smaller scale of the associated challenges. Notably, the requirement for additional retrofit workers is reduced compared to previous estimates, due to the substantial growth in retrofit employment in recent years. Between 2022 and 2024, retrofitting activity accelerated sharply, with employment in the sector rising by 110% in 2023 alone, as previously noted in the McGrath (2024) report. While this progress represents a substantial step towards meeting government retrofit targets, the workforce requirements to achieve these targets remain substantial.

A key innovation in the workforce model developed by Indecon is its incorporation of demand for construction-related occupations outside the construction sector. Figure 4.5 splits the 98,400 requirement under the MMC scenario by sector, with a further breakdown into the construction subsectors. Of the 98,400 additional workforce required by 2030, only 68,600 workers are required in the construction sector, 11,200 in the wider built environment. This includes sectors such as water and electricity utilities, as well as professional services, which encompass a range of construction-related functions. Other sectors, including manufacturing (which in turn includes MMC)[28], are expected to require an estimated 18,500 additional workers in the construction-related occupations identified in this study.

The occupational breakdown within each sector highlights notable differences in the composition of workforce demand. Skilled trades represent the largest share of additional workers required in the residential sectors (new housing and RMI/retrofit) where their contribution dominates the total requirement. Professional and technical roles such as engineers, architects, and project managers feature more prominently in sectors such as non-residential civil engineering infrastructure, and the wider built environment (which includes professional services performing construction-related functions). Operatives account for a smaller, though still material, share across many sectors, reflecting the continued need for a degree of site-based labour alongside the increasing complexity and professionalisation of construction activity.

Figure 4.5: Additional Requirements by 2030 under the MMC Scenario, by Sector and Occupational Group



Source: Indecon analysis

[28] In the MMC scenario, the manufacturing sector's projection is adjusted to take account of the implications of accelerated MMC adoption for the manufacturing sector.

4.6 Summary of Key Findings

- The demand model combines expansion demand, driven by policy targets, and replacement demand, due to workforce exits. This provides a comprehensive estimate of construction workforce needs by 2040.
- Construction demand is segmented into key policy-relevant subsectors of constructions, including new housing, retrofit, non-residential construction, and civil infrastructure. This is achieved by reclassifying NACE categories using Labour Force Survey (LFS), DCEE data, and capital formation metrics.
- Three demand scenarios are considered:
  - No Productivity Gains: Assumes constant output per worker, leading to highest labour demand (up to 543,100 by 2040);
  - Trend Productivity (central scenario): Assumes 1.8% annual productivity growth, yielding moderate demand (464,200 by 2040); and
  - MMC Scenario: Models accelerated adoption of Modern Methods of Construction, reducing demand to 416,100 by 2040.
- Across all scenarios, occupational demand rises substantially, up to 111,700 additional workers by 2030 under the trend productivity scenario, and over 223,000 by 2040. In the MMC scenario, the level of demand is 98,400 by 2030 and 175,600 by 2040.
- Between 2025 and 2030, workforce growth is primarily driven by expansion; by 2040, replacement demand dominates due to retirements and exits from the larger workforce base created during the later 2020s.
- Skilled trades account for the largest share of projected demand (49–50%), followed by professionals/managers (31–33%), and operatives (18–19%). Electricians, elementary construction workers, and carpenters show the highest increases in headcount by 2030.
- Although retrofit still requires additional labour, the scale is lower than previously projected because of a sharp rise in retrofit employment in 2023-2024, which elevated the baseline.
- Projections for the MMC scenario indicate that an additional 29,700 construction-related workers will be required outside the core construction sector by 2030: 11,200 in the wider built environment (e.g., utilities, professional services), and 18,500 in sectors like manufacturing.
- While MMC adoption can ease workforce shortages, the overall scale of demand remains large, with skilled trades still forming the backbone of delivery even in an ambitious technology adoption scenario.

5 Workforce Supply-Demand Gap Analysis

5.1 Introduction

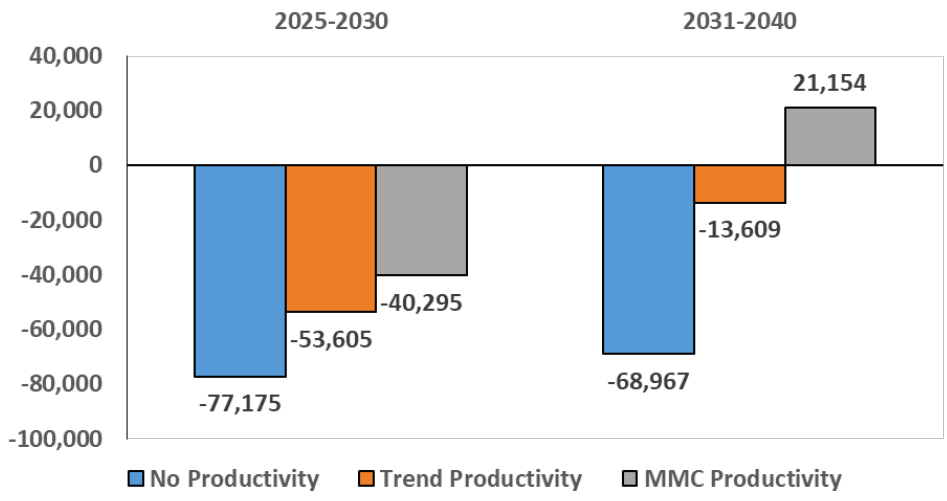
This section integrates the findings from previous sections to assess the extent of the gap between the projected demand for construction-related occupations and the available workforce supply. Section 5.2 brings together the "Status Quo" supply scenario presented in Section 3, with the demand projections discussed in Section 4, thus identifying the gap that would emerge in the absence of supply interventions under alternative productivity assumptions. Section 5.3 then provides an analysis of workforce supply scenarios for the construction sector which would address the shortages identified, including plausible trends in further and higher education courses (including apprenticeships), migration flows, as well as wider labour force participation considerations.

5.2 Gap Analysis – Status Quo Projections

The findings from the demand modelling exercise confirm that the workforce numbers required to achieve the planned government targets are significant. Comparing the demand requirements with the workforce supply that would emerge if no changes were made to the current level of inflows reveals substantial shortfalls across all future productivity scenarios.

Specifically, Figure 5.1 shows that under the *central* or *trend productivity* scenario, the model projects a workforce gap of 53,605 by 2030, and a subsequent gap of 13,609 between 2031 and 2040. Even in the most optimistic scenario (which assumes a step-change in the adoption of MMC) the shortfall remains very substantial at 40,295 by 2030, though it is expected that by 2040, MMC productivity improvements will be such that there will be a surplus of supply. Overall, however, the analysis reflects the scale of workforce requirements even under ambitious assumptions of technological innovation.

Figure 5.1: Supply-Demand Gap if no Changes Made to Supply, 2025-2030 and 2031-2040

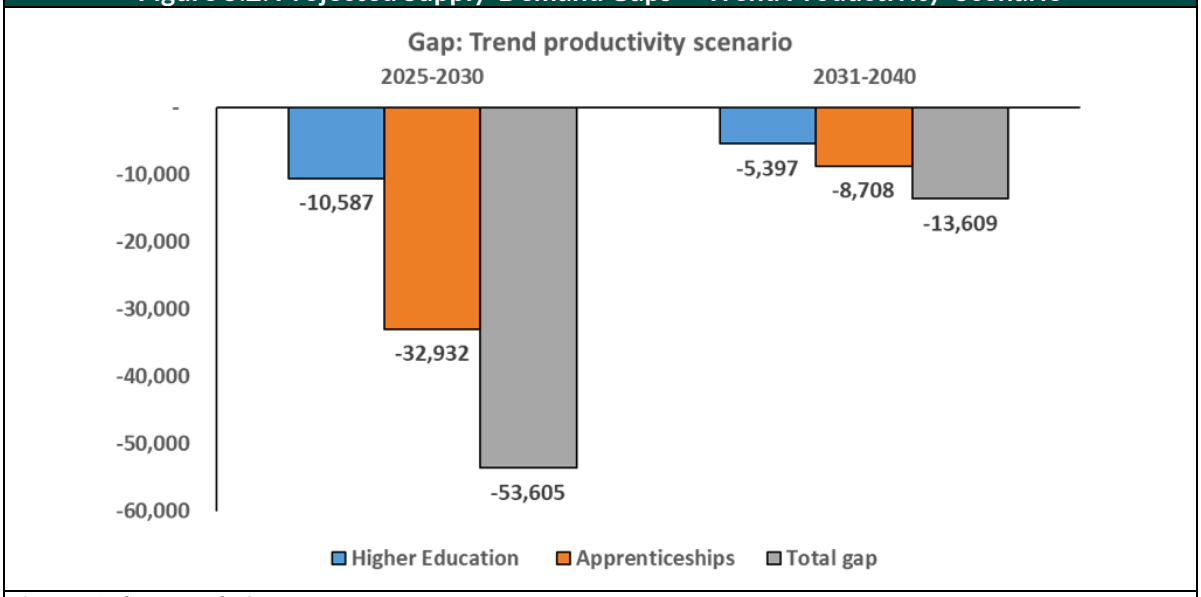


Source: Indecon analysis

Disaggregating the gap reveals that the largest shortfalls are concentrated in apprenticeship-based occupations. Under the *trend productivity* scenario, the shortfall for these trades reaches 32,932 by 2030, indicating significant frictions in the traditional training and certification pathways that supply Ireland's skilled-trades construction workforce. In contrast, occupations requiring higher education qualifications show a smaller, though still material, gap of 10,587 over the same period. The total projected shortfall of 53,605 by 2030 also includes occupations not requiring formal qualifications.

In the period 2031–2040, the overall gap is lower than in 2025-2030, but remains significant. For apprenticeship-based occupations, the reduction in the gap reflects the recent moderate increase in apprenticeship registrations, the impact of which, if sustained, will materialise fully only in the next decade.

Figure 5.2: Projected Supply-Demand Gaps – 'Trend Productivity' Scenario



Source: Indecon analysis

5.3 Gap Analysis – Scenarios for Addressing Gaps

This section sets out the optimal combination of adjustments across different sources of supply required to close the workforce demand-supply gap over the projection horizon. The approach to deriving this response follows a three-step process:

- First, for occupations requiring a higher education qualification, the model was used to estimate the inflow needed to close the gap in the shortest possible time, accounting for the duration of degree programmes;
- Second, for apprenticeship-based occupations, the model applied the same logic, allowing for a gradual increase in inflows in line with a ramp-up in apprenticeship registrations; and
- Finally, taking into account the optimal supply inflows identified in the first two steps, the model estimated the additional supply required to close the residual gap.

In the early years of the projection, this remaining gap includes portions of the higher education and apprenticeship shortfalls that cannot yet be filled due to education course and training durations. By 2029, the gaps for both qualification-based pathways are fully closed under the modelled inflow assumptions, meaning that any remaining shortfall is attributable entirely to occupations that do not require formal qualifications.

Table 5.1 presents the estimated annual inflows required from the domestic further and higher education (HE-FET) system—including apprenticeships—to close the projected workforce gap under three productivity scenarios.

The 2024 baseline reflects current inflows, with approximately 2,287 from HE-FET and 2,597 from apprenticeships. By 2030, these figures must increase significantly to meet workforce requirements, even under optimistic assumptions. Under the *no productivity gains* scenario, the model estimates a more than 50% increase in Higher Education inflows (to 5,757) and a more than fivefold increase in apprenticeships (to 13,408). Even with *trend productivity improvements*, HE inflows must more than double, and apprenticeship completions more than treble, relative to 2024.

It is important to note that even in the *MMC scenario*, which assumes substantial productivity gains through the widespread adoption of Modern Methods of Construction, the required inflows remain considerable. HE inflows would still need to reach 3,970 by 2030 (74% above the 2024 baseline), while apprenticeship completions must rise to 9,110 – an increase of over 200%. These figures demonstrate that MMC adoption, while helpful in reducing labour intensity, does not negate the need for a sizeable and sustained enhancement of domestic education and training pipelines.

By 2040, required inflows moderate slightly under each scenario, reflecting the front-loaded nature of expansion demand. However, apprenticeship needs remain well above baseline levels in all cases, reinforcing the importance of early and strategic investment in increasing the output of the apprenticeships system.

These findings underscore the magnitude of the supply-side response needed, even in a scenario where Ireland successfully delivers on ambitious MMC targets. The challenge is particularly acute for apprenticeships, where training durations, completion rates, employer engagement, and the current limitations in the visibility and appeal of the apprenticeship system, especially for women,

all place practical constraints on how quickly supply can scale. Meeting the scale of demand solely through the domestic apprenticeship route would be very challenging.

Table 5.1: Requirements from Domestic HE-FET sector							
Scenario	**Baseline**	**No Productivity Gains**		**Trend productivity**		**MMC scenario**	
Requirements	**2024**	**2030**	**2040**	**2030**	**2040**	**2030**	**2040**
FET (excl. Apprenticeships)	2,287	5,757	4,054	4,852	3,047	3,970	2,467
Apprenticeships	2,597	13,408	8,141	10,547	4,802	9,110	2,896
Source: Indecon projection model for construction workforce							

Table 5.2 shows the breakdown of requirements for each of the further and higher education courses which are relevant to the occupations covered in this analysis. Courses in architecture and town planning require the largest inflows, followed by building and civil engineering.

Table 5.2: Required Completions from Domestic HE and FET courses (Excl. Apprenticeships)							
	Baseline	**No productivity gains**		**Trend productivity**		**MMC scenario**	
	2024	**2030**	**2040**	**2030**	**2040**	**2030**	**2040**
Architecture and construction not further defined or elsewhere classified	202	875	616	737	462	604	373
Architecture and town planning	536	2,334	1,644	1,965	1,231	1,611	994
Building and civil engineering	1,512	2,454	1,728	2,072	1,305	1,691	1,060
Environment not further defined or elsewhere classified	37	94	66	79	50	65	40
Total	**2,287**	**5,757**	**4,054**	**4,852**	**3,047**	**3,970**	**2,467**
Source: Indecon projection model for construction workforce							

Table 5.3 shows that substantial increases are required across the relevant trades, with the bulk of the requirements expected to be among carpenters, electricians, plumbers, and similar trades.

Table 5.3: Required Completions from Domestic Apprenticeships							
	Baseline	**No productivity gains**		**Trend productivity**		**MMC scenario**	
	2024	**2030**	**2040**	**2030**	**2040**	**2030**	**2040**
Brick and Stone laying	23	850	517	651	280	581	145
Carpentry and Joinery	326	3,441	2,119	2,645	1,166	2,368	625
Painting & Decorating	9	1,394	843	1,066	451	951	228
Plastering	11	919	538	696	272	618	120
Plumbing	483	2,955	1,413	2,378	800	1,780	445
Stonecutting and Stonemasonry	1	36	22	28	12	25	6
Electrical	1,692	3,501	2,533	2,830	1,730	2,597	1,274
Refrigeration and Air Conditioning	52	313	154	253	91	191	54
Total	**2,597**	**13,408**	**8,141**	**10,547**	**4,802**	**9,110**	**2,896**
Source: Indecon analysis							

Closing the projected workforce supply-demand solely through domestic education and training channels would require dramatic and sustained increases in output, which will be challenging to achieve. Even with continued strong Government investment and promotion, expansion of capacity and output will take time to yield fully qualified workers. It would also require a massive shift in post-school education and training preferences. Even with expanded capacity and a shift in preferences, the finite supply of domestic labour means that, in the near term, workforce shortfalls will persist unless alternative sources of labour are mobilised concurrently and productivity is enhanced through enhanced adoption of MMC. Table 5.4 presents the projected annual inflows required to close the residual workforce gap not addressed through domestic education and training pathways. These figures are calculated after accounting for the optimised contributions from higher education and apprenticeship pipelines in Table 5.1. In the early years of the projection period (2025–2028), inflows are required not only to meet the residual demand in non-qualification-based occupations but also to partially offset the temporary gaps in HE and apprenticeship pathways caused by course duration lags.

Table 5.4: Required Level of Inflows Outside the Domestic Education and Training System															
	2026	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
No productivity gains	12,044	12,173	11,541	8,097	8,836	5,120	5,233	5,348	5,466	5,586	5,709	5,834	5,963	6,094	6,228
Trend productivity	9,542	9,530	8,983	6,540	7,040	3,594	3,640	3,687	3,735	3,783	3,833	3,883	3,935	3,987	4,041
MMC scenario	8,057	8,001	7,514	5,890	6,298	2,143	2,508	2,539	2,572	2,606	2,641	2,677	2,714	2,752	2,791
Source: Indecon modelling															

Under the *no productivity gains* scenario, the required inflows are the highest, peaking at over 12,000 in 2027 and remaining above 10,000 until 2029. This reflects both the elevated expansion demand and the time required for individuals to complete education and training programmes before entering the workforce. From 2030 onward, whilst the inflow requirement gradually declines, it still exists, driven by ongoing replacement demand, particularly in non-qualification-based roles.

In the *trend productivity* scenario (central scenario), the required inflows are lower throughout the period, with the peak in 2026 at 9,542 and a steady decline towards the year 2040. While the *MMC* scenario shows a reduced scale of inflow needed—by approximately 10–30% relative to the central scenario—it does not eliminate the need for a sustained contribution from migration and intersectoral flows to meet workforce needs, particularly in occupations not requiring formal qualifications.

Table 5.5 provides a breakdown of the projected annual workforce inflows required from sources other than the domestic education and training system, under the *MMC* scenario between 2025 and 2040. These requirements include migration inflows to supplement the numbers produced through the domestic higher education (HE) and apprenticeship systems, as well as additional inflows for occupations not requiring formal qualifications (referred to here as "other labour requirements").

As discussed above, our approach prioritises closing the gap in requirements by enhancing capacity in the domestic system. The residual inflows required for HE and apprenticeship-based roles reflect the temporary shortfalls that arise in the early years of the projection period due to the time needed to complete courses and training programmes. Even though enrolments are scaled up from the outset, the impact of increased domestic output only becomes visible after several years, creating an interim reliance on migration to fill qualification-based gaps.

For higher education, the migration inflows required to cover these early gaps begin at 813 in 2026 and rise to 1,208 by 2028. From 2029 onward, no further HE-related migration is needed, as the expanded domestic pipeline begins to fully meet demand.

For apprenticeship-based occupations, the pattern is similar, with migration inflows required only during the early years of the projection period. These requirements peak at 2,374 in 2026 and decline steadily each year. From 2029 onward, no further migration is needed for these roles, as the enhanced domestic apprenticeship system is sufficient to meet projected demand. Table 5.6 below shows that the remaining shortfall in apprenticeship-based trades, after accounting for growth in the domestic apprenticeship system, is primarily driven by shortages of carpenters and joiners, as well as painters and decorators, plasterers, and plumbers.

Table 5.5: Breakdown of Projected Requirements – MMC Scenario (2025-2040)

	HE inward migration requirements	Apprenticeship inward migration requirements	Other labour requirements
2026	813	2,374	4,870
2027	1,002	1,820	5,179
2028	1,208	788	5,518
2029	-	-	5,890
2030	-	-	6,298
2031	-	-	2,143
2032	-	-	2,508
2033	-	-	2,539
2034	-	-	2,572
2035	-	-	2,606
2036	-	-	2,641
2037	-	-	2,677
2038	-	-	2,714
2039	-	-	2,752
2040	-	-	2,791

Source: Indecon modelling

Other labour requirements remain significant and persistent throughout the projection period. These inflows represent the continued need to fill roles that do not require formal qualifications or structured training. This requirement increases gradually each year to peak by 2030, after which the domestic training system helps to reduce these requirements. These inflows may be met through targeted migration, increased participation of women and other under-represented groups in the construction workforce, or intersectoral movements from other parts of the economy.

Table 5.6: Breakdown of Additional Projected Requirements to Fill Demand Gap from Sources Outside of Domestic Apprenticeships System – MMC Scenario (2026-2028)			
Occupation	**2026**	**2027**	**2028**
Carpenters and joiners	785	532	132
Electricians and electrical fitters	-	-	-
Plumbers and heating and ventilating engineers	317	181	-
Painters and decorators	614	563	365
Plasterers	381	341	210
Bricklayers and masons	269	203	80
Air-conditioning and refrigeration engineers	8	-	-
Total	**2,374**	**1,820**	**788**
Source: Indecon modelling			

Taken together, figures in the tables reinforce the importance of migration and other flows in bridging short-term gaps in qualification-based occupations, while also highlighting the structural and ongoing reliance on additional inflows for other roles throughout the projection horizon.

Alongside these quantitative findings, we identify qualitative barriers to workforce development. One of the most persistent challenges is the underrepresentation of women in construction. Despite recent efforts, women account for only 10.2% of the workforce in construction-related occupations (Table 5.7), compared to 47% across the economy and 32% in the manufacturing sector. This imbalance is reflected in training pathways, where women make up less than 1% of participants in craft apprenticeships and fewer than 26% of students in higher education programmes related to construction. Unlocking this latent potential requires targeted policies to make the sector more inclusive and to support women at entry and progression stages.

Table 5.7: Female Participation Rate in Construction Employment and Training - %					
	Females as % of Total				
	2020	**2021**	**2022**	**2023**	**2024**
Construction sector employment	7.4%	8.3%	9.2%	8.0%	8.7%
Total apprenticeships	0.3%	0.4%	0.4%	0.7%	1.0%
Carpentry and Joinery	-	0.4%	0.4%	0.8%	0.3%
Painting & Decorating	-	-	-	-	11.1%
Plastering	-	-	-	-	-
Plumbing	0.4%	-	-	-	-
Stonecutting and Stonemasonry	-	-	-	-	-
Electrical	0.3%	0.6%	0.6%	0.8%	1.3%
Refrigeration and Air Conditioning	-	-	-	-	1.9%
Comparison: Engineering, manufacturing and construction degree graduates	23.0%	23.2%	25.1%	25.9%	-
Source: Indecon analysis of CSO Labour Force Survey and National Apprenticeship Office data					

Again, the analysis highlights the role of inward migration as a short- to medium-term lever for bridging immediate workforce shortages—particularly in occupations with long training pathways or where domestic enrolment remains insufficient. Intersectoral labour flows, such as movements of workers from other industries into construction, also offer a valuable supplementary channel, especially for roles not requiring formal qualifications.

However, it is also important to stress that reliance on migration and sectoral transfers has clear limits and presents its own challenges. Indecon, in assessing construction skills demand or skills demand, have taken account of the fact that increases in the labour force in any sector will have the potential to impact on construction demand. This applies to both returning skilled emigrants and new additions to the Irish labour force. However, unlike additional employment from new multinational or other investment, which impact on construction demand, the attraction of skilled construction employees will enable the overall construction requirements to be met.

We have also considered at a high level the social and economic impact of all our recommendations but a detailed economic, social or regulatory impact of each of the proposals is outside the scope of the current study. Nevertheless, migration alone will not be sufficient to address the identified workforce gaps, which will require wider structural reforms. Mobilising underrepresented groups—most notably women, who currently account for less than 10% of the construction workforce—represents a significant untapped opportunity. As outlined in section 6, addressing these gaps will require an integrated strategy that combines targeted migration pathways, expanded and accelerated domestic training provision, and proactive efforts to improve the visibility and accessibility of construction careers, including for women and other underrepresented cohorts.

5.4 Future Skills for the Circular Economy

The quantitative modelling used in this report has been underpinned by the most recent data available from the Census and Labour Force Survey. By definition, this data reflects the occupational and sectoral structure of the Irish economy *at that point in time*. However, it is important to recognise and reflect developments in the nature of the skills profile that will be needed in the industry.

One critical area of future skills development concerns the circular economy, defined by the EPA as an economy where,

"… economic activity is maintained and can grow, while the extraction and consumption of virgin raw materials is reduced, and waste is prevented and reduced at all stages from the design process through to managing end-of-life of products and materials."[29]

[29] See: https://www.epa.ie/publications/circular-economy/resources/EPA_Circular_Economy_2021_Programme_Apr22_Web.pdf

The Irish Government, in its Whole of Government Circular Economy Strategy, recognises the benefits of the circular economy, noting,

"A more circular economy can deliver environmental, economic and social benefits, such as reduced plastic pollution, new sustainable jobs, and better quality, longer lasting, consumer products."[30]

Regarding the construction industry, the circular economy will create a new demand for skills, most pertinently in the areas of refurbishing, recycling, storing and recertification of recycled construction products. More specific technical skills that will be required include, *inter alia*:

- The design of fabric efficiency upgrades.
- Design of building conservation measures.
- Design of structural repairs or alterations.
- Surveying and monitoring of alterations to features.
- Managing and monitoring project.
- Undertaking building conservation surveys
- Undertaking heritage impact assessments.
- Ensuring compliance with regulations.
- Designing M&E services.
- Undertaking energy audits, BER assessments, thermal bridge calculations, and condensation risk assessments.

These circular economy skills may be defined in new occupations, but may also be relevant in upskilling existing occupations, such as architects, building surveyors, structural engineers, conservation consultants, archaeologists, architectural technologists, mechanical and electrical engineers, among others.

A circular economy approach can help alleviate some of Ireland's infrastructural issues, by minimising demolition and the need for new buildings by innovative reuse of existing buildings. The above-mentioned skills are essential in maintaining buildings and in practicing a more effective 'circular' approach, which can avoid specifying materials that degrade the environment in extraction, production, construction or occupation phases. This can be particularly important for the built heritage sector, for example, which often requires nature-and place-based resource management to deliver innovative decarbonisation solutions for existing resources.

Reflecting this, it is important that any workforce analysis is regularly updated to take account of these developments in emerging skills and occupations. Indecon's dynamic construction model used in this report can be periodically updated in this manner.

[30] See: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/policy-information/circular-economy/#circular-economy-strategy

5.5 Summary of Key Findings

- The gap analysis reveals a substantial shortfall in the construction workforce needed to meet Ireland's 2030 and 2040 infrastructure targets. This shortfall persists across all modelled scenarios, including the most optimistic assumptions around productivity gains through Modern Methods of Construction (MMC).
- Under the central trend productivity scenario, the projected gap between supply and demand is 53,605 by 2030 and 13,609 by 2040. Even with accelerated MMC adoption, which reduces the required inflows by around 24% by 2030, the gap remains significant, underscoring that productivity gains, while helpful, are not sufficient on their own.
- The shortfall is most acute in skilled craft occupations that rely on apprenticeship pathways (approximately 61% of the total gap). Gaps also persist for occupations requiring higher education qualifications, and for roles not requiring formal qualifications.
- The analysis confirms that Ireland is not currently on track to meet its construction workforce needs. Domestic education and training pathways do not produce sufficient outputs to meet projected demand within the required timeframe and will need to be significantly expanded.
- Migration emerges as a critical short- to medium-term lever for bridging temporary gaps in qualification-based roles. Our analysis also underscores the importance of combining migration with intersectoral labour flows and increased participation from underrepresented groups (notably women) to address workforce needs across both qualification-based and non-qualification-based occupations.
- A key structural issue contributing to the gap is the low participation of women in the construction workforce. Women currently account for only 10.2% of construction roles, compared to 47% across the economy and 32% in the manufacturing sector. Female representation is also low in training pathways: just 1% in craft apprenticeships and under 26% in higher education programmes related to construction. This represents a substantial untapped labour pool. Increasing female participation will require targeted outreach, inclusive training initiatives, and structural reforms in recruitment and workplace practices.
- The scale of the challenge must be understood in the broader policy context. Ireland’s construction labour demands stem from overlapping infrastructure priorities: housing, retrofit, offshore wind, energy transition, transport, and other non-residential infrastructure. These priorities compete for a limited pool of workers and require integrated planning to avoid bottlenecks and delays.

Overall, the findings point to the need for a dual-track strategy: boosting productivity on the demand side through accelerated MMC adoption, while simultaneously expanding the supply side through increased enrolment in HE/FET and apprenticeships, strategic use of migration in the short-term, increased attractiveness of construction occupations, and greater inclusion of underrepresented groups, especially women. Migration will be essential in the near term, but must be complemented by a sustainable, long-term expansion of domestic education and training output, and increased attractiveness of construction occupations.

6 Delivery Framework for Meeting Workforce Requirements

6.1 Introduction

This section brings together the detailed modelling and assessment undertaken in the preceding sections, and presents a proposed integrated, cohesive, and coherent national framework to create and mobilise the construction workforce required to meet Government priorities in housing, energy and climate action, and other infrastructural developments.

6.2 Conclusions re Scale of the Challenge

Projected skills shortfall

Of importance is the need to restate the scale of the challenge facing policymakers in relation to the combined implications for construction-related workforce requirements arising from the confluence of competing infrastructural priorities. The key implications are as follows:

- Overall, Indecon's integrated supply-demand modelling and gap analysis make clear that Ireland faces an unprecedented shortfall in supply of construction-related workforce over the coming decade.
- In a central "business-as-usual" scenario with only modest or trend productivity gains, meeting demand would require roughly 53,605 additional construction workers by 2030 over and above what current domestic training pipelines are likely to produce. This gap narrows to around 13,609 by 2040.
- The MMC adoption scenario significantly reduces the projected shortfall in construction workers by 2030, from over 53,000 to approximately 40,295. While this gap remains substantial and will require major enhancements in domestic supply, the scenario demonstrates the potential of MMC to alleviate labour pressures, and should therefore be actively targeted and incentivised as a key component of the Government's strategy to address the workforce challenge.

The projected deficit is most acute in the skilled trades that depend on multi-year apprenticeships. Occupational modelling indicates that craft and apprenticeship-reliant trades account for the bulk of the gap, with an estimated 32,932-worker deficit in these occupations by 2030 under the central "business-as-usual" scenario.

While roles requiring higher-education or further-education (HE/FET) qualifications also face significant shortages – approximately 10,500 workers under the central or trend productivity scenario – the scale is less pronounced than in the apprenticeship-related occupations. Eliminating these gaps entirely through domestic pathways would require dramatic, sustained increases in apprenticeship starts and completions, and HE/FET enrolments and graduation rates. However, these channels are constrained by capacity limits and programme design features including course duration. Consequently, workforce shortfalls are expected to persist in the near term unless alternative sources of labour are mobilised.

These findings underscore both the magnitude and urgency of the challenge: under the range of scenarios examined, Ireland is not on track to have sufficient skilled construction labour to deliver

its housing, energy and climate action, and wider infrastructural policy commitments - as set out in the recently updated National Development Plan - on schedule.

Productivity Constraints and Modern Methods of Construction

Productivity in Ireland's construction sector remains well below Northern European benchmarks. This reflects a combination of subdued investment, planning challenges, and the fragmented nature of the industry. An important factor is that MMC and other advanced productivity-enhancing techniques are still used sparingly. Current estimates suggest that MMC adoption would need to roughly triple for Ireland to converge with leading European peers. While accelerated uptake of MMC could materially reduce labour intensity and narrow the workforce gap, even an aggressive modernisation path would not, on its own, eliminate the projected shortfalls. Productivity gains are therefore necessary but not sufficient: they must be accompanied by parallel measures that increase the absolute supply of skilled workers.

Competing demands for workforce

With the economy operating at full employment with very low levels of unemployment, labour force constraints and skills shortages are affecting many sectors. Workforce constraints are already emerging as a critical bottleneck in delivering Government priorities – most visibly in housing. Yet housing is only one element of a wider, simultaneous investment agenda set out in the recently updated NDP spanning retrofitting, wind energy, transport, healthcare, and education infrastructure. These overlapping – and, in some cases, interdependent – demands draw on one finite pool of construction labour, requiring careful prioritisation and sequencing of programmes and projects to avoid resource conflicts. Without coordinated planning, advancing one set of investments is likely to delay others, compromising wider social and economic objectives.

Untapped domestic talent pools

A particularly notable feature of the Irish construction workforce is the severe under-representation of women. Women comprise only about 10% of construction employment, compared with approximately 47% across the wider economy and 32% in manufacturing. Participation rates are equally low in training pipelines: women account for roughly 1% of craft-apprenticeship enrolments and about a quarter of students in relevant HE programmes. Mobilising this latent talent pool through targeted outreach, inclusive workplace practices and supportive training pathways represents a strategic opportunity to expand the domestic workforce and improve sectoral diversity.

6.3 Successfully Addressing the Challenge

Notwithstanding the scale of the challenges outlined above, Indecon is of the view that the adoption of a multi-prong cross-government strategy, with buy-in from government departments, agencies and industry, can make a substantial contribution towards addressing these challenges if supported by clear prioritisation of investment and delivery efforts. Given the importance of the construction workforce to meeting government investment priorities and other private sector demands across a range of sectors, the strategy should be developed in a way that engages the support and commitment of all relevant public and private stakeholders: this includes DETE and DHLGH driving enhanced productivity in the construction sector, as well as skills development supports implemented by DFHERIS. It will also require the targeted phasing of prioritised infrastructure investment by Government and investment in skills supply. An approach that recognises the constraints facing construction skills but that employs all available policy levers can yield significant benefits. Indecon is confident that substantial progress can be made through an integrated delivery framework along the lines of that outlined below.

6.4 Integrated Delivery Framework

Approach to formulation of framework

The delivery framework set out in this section represents an integrated, cohesive, and coherent methodology for meeting priority construction workforce needs across key government strategies and known investment plans, notably including, but not limited to:

- NDP
- Housing for All (and most recently updated targets);
- Climate Action Plan; and
- Offshore Wind Energy Programme.

The framework is designed to respond to the scale of the challenge as evidenced by Indecon's detailed demand-supply modelling and gap analysis. It also builds upon the foundations of relevant government/DFHERIS skills action plans, including:

- Careers in Construction Action Plan 2023 (being updated);
- MMC Action Plan 2025;
- Report on Analysis of Skills for Residential Construction and Retrofitting, 2022 (being updated);
- Offshore Wind Skills Action Plan, 2024;
- Action Plan for Apprenticeship (2021-2025); and
- Green Skills 2030 – The 1st National Further Education & Training (FET) Strategy for the Green Transition (2024).

Responding to the Scale of the Challenge

Addressing the scale of the challenge identified will require a radical, multi-faceted and urgent approach, underpinned by a clear prioritisation of investment and implementation actions. Four broad supply responses will be required, with the prioritisation and focus of these responses shaped by an agreed sequencing of investment priorities:

- Expanding domestic capacity and accelerating adoption of MMC, including for panellised and particularly modular construction and other technological and structural changes. Also important is site level planning, achieving scale economies and the application of best practice technologies.

- Driving a substantial increase in apprenticeship and wider training capacity, take-up, and output.

- Boosting the attractiveness of construction and MMC careers and entry from other sectors, including among women.

- Attracting skilled labour in the short term, through accelerated inward migration.

Table 6.1 presents an overall summary of recommendations to support the delivery framework for meeting priority construction workforce needs. Each recommendation, including associated supporting measures, is described further in the subsequent text.

Table 6.1: Summary of Overall Recommendations

No.	Recommendation
Rec. 1	Establish robust mechanisms to monitor workforce trends and evaluate the effectiveness of initiatives and actions for meeting national construction-related priorities.
Rec. 2	Modernise and strengthen the construction industry's productivity performance
Rec. 3	Decide on prioritisation and sequencing of investment and associated construction plans for different sectors
Rec. 4	Pursue options to expand apprenticeship and wider education and training capacity
Rec. 5	Boost attractiveness of construction and MMC careers, and promote entry from other sectors and occupations
Rec. 6	Prioritise leverage of skilled inward migration to help address immediate skill shortages

Source: Indecon assessment

The recommendations overall will be considered in the work of the Industry Capability Group, an oversight mechanism for *"Delivering Homes, Building Communities"*, and the Accelerating Infrastructure Taskforce.

Recommendation 1: Establish robust mechanisms to monitor workforce trends and evaluate the effectiveness of initiatives and actions for meeting national construction-related priorities

Robust governance is critical to track progress and enable course-correction. As shown in Table 6.2, Recommendation 1 proposes the establishment of quarterly reporting supported by appropriate KPIs, application of dynamic labour demand forecasting, and outcomes such as innovation (including MMC adoption rates) to assist in maintaining an evidence-based approach.

Table 6.2: Recommendation 1 – Supporting Actions
Supporting Actions and associated features:
Establish Working Group to review requirements to boost construction workforce and skills, aligned to previous reports on skills needs and the recent report of the Accelerating Infrastructure Group: ➢ Quarterly Dashboard drawing data from relevant bodies and sources ➢ Relevant Government publications to include annual research and analysis of construction sector skills demand and supply, productivity trends, and capacity within the MMC sector, leveraging Quarterly Dashboard data and other research
Define Key Performance Indicators (KPIs): Develop a concise set of KPIs to measure progress on workforce expansion and skills development, including: ➢ Inputs (training enrolments, apprenticeship starts / completions) ➢ Outputs (qualified workers in key trades per year) ➢ Outcomes (e.g., % of housing and retrofit targets achieved without labour-related delays) ➢ Construction productivity ➢ Innovation metrics (share of projects using MMC or BIM) ➢ Diversity metrics (female and minority participation rates)
Conduct dynamic forecasting to continuously update construction labour demand forecasts: ➢ To draw from Indecon projections as baseline ➢ To utilise latest data on construction output, productivity trends, and policy targets ➢ To incorporate early warning indicators for emerging skill shortages
Leverage EU and International Data to benchmark Ireland's performance on construction sector innovation and productivity, MMC adoption and other metrics
Quarterly updates to the appropriate Governance and oversight groups to include ongoing progress on MMC Action Plan, Careers in Construction Action Plan, etc.
Source: Indecon assessment

Recommendation 2: Strengthen the construction industry's productivity performance

To raise productivity and ease labour intensity, Recommendation 2 advances the accelerated adoption of Modern Methods of Construction, digital construction including in supporting public services such as e-planning and building control, and research-led innovation. Table 6.3 overleaf sets out proposed supporting actions, including in relation to reflecting MMC targets in public procurement, developing new off-site manufacturing skill modules, a Construction Technology Research Forum and demonstration projects, complemented by actions to improve workplace practices and retention.

Table 6.3: Recommendation 2 – Supporting Actions
Supporting Actions and associated features:
Set Targets for MMC Adoption: ➢ Enterprise development agencies to accelerate initiatives to attract investment and expand domestic capacity in MMC, including manufacture of prefabricated housing ➢ Building on the PfG target for 25% MMC use in State-backed housing, establish clear government targets for MMC usage on public projects to drive industry change ➢ Include MMC utilisation as a weighted criterion in public tender evaluations, building on approaches adopted under the Accelerated Delivery Programme and supported by the use of the PW-CF2 Design and Build contract
Integrate MMC & Digital Training: ➢ Ensure training programs produce the skills required for increased MMC and digital construction ➢ Introduce new courses or apprenticeship electives on off-site manufacturing techniques ➢ Encourage Design for Manufacture and Assembly (DfMA) modules in architecture/engineering curricula
Promote Construction R&D and Innovation: ➢ Encourage applications to research calls for construction-related topics by 2026 ➢ Engage with the EU's 'Built4People' partnership and the Blueprint for Construction Skills initiative to bring international research knowledge to Ireland ➢ Launch an initiative to pilot and adopt new construction technologies on real projects ➢ Deploy and trial innovative techniques: e.g., trial, advanced modular systems, etc. ➢ Consider launching an annual Construction Tech Innovation Challenge Call to startups and tech firms to propose technical solutions (e.g., automating retrofit processes)
Improve employment practices to increase retention of workforce, including enhancing on-site working conditions ➢ Update and roll out guidelines ➢ Promote existing initiatives such as "Construction Cares"
Source: Indecon assessment

Recommendation 3: Decide on Prioritisation and Sequencing of Investment and Associated Construction Plans for Different Sectors

Indecon's modelling suggests that construction-related workforce supply will be insufficient, in the short-term, to meet combined demands. It is therefore recommended that, as envisaged in the recent review of the NDP, agreement is reached on the most appropriate prioritisation and sequencing of sectoral investment programmes and projects over the coming months. This is likely to require a reprioritisation of the timelines for delivery of certain infrastructural investments to ensure that the projects can be delivered cost-effectively and do not impact on urgent housing targets.

The strengthening of ex-ante assessment of skills needs for capital plans and projects will provide further evidence to inform such decisions.

Table 6.4: Recommendation 3 – Supporting Actions
Supporting Actions and associated features:
➢ Review of NDP to identify appropriate phasing of investment plans
Strengthen ex-ante assessment of skills needs for capital plans and projects:
➢ Sectors to set out estimated workforce need in establishing plans and in bringing forward project proposals through the project lifecycle.

Recommendation 4: Pursue options to expand apprenticeship and wider education and training capacity

Meeting medium-term labour requirements will require radical action to achieve a step-change in apprenticeships and further education and higher education outputs. Table 6.5 on the following pages, details a series of proposed reforms and other actions in relation to incentives, curricula and delivery models—ranging from new high-demand apprenticeships and 'build-up-skills' programmes to on-site training hubs and strengthened FE-HE progression routes. Jointly led by DFHERIS, SOLAS and the National Apprenticeship Office, it is recommended that most initiatives should be implemented from 2025-26, with the aim of shortening time-to-qualification, widening participation, and creating a resilient domestic talent pipeline. It is important to acknowledge existing labour market and demographic constraints which limit the extent to which apprenticeship supply can be enhanced in the short to medium term. Increasing apprenticeship numbers requires sufficient demand from both employers and prospective apprentices. Ireland's available pool of training-age individuals is finite and expected to tighten, with the Leaving Certificate cohort likely to peak in the coming years. The broader context of full employment places further limits on the scale of growth that can be achieved. While financial incentives exist to support apprentice recruitment, this may be insufficient to boost employer-side demand. As increasing incentives would carry a fiscal cost, there may be merit in considering redirecting existing public resources to improving incentives for firms hosting construction-related apprenticeships. It will also be important to ensure that any incentive acts in a counter-cyclical manner, to avoid erosion of supply pipelines at a time when employer demand may temporarily weaken.

Table 6.5: Recommendation 4 – Supporting Actions
Supporting Actions and associated features:
Accelerate Apprenticeship reform and examine options to expand construction and MMC-related Apprenticeship take-up and output: ➢ Investigate optimal incentivisation structures to encourage more companies to take on apprentices and individuals to register ➢ Update outgoing (2021-25) Action Plan for Apprenticeship and implement new plan ➢ Accelerate legislative reform / rule changes to facilitate modularised and flexible delivery ➢ Shorten time to qualification, e.g., 3-year, more intensive option ➢ Explore potential for a Construction Training Organisation model (similar to Group Training model in Australia): directly employ and rotate a cohort of apprentices among a consortium of (small) firms ➢ Introduce higher-level apprenticeships (Level 7–8) for site management, quantity surveying technicians, off-site construction, etc, that recognise prior learning.
Establish national 'build up skills' programme of short, targeted upskilling courses for construction workers: ➢ Offer flexible training modules in critical deficit areas incl. retrofit skills; digital skills; MMC/off-site construction; and safety/regulatory training ➢ Prioritise courses addressing critical skill gaps and productivity gains ➢ Develop an enhanced construction traineeship offering
Expand pathways for under-represented groups, including women and girls: ➢ Significantly increase the number of pre-apprenticeship and traineeship places ➢ Further develop courses targeting young people from disadvantaged areas ➢ Expand the existing offering of bridging courses for career switchers
Facilitate transitions from adjacent sectors to attract experienced workers from related industries (manufacturing, engineering, logistics, agriculture), incl. through: ➢ Fast-track conversion courses for trades-adjacent workers ➢ Accelerated apprenticeship and traineeship pathways that credit prior learning and experience
Expand Second-Level Curriculum options: ➢ Update construction-related subjects in post-primary schools and continue to develop Transition Year iVET modules. ➢ Engage with guidance counsellor representatives to encourage knowledge sharing about careers in construction
Invest in Training Infrastructure & Staff: ➢ Expand capacity of FET centres and apprenticeship training facilities to eliminate bottlenecks ➢ Invest in expansion of Mount Lucas campus as the National Construction Training Campus, offering advanced practical labs for modern methods and acting as a hub for curriculum innovation and trainer training
Accelerate Adoption of Blended & Flexible Learning Models to speed up training: ➢ Increase provision of blended and flexible learning options ➢ Expand development and take-up of micro-credentials and micro-qualifications.

Table 6.5: Recommendation 4 – Supporting Actions
Supporting Actions and associated features:
Ensure Continuous Curriculum Renewal: ➢ Advisory Panels for each major construction training program to update curricula with new and emerging skills requirements
Develop on-site training hubs on construction sites: ➢ Create mechanisms to deliver training directly on large construction sites, so current workers can upskill without leaving their job location
Source: Indecon assessment

Recommendation 5: Boost Attractiveness of Construction and MMC Careers, and Promote Entry from Other Sectors and Occupations

Expanding the potential labour pool requires repositioning construction as a modern, inclusive, and rewarding career choice. Table 6.6 outlines a number of proposed actions, including a national 'Building Your Future' multimedia campaign, careers roadshows, enhanced guidance services and the development of a sectoral diversity and inclusion charter. Coordinated by DFHERIS in partnership with education, procurement and industry bodies, delivery should commence in 2025 and be overseen by a new Construction Sector Group sub-group to ensure alignment with related action plans.

Table 6.6: Recommendation 5 – Supporting Actions
Supporting Actions and associated features:
Implement Careers in Construction Action Plan
➢ Build further on existing recruitment and promotion campaigns targeting both Irish diaspora and foreign talent for selected key skilled roles
Enhance career guidance to include enhancing careers portals to include up-to-date information on careers and roles
Extend 'Building Heroes' and similar initiatives to promote greater participation of women in construction and related (incl. MMC) careers and roles
Develop longitudinal monitoring and tracking of women in the construction workforce to help analyse identified structural challenges, including retention and career development
Work with partners to develop and monitor diversity targets, including for female participation.
Source: Indecon assessment

Recommendation 6: Prioritise leverage of skilled inward migration to help address immediate skill shortages

Domestic training pipelines will not close the immediate construction-skills gap; a targeted programme of skilled inward migration is therefore essential. Table 6.7 sets out proposed supporting actions informed, inter alia, by a recent paper by ODI in relation to the role of immigration policy in addressing construction workforce challenges.[31] This is envisaged a short-term requirement.

Table 6.7: Recommendation 6 – Supporting Actions
Supporting Actions and associated features:
Leverage skilled immigration initiatives to address immediate skill shortages: ➢ Build further on existing recruitment and promotion campaigns targeting both Irish diaspora and foreign talent for selected key skilled employees ➢ Work with partners to review the speed of application for, and issuing of, Employment Permits and work visas ➢ Continue to pursue bilateral engagement and agreements with countries that have compatible skills ➢ Provide integration supports for skilled migrant workers, including fast-track assessment of qualifications
Source: Indecon assessment

While employment permits are very important for many sectors, given the specific challenges in meeting skilled needs in the construction sector, it is important to consider the potential for fast tracking to facilitate attraction of highly mobile skilled construction employees. The construction sector is also comprised of many SMEs for which available resources to plan-ahead may be constrained. While DETE have an impressive reputation in handling employment permits for multiple sectors, there would be merit in considering additional changes to accelerate skill provision to meet housing and other construction needs which are a national priority. Potential changes would be to speed up work visa application timeframes facilitating an adjustment of the existing recommendation for employment permits for construction to be at least 12 weeks before the employment start date, and to consider a tiered fee system depending on priority. For example, in the UK, employers can pay an additional fee for a five-day priority application or a higher fee for a high priority one-day application. The planned development of a single application procedure for employment permits and immigration permissions as agreed by Government should also be expedited.

[31] https://media.odi.org/documents/ODI_Decarbonising_Irelands_housing_stock_eNHca1b.pdf

6.5 Overall Conclusions

Indecon's analysis has rigorously quantified the scale of Ireland's construction-skills gap. Based on the scenarios examined, the modelling estimates that between 40,295 and 77,175 additional construction- and MMC-related workers will be required by 2030. Accelerating all aspects of MMC remains essential, but this will not fully bridge the projected skills supply gap unless accompanied by other radical and urgent actions. A step-change in apprenticeship and wider training provision is imperative, supported by policy reforms that shorten time-to-qualification and boost participation. In the immediate term, a managed programme of skilled inward migration will be critical to safeguarding delivery schedules for housing, climate/energy, and other infrastructural investments. There is also a need to prioritise the phasing of construction plans for different sectors. Taken together, these findings call for decisive, whole-of-government action – including the strategic reallocation of some public resources towards targeted workforce development – to ensure that labour constraints do not impede Ireland's national investment targets/priorities. A larger available skilled workforce will assist in moderating the cost of construction in Ireland. This will contribute to improved value for money in public expenditure on construction projects and will ease viability constraints facing the building sector. This will, in turn, support the Government's housing output and other targets. Given the importance of these impacts, introducing the proposed new measures to change skill availability should be given priority.

Annex 1 Listing of Consultees

Listing of Organisations Consulted
Department of Further and Higher Education, Research, Innovation and Science
Department of Public Expenditure, Infrastructure, Public Service Reform and Digitalisation
Department of Enterprise, Tourism and Employment
Department of Housing, Local Government and Heritage
Department of Climate, Energy and the Environment
Enterprise Ireland
SOLAS Skills and Labour Market Research Unit
National Standards Association of Ireland (NSAI)
Construction Sector Group, Innovation Sub-Group
Construction Industry Federation
Society of Chartered Surveyors Ireland
Royal Institute of the Architects of Ireland
Irish Planning Institute
Irish Green Building Council
Cairn Homes
John McGrath, independent consultant