European Commission

Analytical Report on Skills

European Construction Observatory

DISCLAIMER

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Glossary

cVET:	Continuous Vocational Education and Training
ECO:	European Construction Observatory
ESCO:	European Skills, Competences, Qualifications and Occupations
EU:	European Union
EU-27:	All EU Member States from 2020
ISCED:	International Standard Classification of Education (ISCED 2011 and ISCED-F 2013)
ISCO:	International Classification of Occupations (ISCO-08)
NACE:	Statistical classification of economic activities in the European Community (NACE Rev.2)

1. Introduction

This report is an analytical report on skills in the European construction sector. It is published as part of the European Construction Observatory (ECO). It also follows and builds on the approach from the 2020 ECO Analytical Report 'Improving the human capital basis'.[1]

1.1. Aims

The analysis aims to present an overview of the European Union (EU) construction sector workforce and skills (see Section 1.2 for definitions and scope of analysis). The report supports the identification of potential gaps and opportunities, complements existing activities, and informs policy initiatives in the area of skills in the construction sector.

Following a review of context, the report presents an overview of the key drivers and policy trends of relevance. It then presents a detailed analysis of data on the construction sector, including a historical analysis of trends and indicators in relation to:

- Employment in the construction sector and its subsectors.
- Workforce demographics.
- Employment types.
- Education and training, including education levels, qualifications and training.

The report then analyses potential future trends in quantitative terms in relation to the likely overall volume of demand for construction sector workers and occupations in the shorter (2030) and longer term (2050). Lastly, the report presents a qualitative review of the likely evolution of skills and tasks and demand for selected occupations.

1.2. Scope

As described in the Annual Single Market Report 2021 and reiterated in the Commission staff working document 'Scenarios for a transition pathway for a resilient, greener, and more digital construction ecosystem',[2] the construction ecosystem includes activities carried out during the whole lifecycle of buildings and infrastructures. It covers the design, construction, maintenance, refurbishment and demolition of buildings and infrastructure. Activities included in the construction ecosystem are:

- On-site construction, renovation, refurbishment and demolition, including
    - On-site construction of buildings and infrastructure projects: residential buildings, non-residential buildings (e.g., offices, warehouses) and civil engineering projects (e.g., roads, railways, airports, utility networks, sewage, pipelines).
    - Specialised activities: site preparation, electrical, plumbing and other installation, roofs, and other forms of building completion and finishing.
    - Development of building projects (e.g., buying land, project initiation, obtaining permits).

[1] European Construction Sector Observatory (2020) Improving the human capital basis: analytical report. Retrieved 19.11.25 from https://single-market-economy.ec.europa.eu/document/download/0e4ab245-35eb-4922-988f-b7bbecc85a18_en

[2] Commission staff working document: Scenarios for a transition pathway for a resilient, greener and more digital construction ecosystem Brussels, 14.12.2021 Ares(2021)7679109) final. Retrieved 19.11.25 from https://ec.europa.eu/docsroom/documents/47996

- Other services: including architectural and engineering services, as well as activities supporting the operation of buildings, including facility management and landscaping activities.

In this context, the analysis presented in this report focuses on economic activities associated with the on-site construction and renovation of buildings and infrastructure, specialised construction activities, and associated architectural, engineering and testing services. It uses the classification of economic activities in the European Union (NACE)[3] and includes:

- Construction sector (NACE F): this includes activities that are categorised as part of NACE F (Construction). This includes the following subcodes:
    - Construction of buildings (F.41),
    - Civil engineering (F.42),
    - Specialised construction activities (F.43).
- Architectural, engineering and testing services (NACE M.71)[4]: This category is also presented where data is available at the NACE two-digit level. Activities include architectural and engineering services, building inspection, surveying and mapping services, and physical, chemical, and other analytical testing services.[5]

Where data for both the construction sector (NACE F) and architectural, engineering and testing services (NACE M.71) is available and presented together, it is referred to as the combined construction sector.

For the analysis of specific occupations and associated skills, the analysis focuses on specialist construction sector occupations defined through the International Standard Classification of Occupations (ISCO)[6] structure. Its principal focus is on 'blue-collar' construction trades occupations, as well as selected 'white-collar' occupations that are directly associated with construction activities (Table 1). These include:

- Occupations classified under 'Building and Related trades' (ISCO group 71), which includes various detailed occupations relating to construction and finishing of buildings, as well as 'Electrical and electronic trades workers' (ISCO 7411), and 'Labourers in construction' (ISCO 9312 and 9313).
- Selected 'white-collar' construction occupations, primarily 'Construction managers and supervisors' (ISCO 1323), 'Civil engineers' and 'Civil engineering technicians' (ISCO 2142 and 3112), 'Architects' (ISCO 2161).

[3] NACE revision 2 (NACE Rev. 2). Available from: https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-ra-07-015
[4] The full NACE M.71 title is 'Architectural and engineering activities; technical testing and analysis'. For the purposes of clarity this report will refer to it as architectural, engineering and testing services
[5] The NACE M code that includes M.71 architectural, engineering and testing services is associated with construction activities in scope of this report. Where only top-level NACE groups are available (i.e. NACE M) only data for the construction sector (NACE F) is presented in the analysis. N.B from 2025 onwards the NACE revision 2.1 M.71 activities will be grouped under section N professional, scientific and technical activities.
[6] International Standard of Classification of Occupations available from: https://ilostat.ilo.org/methods/concepts-and-definitions/classification-occupation/

Table 1: Construction sector occupations (ISCO codes)

ISCO 2-digit occupations		Detailed ISCO codes
Blue-collar occupations		
71	Building and related trades workers, excluding electricians	71
72	Metal, machinery and related trades workers	7214; 7215
74	Electrical and electronic trades workers	7411
93	Labourers in mining, construction, manufacturing and transport	9312; 9313
White-collar occupations		
13	Production and specialised services managers	1323
21	Science and engineering professionals	2142; 2162
31	Science and engineering associate professionals	3112

The report does not examine in depth the likely skills for clerical and administrative functions or general management occupations (e.g. company managers), or supply chain and logistics sectors, although these are necessary for the construction sector to function. It is taken into consideration that skills in these occupations are an important part of the construction sector and make up a significant share of construction sector employment. However, the focus of this report is on specialist occupations for the construction sector.

Analysis of future trends builds on previous models and approaches and focuses on the impact of required or intended investments to deliver the Renovation Wave. The analysis builds on prior analysis by the Commission, including Cedefop, industry, and civil society. Given the complexity and uncertainty of forecasts, the analysis and scenarios presented in this report should be treated as illustrative rather than firm predictions.

The report draws on the definition used in the European Qualifications Framework, and the European Skills, Competences, Qualifications and Occupations (ESCO) classification, "skill means the ability to apply knowledge and use know-how to complete tasks and solve problems". This may include technical skills, competencies, and knowledge dimensions, including the ability to carry out specific tasks or to use tools, processes or techniques, as well as the relevant underlying knowledge.

The report recognises that many professions and occupations in the construction sector require professional qualifications, whilst also recognising the diversity of the sectors and occupations in the labour market. In this context, the report views likely skills needs for occupations but does not present specific recommendations on future skills or knowledge requirements for occupations.

Analysis of historic trends commences from 2015 up to the latest available data. All sectoral data is presented for the EU-27, and all quantitative data is sourced from Eurostat unless otherwise stated.

1.3. Context

A skilled construction workforce is key to supporting the transformation of the construction sector, and the inclusive economic growth and competitiveness of the European Union and contributes to efforts to address various objectives, such as affordability of housing. The combined sector is a major employer, responsible for over 8% of employment in the EU and is a key employer of workers in craft and related trades. The construction sector is characterised by high levels of self-employment and micro-enterprises that are structured around specific trades or professions as part of flexible and complex supply chains. Construction activities range from domestic renovations to major infrastructure projects.

The construction ecosystem is central to the delivery of EU climate targets. The objective of the **Energy Performance of Buildings Directive**[7] (EPBD) to decarbonise the building stock by 2050 is expected to influence demand in the construction ecosystem.[8] Factors include:

- Design, management, and construction requirements associated with the introduction of Minimum Energy Performance Standards (MEPS);[9]
- Revised Construction Products Regulation (CPR);[10]
- Specific impacts associated with phase out fossil fuel heating systems and the introduction of renewable energy systems.

Previously, the **Renovation Wave** (2020)[11] set significant targets for energy-efficient renovations and associated investments. This strategy, alongside wider investments in the green transition, anticipate a doubling of the deep energy renovation rate of residential and non-residential buildings and an estimated total renovations of 35 million building units by 2030 (deep energy renovations[12]) that is likely to need an estimated additional EUR 275 billion additional investments per year (See SWD(2020) 98

[7] Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings (recast) (Text with EEA relevance). PE/102/2023/REV/1. OJ L, 2024/1275, 8.5.2024, ELI: http://data.europa.eu/eli/dir/2024/1275/oj

[8] The EPBD sets objectives to reduce residential building average primary energy use by 16% by 2030 and 20-22% by 2035 (55% of the decrease of the average primary energy use is achieved through the renovation of the worst-performing buildings), the renovation of the 16% worst-performing non-residential buildings by 2030 and the 26% worst-performing buildings by 2033, and the aim of zero on-site emissions from fossil fuels, as of 1 January 2028 for publicly-owned buildings and as of 1 January 2030 for all other new buildings.

[9] Annex to the Communication from the Commission. Approval of the content of the draft Commission Notice providing guidance on new or substantially modified provisions of the recast Energy Performance of Buildings Directive (EU) 2024/1275 Minimum energy performance standards for non-residential buildings and trajectories for progressive renovation of residential buildings (Article 9). Brussels, 30.6.2025 C(2025) 4132 final. Retrieved 19/11/25 from https://energy.ec.europa.eu/publications/communication-approving-content-notice-providing-guidance-recast-epbd-guidance-recast-epbd_en

[10] Regulation (EU) 2024/3110 of the European Parliament and of the Council of 27 November 2024 laying down harmonised rules for the marketing of construction products and repealing Regulation (EU) No 305/2011 (Text with EEA relevance) PE/12/2024/REV/1 OJ L, 2024/3110, 18.12.2024, ELI: http://data.europa.eu/eli/reg/2024/3110/oj

[11] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives {SWD(2020) 550 final}. Retrieved 19/11/25 from https://energy.ec.europa.eu/system/files/2020-10/eu_renovation_wave_strategy_0.pdf

[12] Whilst not defined in the original Renovation Wave strategy, deep renovations have been defined in the revised EPBD as a renovation that transforms buildings into zero-emission buildings, or as a first step, as a renovation that transforms buildings into nearly zero-energy buildings.

final[13] and SWD(2020) 176 final[14]). Since its publication, the Renovation Wave agenda is expected to have driven up the demand for workers in construction, particularly in small residential projects.

Early estimates suggested that to meet the targets, an additional 160,000 green jobs in construction would be needed by 2030.[15] Given the scale of the ambition, more recent estimates suggest that this figure may be an underestimate. For example, the most recent Eurofound study estimated that the objectives of the EU Renovation Wave alone will require between 486 000 and 1 549 000 additional workers, with this figure rising to 7 million when replacement needs for the workforce are taken into account.[16] Cedefop analysis in 2023 estimated that between 2022 and 2035, an estimated 4.2 million job openings in the construction sector will need to be filled.[17] Estimates published by the European Federation of Building and Woodworkers (EFBWW) and the Just Transition Centre (JTC) of the International Trade Union Confederation (ITUC) suggested that between 486,600 and 1,549,000 additional workforce positions will be required in the building construction and energy renovation sector from 2023 to 2030.[18]

The forthcoming **European Affordable Housing Plan**[19] is expected to encourage public and private investment, provide technical assistance to Member States, and establish a pan-European investment platform for affordable and sustainable housing. The European Strategy for Housing Construction will focus on boosting construction productivity, enhancing skills, and reducing costs. Additionally, Cohesion policy investments are being leveraged to double investments in affordable housing, while the Social Climate Fund also aims to support vulnerable households.

The demand for additional workforce and changes in technology and practices is expected to drive demand for training of new workers and reskilling and upskilling of the construction ecosystem. To help meet this ambition, construction sectoral partners[20] through the framework of the **Pact for Skills Large-Scale Partnership** for the construction ecosystem[21] have signalled the objective of supporting 30% of the construction ecosystem workforce to participate in upskilling and reskilling actions each year by 2030.[22] This is estimated to mean approximately 3 million each year by 2030. The commitments also

[13] Commission staff working document: Identifying Europe's recovery needs (SWD/2020/98 final). Retrieved 19.11.25 from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020SC0098
[14] Commission staff working document: Impact assessment - Stepping up Europe's 2030 climate ambition Investing in a climate-neutral future for the benefit of our people (SWD/2020/176 final). Retrieved 19/11/25 from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020SC0176
[15] Employment and Social Developments in Europe, Annual Review (2019), European Commission. Retrieved 19.11.25 from https://op.europa.eu/en/publication-detail/-/publication/747fefa1-d085-11e9-b4bf-01aa75ed71a1/language-en
[16] Eurofound (2025a), Building on growth potential: Preparing the construction sector for the twin transitions, Publications Office of the European Union, Luxembourg)
[17] European Centre for the Development of Vocational Training (Cedefop) (2023) 'Construction workers: skills opportunities and challenges (2023 update)', Cedefop website, 19/12/23. Retrieved 19.11.25 from https://www.cedefop.europa.eu/en/data-insights/construction-workers-skills-opportunities-and-challenges-2023-update#_summary
[18] Mella, A. and Werna, E (2023) Skills and Quality jobs in construction in the framework of the European green deal and the post covid recovery. (Brussels, EFBWW and the JTC of the ITUC). Retrieved 19.11.25 from https://www.ituc-csi.org/IMG/pdf/230630_-_jtc_study_report_may_2023.pdf
[19] For further information see https://housing.ec.europa.eu/index_en
[20] European Construction Industry Federation (FIEC), the European Federation of Builders and woodworkers (FBWW) and European Builders Confederation (EBC)
[21] Pact for Skills Construction. Further information available at: https://pact-for-skills.ec.europa.eu/about/industrial-ecosystems-and-partnerships/construction_en
[22] A Pact for Skills in Construction by the EU sectoral Social Partners, EFBWW and FIEC in cooperation with EBC. Retrieved 19.11.25 from https://pact-for-skills.ec.europa.eu/document/download/2c705cea-a5ed-474f-9ea7-b79870a6f3fa_en?filename=Partnership%20Agreement%20Construction%20w%20Commitment.pdf

build on the 2020 reports of the Erasmus+ funded Construction Blueprint,[23] which identified skills development needs in relation to energy efficiency, circular economy and digitalisation.[24]

To support the sector in delivering against these objectives, the EU is making significant investments in skills. The Recovery and Resilience Facility supported policies for the next generation through National Recovery and Resilience plans, which included support for reforms and investments aimed at improving access to general, vocational, and higher education.[25] The European Year of Skills (2023) and the Pact for Skills[26] have sought to mobilise public-private partnerships to prioritise skills across a range of industrial ecosystems with the support of funding through Erasmus+. The EU has also invested an estimated € 44.2 billion in skills through EU contributions to cohesion funds across the 2021 to 2027 programme period, equivalent to 14.6% of all Cohesion Fund investments.[27] The majority of these are through the European Social Fund Plus (ESF+) (91.5%), with the remaining investment and the Just Transition Fund (JTF) (52%) and the European Regional Development Fund (ERDF) (3.3%).

Further activities noted under the **Transition pathway for Construction[28]** include investment in lifelong learning and digitalisation, working conditions and social protection, healthier and safer working environment.[29] BUILD UP Skills, an initiative of the European Union, was launched in 2011 and is currently funded under LIFE Clean Energy Transition.[30] It supports skills intelligence, development and uptake to support energy efficiency and renewable energy in buildings and has funded more than 100 projects to date. The Clean Industrial Deal will promote skills and quality jobs and establish a Circular Economy Act to increase the use of circular materials by 2030. Under the Green Deal Industrial Plan, Net Zero industry Academies will also support skills needs in net zero technologies and materials of relevance to the wider construction ecosystem. This includes the development of learning programmes, local education and training partnerships, and credentials for transferability between jobs and cross-border mobility.[31] The New European Bauhaus Academy[32] will accelerate up-skilling and re-skilling in the construction ecosystem to support the transition towards a more regenerative and circular system of material use. The expansion and consolidation of the Academy will further support the development

[23] For further information see https://constructionblueprint.eu and the successor project https://constructionblueprint2.eu/
[24] Construction Blueprint outputs included: Status quo and sectoral skills strategy: skills needs analysis (2022). Retrieved 19.11.25 from https://constructionblueprint.eu/wp-content/uploads/2021/11/R2.-Skills-needs-analysis.pdf. Report on the professions and qualifications to be subject of modernisation. Retrieved 19.11.25 from https://constructionblueprint.eu/wp-content/uploads/2022/02/R5.-Construction-Blueprint_-Professions-and-qualifications-to-be-subject-of-modernisation_V1-1.pdf
Status quo and sectoral skills strategy: roadmap and action plan. Retrieved 19.11.25 from https://constructionblueprint.eu/wp-content/uploads/2020/02/D4.-Roadmap-and-Action-Plan.pdf and
[25] https://next-generation-eu.europa.eu/recovery-and-resilience-facility_en
[26] Pact for Skills https://employment-social-affairs.ec.europa.eu/policies-and-activities/skills-and-qualifications/working-together/pact-skills_en
[27] European Commission: Directorate-General for Employment, Social Affairs and Inclusion (2024), An in-depth overview of the EU cohesion funds' investments in skills in the context of the European Year of Skills – Final report (Publications Office of the European Union). Retrieved 19.11.25 from https://data.europa.eu/doi/10.2767/522457
[28] European Commission (2023) Transition Pathway for Construction. Retrieved 12.12.25 from https://ec.europa.eu/docsroom/documents/53854
[29] Commission staff working document: Scenarios for a transition pathway for a resilient, greener and more digital construction ecosystem Brussels, 14.12.2021 Ares(2021)7679109) final. Retrieved 20.11.25 from https://ec.europa.eu/docsroom/documents/47996
[30] The initiative was previously funded through Horizon 2020 and Intelligent Energy Europe Programme (IEE). For further information about the BUILD UP Skills projects see https://build-up.ec.europa.eu/en/bup-skills
[31] With the Net-zero Industry Academies, the Commission acts to train Europe's workforce for the net-zero economy https://ec.europa.eu/newsroom/growth/items/823315/en
[32] For further details see https://neb.academy/

of knowledge, skills, and innovation, including support for start-ups and sandboxes for innovative products.

The importance of construction skills was identified by the Draghi report[33] and by the subsequent Competitiveness Compass.[34] The Compass aims to boost growth, including through innovation, decarbonisation, and promoting skills and quality jobs, and coordination of measures with the support of the competitiveness fund. Measures include the establishment of the Union of Skills[35] that will support investment in workers, skills and quality jobs, including through Erasmus+.

2. Historical trends

This section presents recent historical trends in the construction workforce, including rates of employment, workers' profiles, patterns of education and training, as well as the demographics of businesses and firms. It draws on Eurostat statistics and presents data in relation to employment in the construction sector (NACE F and sub codes) and architectural, engineering and testing services when available (NACE M.71). Where data is presented together, it is referred to as the combined construction sector.

Building upon the previous Analytical Report[36], several supply-side factors are identified that have produced or could potentially create bottlenecks. These include:

- An ageing European population and a declining share of the active workforce.
- An increased share of construction workers aged 50 to 64.[37]
- Low rates of younger entrants and poor perceptions of construction careers.
- Significant under-representation of women in the sector.
- Labour rights issues due to extensive subcontracting and irregular or undeclared employment, including that of immigrant workers.[38]
- Dominance of micro-enterprises with limited margins for investment in training and R&I.

Previous analysis focusing on the 2010-2020 decade considered the recovery of the sector following the global financial crisis of 2008 and the subsequent Eurozone debt crisis that started in 2009. Current analysis needs to consider the effects of the COVID-19 pandemic in supply chains, the energy crisis, to some extent triggered by the Russian war in Ukraine, the climate crisis effects on construction sites, the built environment and infrastructure and social crises, including the affordable housing one.

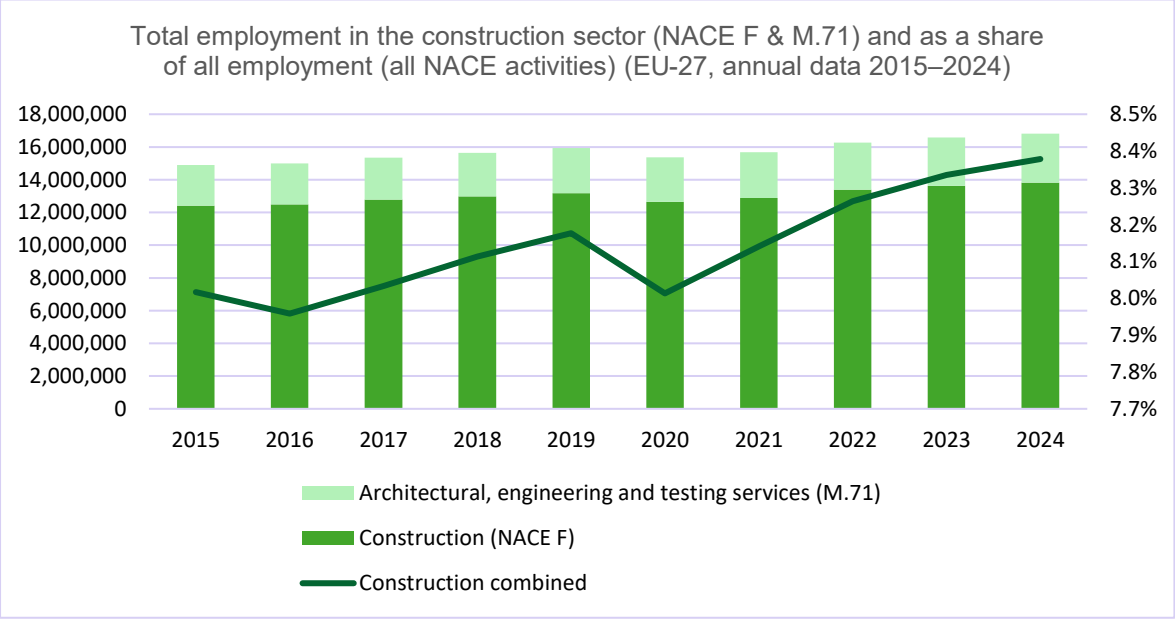
[33] See: https://commission.europa.eu/topics/competitiveness/draghi-report_en
[34] Communication from the Commission to the European Parliament, the European Council, The European Economic and Social Committee and the Committee of the Regions: A Competitiveness Compass for the EU. COM(2025) 30 final. Brussels, 29.1.2025. Retrieved 19.11.25 from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52025DC0030
[35] Communication from the Commission to the European Parliament, the European Council, The European Economic and Social Committee and the Committee of the Regions: The Union of Skills. COM(2025) 90 final. Brussels, 5.3.2025. Retrieved 19.11.25 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX%3A52025DC0090
[36] European Construction Sector Observatory (2020) Improving the human capital basis: analytical report. https://single-market-economy.ec.europa.eu/document/download/0e4ab245-35eb-4922-988f-b7bbecc85a18_en
[37] This stood at 23% in 2018 and is predicted to keep rising.
[38] See also European Labour Authority (2023b) Undeclared work in the construction sector Learning resource paper from seminar. Retrieved 19.11.25 from https://www.ela.europa.eu/sites/default/files/2023-12/UDW-learning-paper_undeclared-work-construction-sector.pdf

2.1. Employment in construction

Employment in the combined construction sector (including NACE F and M.71 sectors) has increased both in absolute terms and as a share of total employment (Figure 1). In 2024, 16,819,400 people were employed in the combined construction sector. This represented an increase of 13% since 2015, with an addition of 1,930,000 workers. In 2024, Construction (NACE F) made up 82% of employment (13,829,400) and architectural, engineering and testing services (M.71) employed 2,990,000 (18%). In total, by 2024, combined construction represented 8.38% of the total EU-27 workforce compared to 8% in 2015 (Figure 1).[39] There has been a steady increase in the share of employment since 2016, but with a significant dip in 2020 in the context of COVID-19. Between 2015 and 2024, the additional 1,930,000 construction sector workers represented 13% of the 15 million workers that had been added across the EU-27 economy.

It is important to acknowledge that the actual number of people working in construction is greater due to undeclared work. According to a 2019 Eurobarometer survey, 3% of EU respondents purchased undeclared construction services (renovation, maintenance and improvements for buildings) in the past year, with Greece, Bulgaria, and Slovakia having the highest rates of undeclared purchases, and Austria, Lithuania, Portugal, Germany, Romania, and Finland having the lowest rates. According to the European Labour Authority (ELA)[40] approximately 3.8 million Europeans (equivalent to 0.75% of the population) perform undeclared home repairs and renovations. Among those providing these services, 63% are self-employed, and 14% rely solely on undeclared work for their income.

Figure 1: Total employment in the construction sector (NACE F & M.71) and as a share of all employment (all NACE activities) (EU-27, annual data 2015–2024)



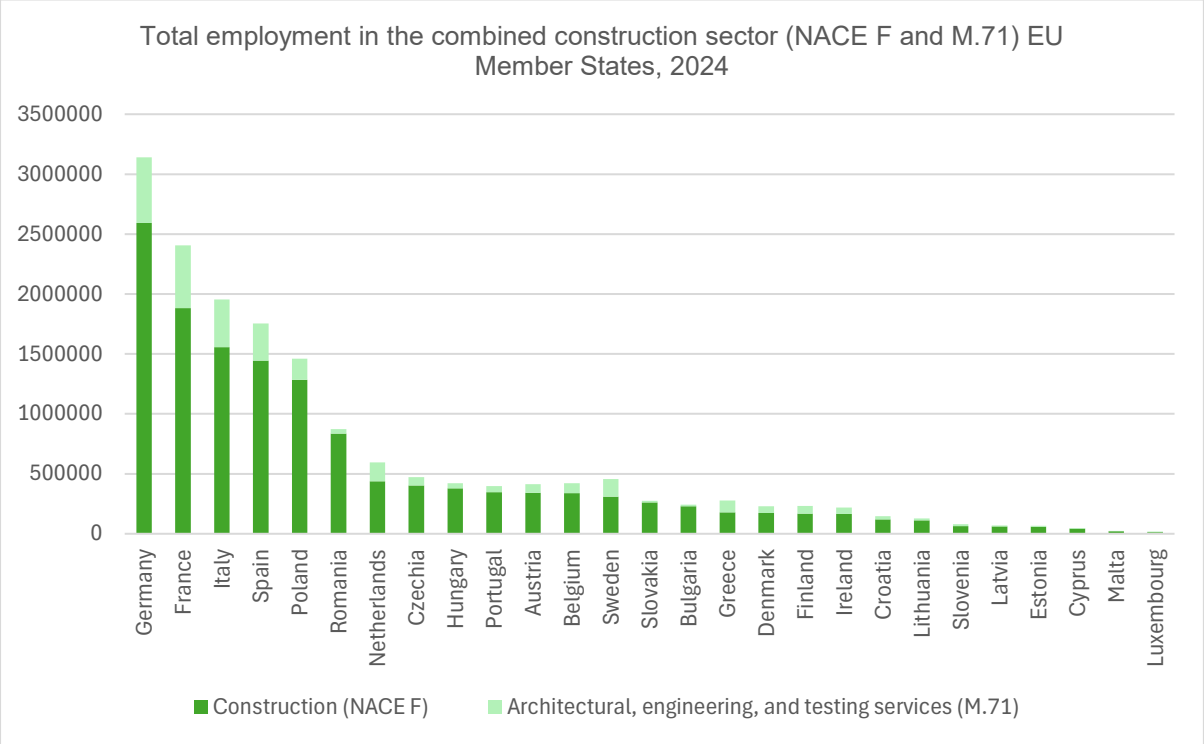
Source: Eurostat Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d]

[39] Eurostat Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d)

[40] Williams, C.C. and Kayaoglu, A. (2021). Explaining the supply of home repair and renovation services in the undeclared economy: lessons from Europe and cited in European Labour Authority (2023b) Undeclared work in the construction sector Learning resource paper from seminar. Retrieved 19.11.25 from https://www.ela.europa.eu/sites/default/files/2023-12/UDW-learning-paper_undeclared-work-construction-sector.pdf

At the Member State level (Figure 2), the largest construction sector workforce was in 2024 in Germany, where 3.1 million people were employed in the combined construction sector (NACE F and M.71). This is followed by France (2.4 million), Italy (1.9 million), Spain (1.7 million) and Poland 1.5 million). The Member States with the smallest workforce in the combined construction sector were Luxembourg (18,700), Malta (24700), Cyprus (47,300), Estonia (66,200), Latvia (68,700) and Slovenia (79,300).

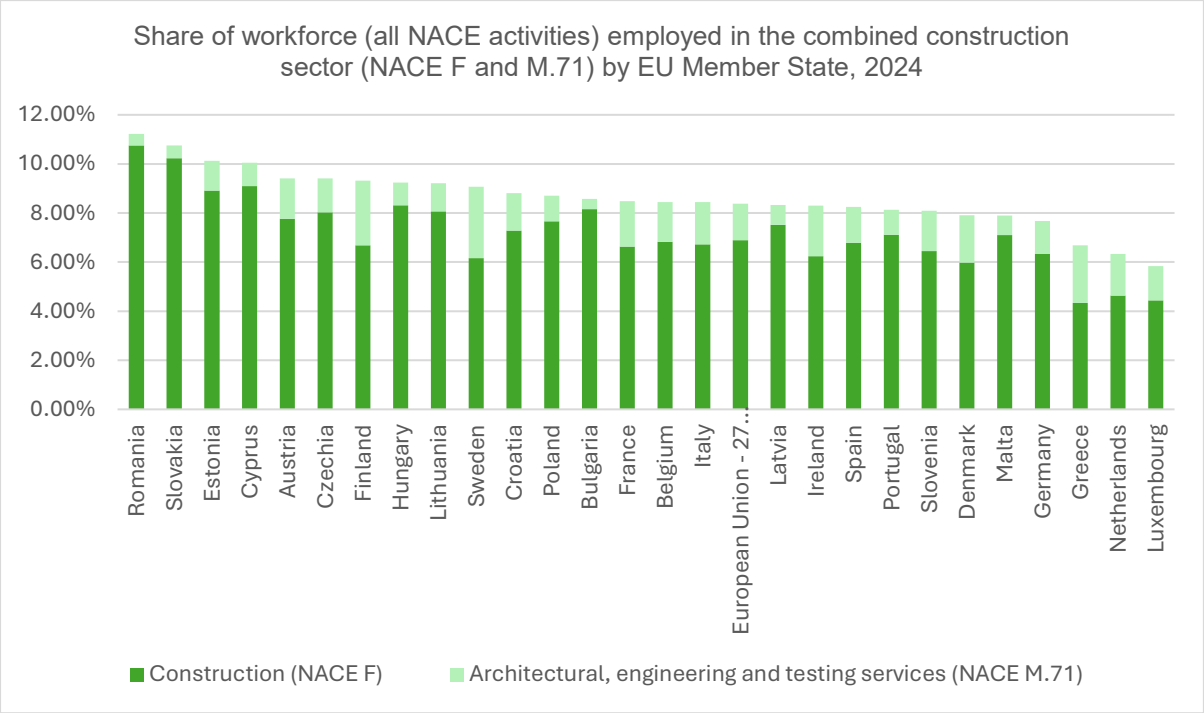
Figure 2: Total employment in the combined construction sector (NACE F and M.71) EU Member States, 2024



Source: Eurostat employed persons by detailed *economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d]*

There are differences in terms of the overall share of workers employed in the combined construction sector (Figure 3). Countries with the highest share of employees in the combined construction sector of the overall economy are Romania (11%), Finland, Estonia and Cyprus (10%). Countries with the lowest shares are Greece (7%), the Netherlands, and Luxembourg (6%). In terms of composition of the combined construction sector, countries where architectural, engineering and testing services make up larger shares of the combined construction workforce are Greece (54%), Sweden (47%), Finland (39%), the Netherlands (36%), Denmark (34%), and Ireland (33%). Countries that have lower shares of employment in architectural, engineering and testing services (M.71) in the combined construction sector include Bulgaria (5%), Cyprus and Latvia (11%). Hungary (11%), Malta (11%), Romania (4%), Slovakia (5%).

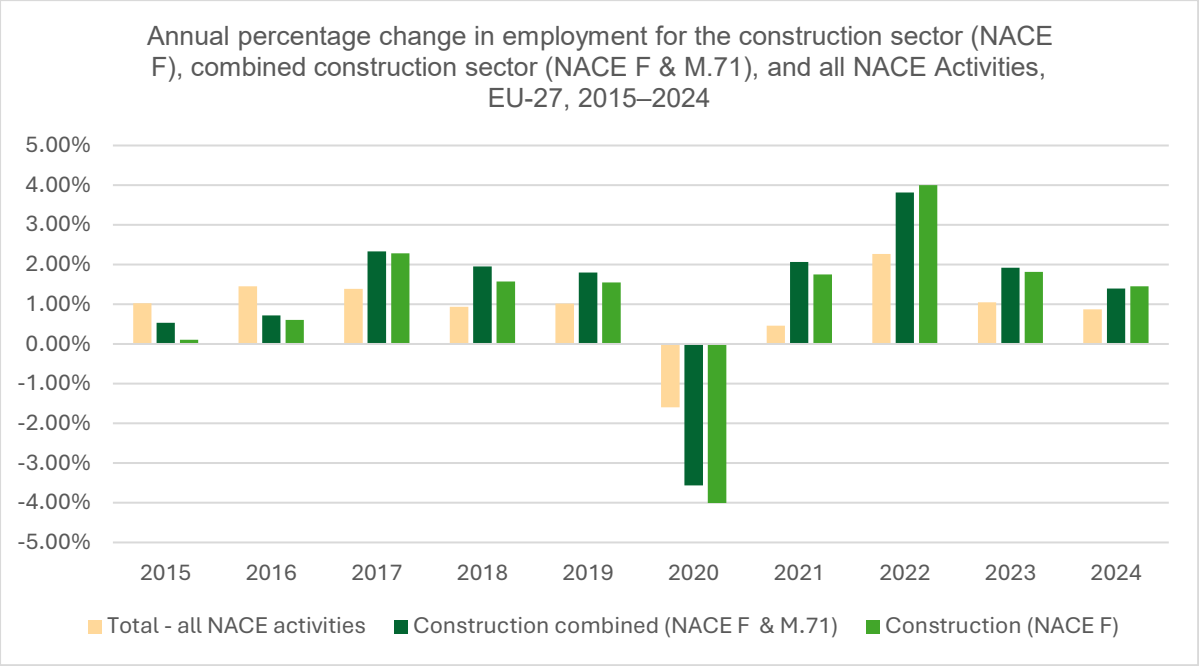
Figure 3: Share of workforce (all NACE activities) employed in the combined construction sector (NACE F and M.71) by EU Member State, 2024



Source: Eurostat employed persons by detailed *economic activity (NACE Rev. 2, two-digit level) (2008-2026) [lfsa_egan22d]*

As noted above, there was a significant decrease in employment in construction in both relative and absolute terms in 2020 in the context of COVID-19. In 2020, total employment in the construction sector declined by 4%, a reduction of 567,800 people in the workforce (Figure 4). Employment in the construction sector then returned the following year, rapidly growing by 2.1% in 2021, 3.8% in 2022, and 1.92% in 2023. However, annual growth in construction employment dropped back to 1.39% in 2024, which was the lowest level since 2016 but continued to exceed workforce growth across the whole economy (all NACE activities) (0.9%). Growth in construction employment was also strong in 2017, a 2.33% increase in the workforce and second only to the growth in 2023.

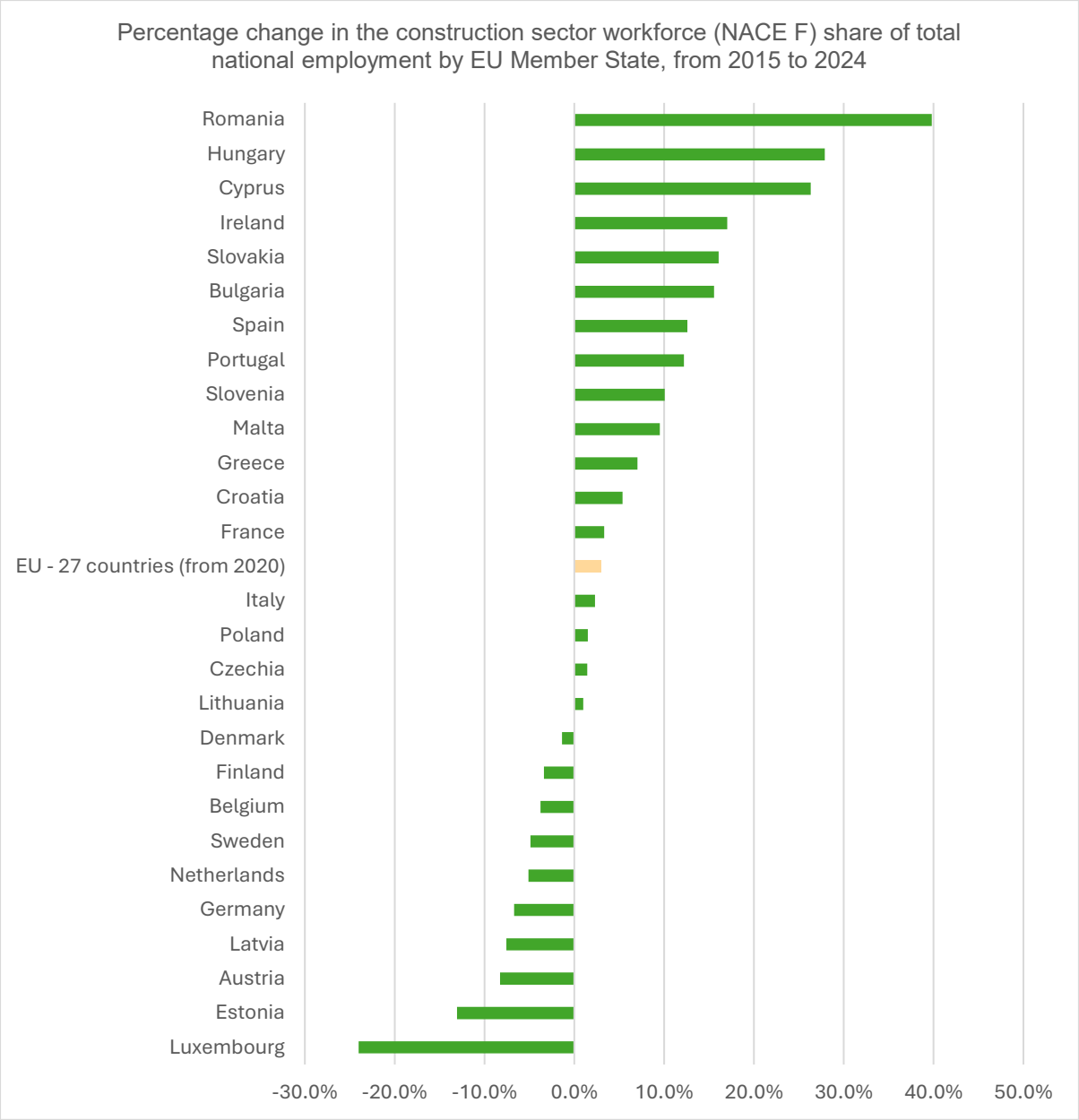
Figure 4: Annual percentage change in employment for the construction sector (NACE F), combined construction sector (NACE F & M.71), and all NACE Activities, EU-27, 2015–2024



Source: Eurostat Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d]

At the national level, there are differences in the relative growth of the construction sector (NACE F) as a share of the overall workforce in the 2015-2024 period (Figure 5). The largest relative growth in the construction sector workforce was in Romania, Hungary and Cyprus. In Romania, employment in construction grew from 7.7% to 10.8%, an increase of 3.1pp or 40%. In Hungary, employment in construction grew from 6.5% of the workforce to 8.3% of the workforce, a 1.8 percentage point (pp) increase, or 30% increase in share. In Cyprus, the sector grew from 7.2% to 9.1%, a 1.9pp increase or 26% increase in share. The largest drops in share were in Luxembourg. Estonia, Austria and Latvia. Luxembourg dropped from 5.8% to 4.4% of the workforce, Estonia from 10.3% to 8.9%, Austria from 8.5% to 7.8% and Latvia from 8.1% to 7.5%.

Figure 5: Percentage change in the construction sector workforce (NACE F) share of total national employment by EU Member State, from 2015 to 2024



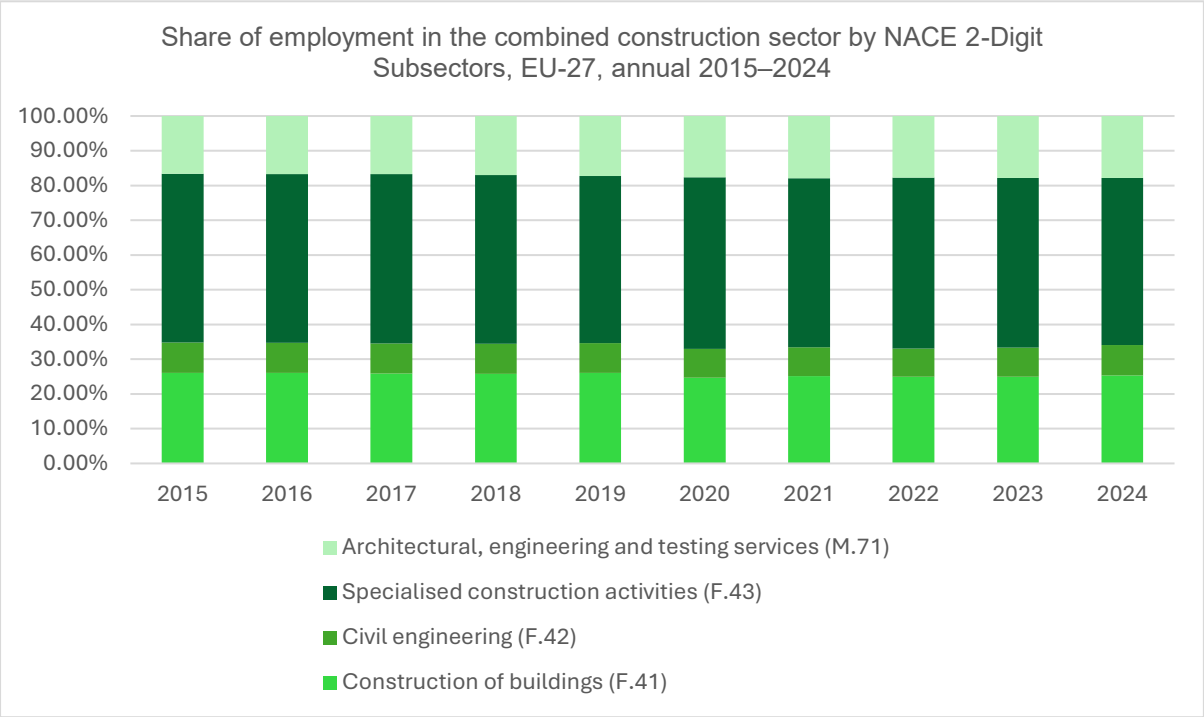
Source: Employed persons by economic activity (NACE Rev. 2) (2008-2026) [lfsa_egan2]

The composition of the construction sector has remained relatively stable over the last decade (Figure 6). Specialised construction activities (NACE F.43), including building renovation, remain the largest construction subsector. In 2024, it employed 8,094,800 workers, which represented 48% of employment in the combined construction sector. The next largest subsector continues to be construction of buildings (NACE F.41), which in 2024 employed 4,257,600 people, which represented 25% of the combined construction sector workforce. Civil engineering (NACE F.42) employed 1,477,00 people in 2024, which represented 9% of the combined construction sector.

Architectural, engineering and testing services (NACE M.71) employed 2,990,000 workers in 2024. This represented 17.8% of the combined construction sector workforce, up from 16.6% in 2015. Employment in the architectural, engineering and testing services (NACE M.71) subsector increased by 21% between 2015 and 2021, an additional 519,900 workers. The increase in employment in the architectural, engineering and testing sector since 2015 represents 27% of the additional 1,930,300

workers in the combined construction sector during the period. When looking only at employment in the construction sector, there has been an 11% employment growth since 2015 (rather than 13% for the combined sector). The number of people employed in the construction of buildings (NACE F.41) grew by 9.8% over the period, civil engineering (NACE F.42) by 12.9%, and specialised construction activities by 11.9% (NACE F.43).

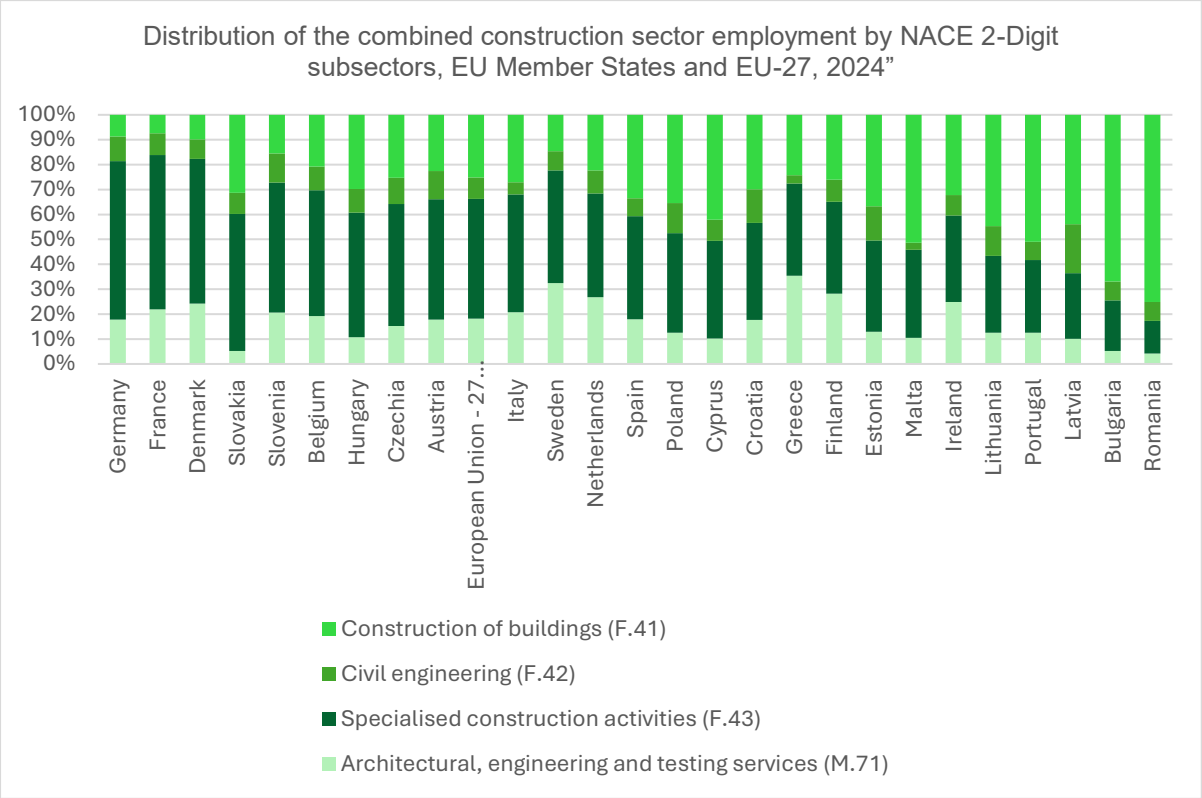
Figure 6: Share of employment in the combined construction sector by NACE 2-Digit Subsectors, EU-27, annual 2015–2024



Source: Eurostat Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d]

There is relatively wide variation at the national level in the composition of the combined construction sector (Figure 7). In most cases, the specialised construction activities sector is the largest. In certain countries, construction of buildings (NACE F.41) is the largest sector, as in Romania (75%), Bulgaria (67%), Malta (51%), Portugal (51%), Latvia (44%), Cyprus (42%), and Estonia (36%). Romania and Bulgaria also have the lowest share of architectural, engineering and testing services (4% and 5% respectively) and comparatively small specialised construction activities subsectors (13 and 20% respectively), whilst Malta (3%), Greece (3%) and Italy (5%) have the smallest shares of civil engineering (NACE F.42) employment.

Figure 7: Distribution of the combined construction sector employment by NACE 2-Digit subsectors, EU Member States and EU-27, 2024

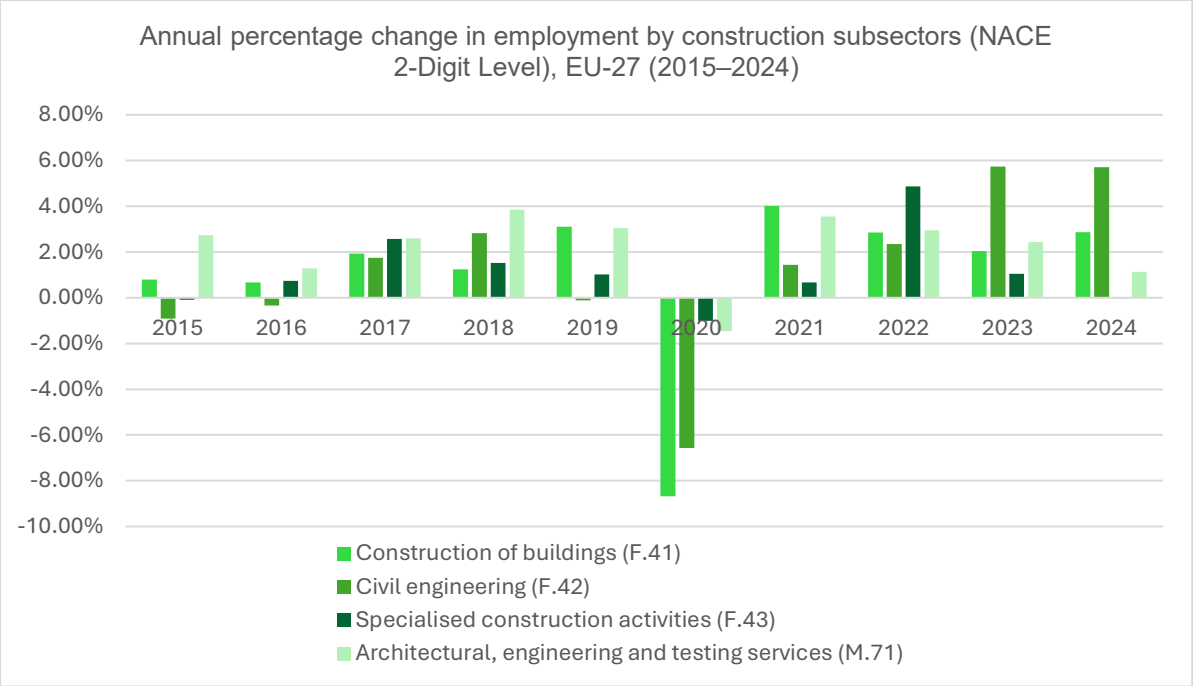


Source: Eurostat Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d][41]

Employment across all the construction subsectors was affected by COVID-19 to varying degrees (Figure 8). Construction of buildings (NACE F.41) and Civil engineering (NACE F.42) were the most significantly affected and accounted for 79% of the total drop in construction sector employment in 2020. Employment in the construction of buildings dropped by 8.7% (360,800) and 6.6% (89,500) for the civil engineering sector. Specialised construction activities (NACE F.43) declined by 1%, which represented a reduction of 77,000 workers, whilst architectural, engineering and testing services (NACE M.71) declined by 1.45% which represented a reduction of 39,900 workers. All subsectors returned to relatively strong employment growth in 2021 and 2022, with construction of buildings growing by 4% and architectural, engineering and testing services by 3.6% in 2021. In 2022, specialised construction activities grew by 4.9% and then civil engineering grew by 5.7% in both 2023 and 2024. Employment levels for all subsectors returned to within 97% of 2019 levels by 2022 (construction of buildings 98% and civil engineering 97%) and within100% by 2023.

[41] Data not available for Luxembourg.

Figure 8: Annual percentage change in employment by construction subsectors (NACE 2-Digit Level), EU-27 (2015–2024)



Source: Eurostat Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d]

Employment in specialised construction activities (NACE F.43) is the largest construction subsector and includes a range of economic activities that are associated with specific construction trades. This includes activities required for the construction of new buildings, energy-efficient renovation of existing buildings, such as plumbing and heating installation, electrical installation, and building finishing, including glazing, insulation and cladding. The most recent year where full data is available in relation to persons employed in more detailed economic codes is 2021 (Table 2). This shows that 43% of employment in specialised construction was in the installation sub-segments, including electrical and plumbing installations, with a total of 3,639,500 workers. Building completion and finishing accounted for 32% of employment in specialised construction (2,714,934 workers), whilst other activities, including roofing, accounted for 19% (1,584,295 workers).

Table 2: Employment in the specialised construction activities subsector (NACE F.43) and level 3 and 4 subsectors (2021)

Subsector	NACE code	Total employment (2021)	Share
Specialised construction activities (F.43)	**F.43**	**8,521,400**	**100%**
Demolition and site preparation (F.43.1)	F.43.1	582,676	6.8%
Electrical, plumbing and other construction installation activities	F.43.2	3,639,500	42.7%
Electrical installation	F.43.2.1	1,662,100	45.7%
Plumbing, heat and air-conditioning installation	F.43.2.2	1,478,793	40.6%
Other construction installation	F.43.2.9	498,608	13.7%

Building completion and finishing	**F.43.3**	**2,714,934**	**31.9%**
Plastering	F.43.3.1	270,000	9.9%
Joinery installation	F.43.3.2	781,086	28.8%
Floor and wall covering	F.43.3.3	466,170	17.2%
Painting and glazing	F.43.3.4	636,557	23.4%
Other building completion and finishing	F.43.3.9	565,000	20.8%
Other specialised construction activities	**F.43.9**	**1,584,295**	**18.6%**
Roofing activities	F.43.9.1	482,956	30.5%
Other specialised construction activities n.e.c.	F.43.9.9	1,101,338	69.5%

The growth in employment in the construction of buildings (NACE F.41) up to 2020 (Figure 8) suggests sustained demand for housing and commercial buildings. The slightly weaker relative growth in employment in the most recent years is likely linked to declines in investment in housebuilding in the context of increased interest rates and inflation. Within the construction of buildings subsector of the 3,451,503 employed in 2022, 3,088,767 were employed in the construction of residential and non-residential buildings (89% of the subsector), and 362,735 were employed in the development of building projects (11% of the subsector).

Employment growth in the civil engineering (NACE F.42) subsector (Figure 8) are in the context of increases in investment across Europe and continued expectations of strong growth in the sector. This includes continued investment in transport infrastructure, green transition projects, and financing from the EU Recovery and Resilience Facility.[42] In 2022 construction of roads and railways subsector employed 900,000 people, which represented 58% of the civil engineering segment, and an increase of 30,000 (3.6%) from the previous year (2021). Construction of utility projects for electricity and telecommunications was estimated to employ 450,000 in 2022, 16% of the civil engineering subsector.

The growth of employment in architectural, engineering and testing services (NACE M.71) relative to the construction sector (NACE F) (Figure 6) shows a rising demand for 'white-collar' professional skills in construction. This includes supporting the design and delivery of more sustainable and technologically complex projects that meet revised construction and environmental standards and incorporate new technologies and practices. In 2022, of the 3,127,211 people employed in architectural, engineering and testing services, 65% (2,027,585) were employed in the engineering services subsector (NACE 71.12), whilst 19% (608,073) were employed in the architectural services (NACE 71.11) subsector and 16% (491,556) in the technical testing and analysis subsector (71.20). According to the Architects Council of Europe, the turnover from Europe's architectural practices has grown by 30% since 2022 (2024 data). In 2024, architects' work was dedicated mainly to refurbishments (49%), followed by new build (40%), and heritage (11%). 2% of the architects' work is international.[43]

In terms of specific occupations (ISCO-08) with the construction sector (NACE F), most workers continue to be employed in skilled 'blue-collar' craft and related trades (Figure 9).[44] In 2024, 7,894,200

[42] Ibid
[43] Mirza & Nacey Research (2025). The Architectural Profession in Europe 2024 Sector Study (The Architects Council of Europe, Brussels). Retrieved 19.11.25 from https://ace-cae.eu/wp-content/uploads/2025/03/2024-ACE-Sector-Study-EN-01042025.pdf
[44] Occupations as defined in the International Standard Classification of Occupations (ISCO)

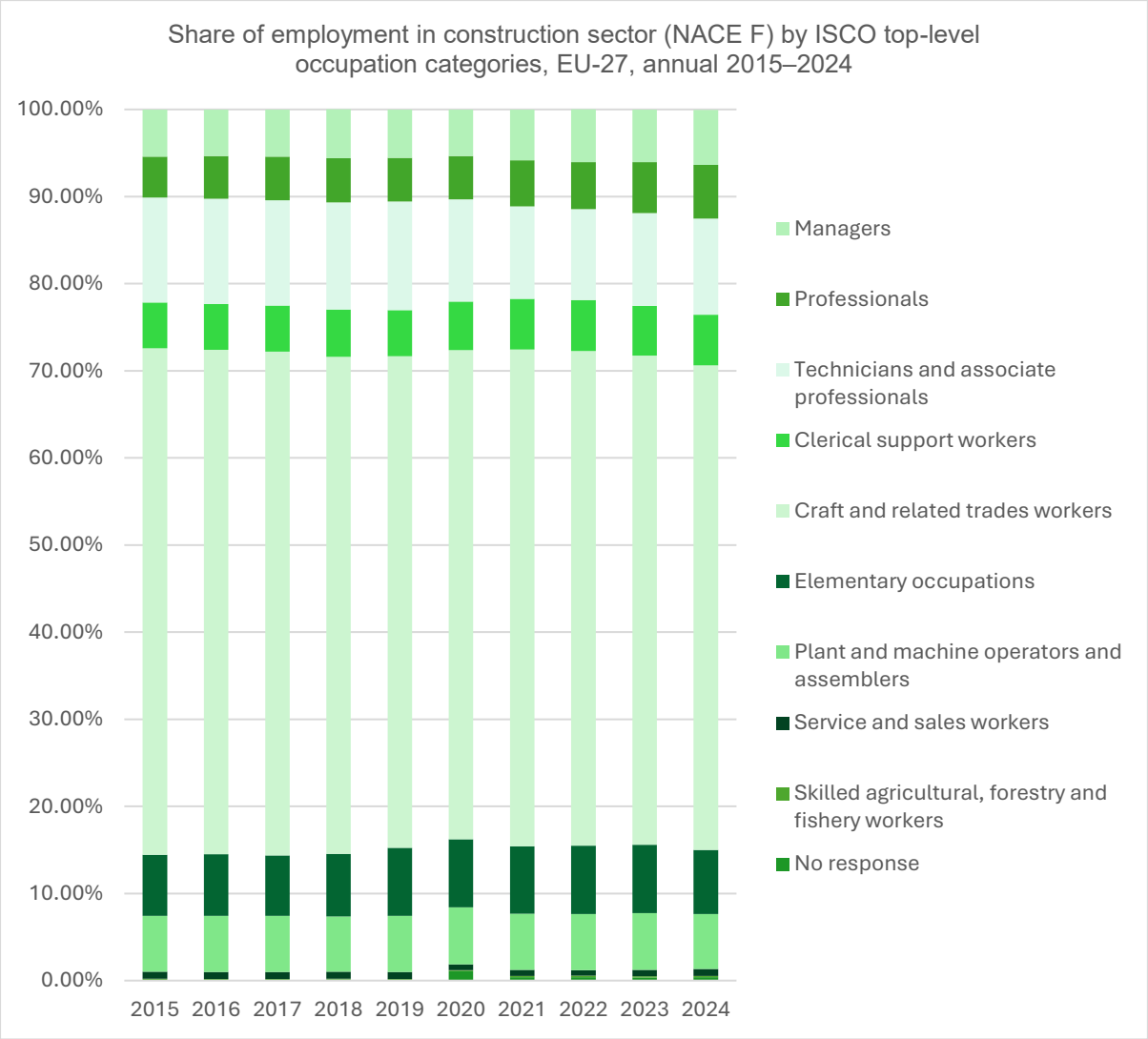
workers were employed in craft and related trades occupations, which represented 56% of the construction workforce. These occupations accounted for 35% of the total growth in construction employment between 2015 and 2024. Furthermore, the construction sector accounted for over a third of all craft and trades workers across all NACE activities (34%) and has increased in terms of share from 31.7% in 2015, Furthermore, the increase in construction sector trades occupations accounts for 564,400 of the total 74,500 additional workers in trades occupations across the whole economy (all NACE activities), equivalent to 758% of since 2015. In 2024, elementary occupations make up 7.4% (1,043,300 workers) of the construction sector workforce. Of other 'blue-collar' occupations, plant and machine operator occupations have remained relatively stable as a share of the sector, making up 6.3% of workers, a total of 895,700 workers, and down very slightly from 6.3% of the sector.

There has also been relative growth in the share of 'white-collar' occupations in the construction sector.[45] In 2024, 'Technicians and associated professionals' made up 11% of the construction sector (1,565,100 workers), which represented the second largest occupation group after craft and related trade workers, whilst occupations classified as 'Professionals' (874,400 workers) represented 6.2% of the workforce. Occupations classified as 'Professionals' have grown the most in terms of percentage increase, by 48%, 283,600 additional workers (and in the context of a 12.6% increase in construction sector employment overall), which represented an increase in share from 4.7% to 6.2%. The number of workers employed as 'Technicians and associate professionals' grew by 46,500 workers in this period, to a total of 1,565,100. Whilst this represented an increase of 3.1% over the as a share of the construction workforce, associate professional occupations declined from 12.1% to 11%. Nevertheless, the combined 'Professional' and 'Technicians and associate professionals' occupation categories have increased in share from 16.7% to 17.2% and accounted for 21% of employment growth in the construction sector between 2015 and 2024.

The number and share of people employed in both 'Management' and 'Clerical support' occupations in the construction sector (NACE F) have grown over the period. In 2024, managers made up 6.3% of workers (896,200 workers) in the construction sector, up from 5.4% in 2015. This represented an increase of 31.4%, or an additional 214,400 workers in management occupations over the period. At the same time share of clerical occupations in the sector has remained relatively stable, rising from 5.2% to 5.8% in 2024, an increase of 165,300 workers to a total of 825,800.

[45] In addition to the 'white-collar' roles associated with architecture and engineering and testing sector – NACE M.71 - noted above.

Figure 9: Share of employment in the construction sector (NACE F) by ISCO top-level occupation categories, EU-27, annual 2015–2024

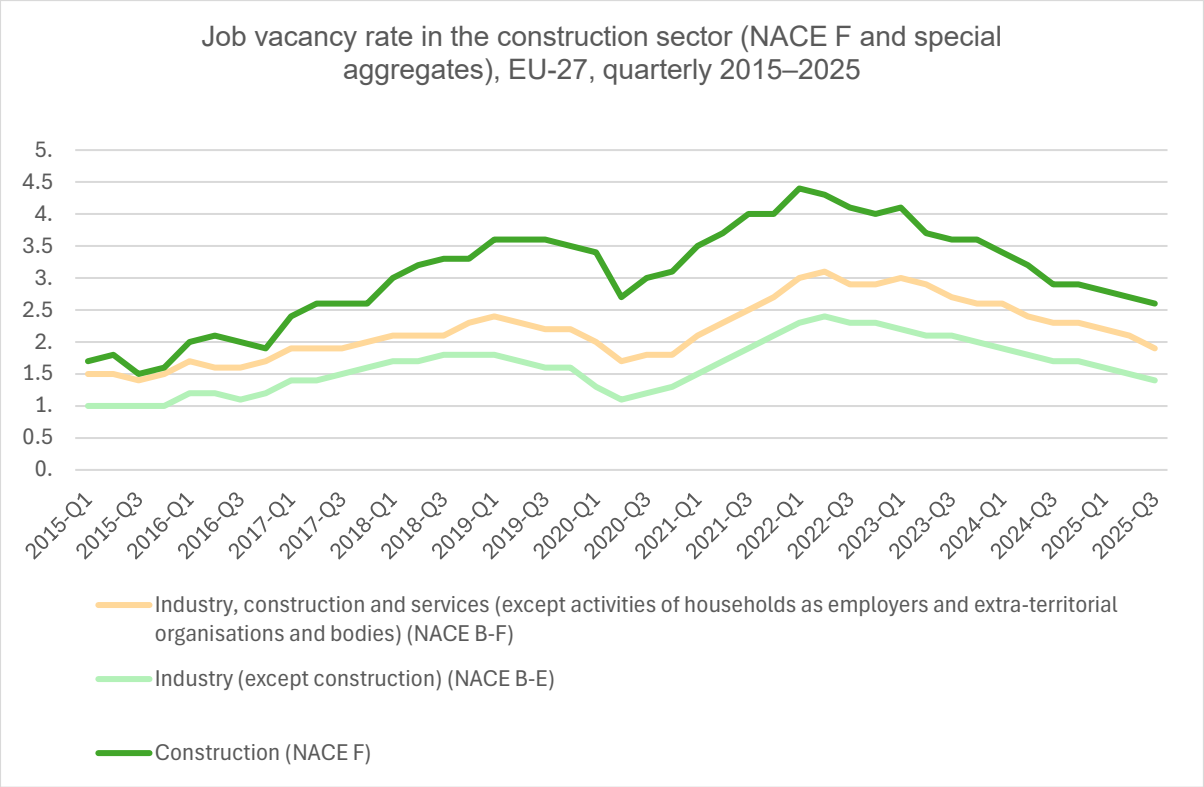


Source: Employed persons by occupation and economic activity (NACE Rev. 2) (2008-2026) [lfsa_eisn2]

The job vacancy rate[46] in the construction sector has steadily increased between 2015 and 2022, with a notable drop during 2020 in the context of COVID-19 (Figure 10). However, since the peak in the subsequent recovery, there has been a steady decline in vacancy rates. This has resulted in a 39% drop from the high of 4.4 in Q1 2022 to 2.7 in Q2 2025. As illustrated by Figure 10, vacancy rates are consistently higher in the construction sector (NACE F) in comparison to other parts of the economy, including other industrial sectors (excluding construction), and when including services sectors. Further 2023 Analysis by EURES of Business and Consumer Survey and Labour Force Survey suggests that whilst most sectors have experienced a similar trajectory in terms of employment, vacancies and shortages, shortages have been particularly acute in the construction sector.[47]

[46] When JVR = number of job vacancies / (number of occupied posts + number of job vacancies) x100). Higher rates indicate a larger proportion of unfilled positions.
[47] European Labour Authority (2024) EURES Report on labour shortages and surpluses 2023. Retrieved 19.11.25 from https://www.ela.europa.eu/sites/default/files/2024-05/EURES-Shortages_Report-V8.pdf

Figure 10: Job vacancy rate in the construction sector (NACE F and special aggregates), EU-27, quarterly 2015–2025



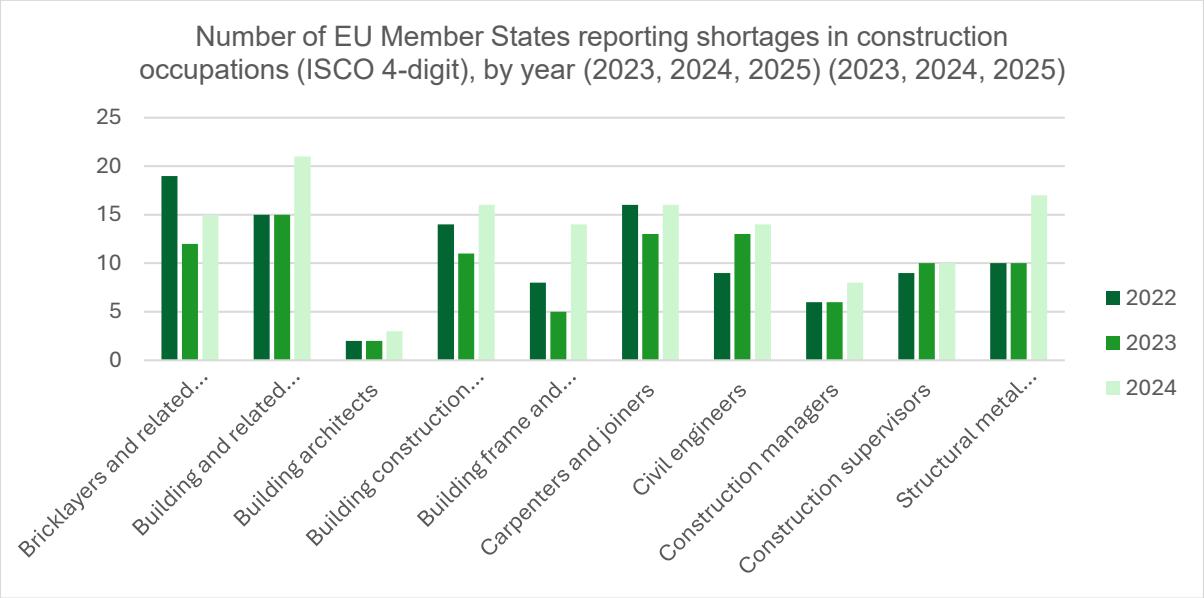
Source: Eurostat Job vacancy statistics by NACE Rev. 2 activity - quarterly data (from 2001 onwards) [jvs_q_nace2]

EURES data and analysis on labour shortages and surpluses also show evidence of ongoing and persistent shortages of workers for specific construction sector occupations (Figure 11).[48] Of selected construction sector occupations, there is evidence of shortages of labour across almost all 'blue-collar' occupations across the EU, including bricklayers and related workers, electricians, labourers, carpenters and joiners, and structural metal preparers. In addition, shortages for 'white-collar' occupations include construction supervisors and civil engineers. All Member States have reported at least one shortage occupation in the construction sector over the last five years.[49] The countries reporting 20 or more shortages combined across the three years of data were Belgium (total of 28 reports), France (24 reports), the Netherlands (21 reports), Slovenia (21 reports) and Germany (20 reports).

[48] Ibid and European Labour Authority (2025), EURES Report on labour shortages and surpluses 2024, Publications Office of the European Union, Luxembourg. Retrieved 19.11.25 from https://www.ela.europa.eu/sites/default/files/2025-06/EURES_Report_on_labour_shortages_and_surpluses_2024.pdf

[49] Reporting is at ISCO 4-digit level. A report does not quantify the extent of shortages. Severe shortage is equivalent to a shortage of a high magnitude, as defined by EURES National Coordination Offices (NCOs) for their national context. Data is based on data collected for European Labour Authority (2025), EURES report on labour shortages and surpluses 2024, which compiles administrative data from Public Employment Services (PES) and data from other sources as submitted by the EURES National Coordination Offices. Contributors used different methodologies and data sources available at national level. Member States may report both shortage and surplus for occupations in a year due to regional differences.

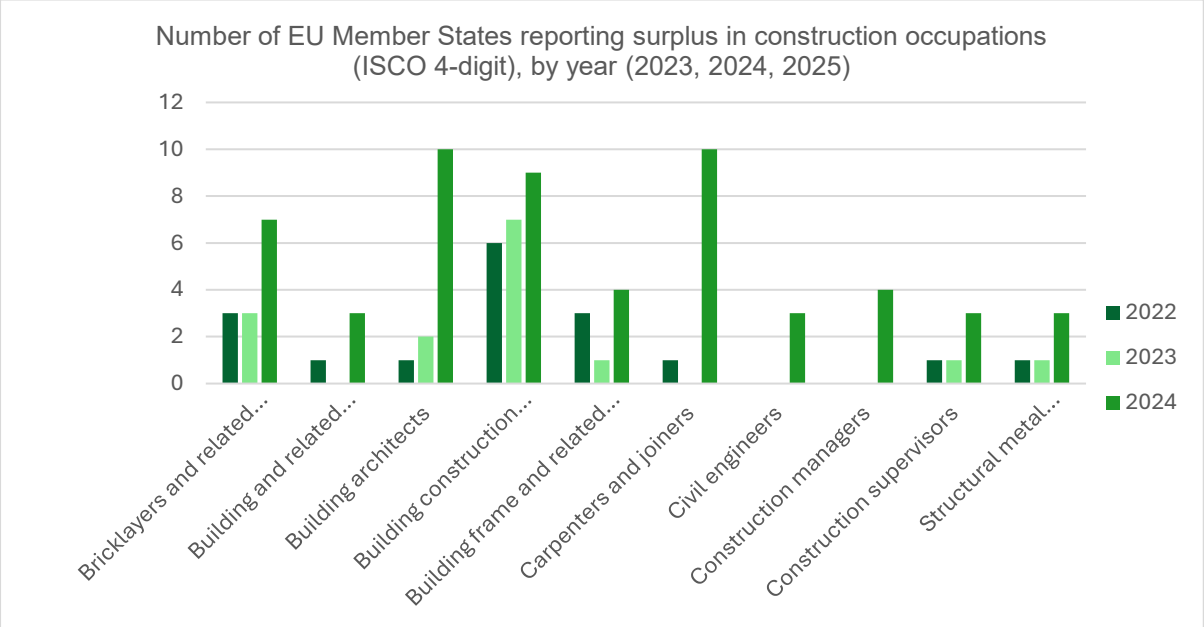
Figure 11: Number of EU Member States reporting shortages in construction occupations (ISCO 4-digit), by year (2023, 2024, 2025)



Source: European Labour Authority (2023, 2024, 2025), EURES Report on labour shortages and surpluses 2024, Publications Office of the European Union, Luxembourg

Some surpluses for construction sector occupations have also been reported over the past three years (Figure 12). In 2024, surpluses have been reported for building architects, building construction labourers, carpenters and joiners. Spain (10) and Portugal (8) reported the largest number of surplus occupations in 2024. Slovakia and Hungary reported a combined total of 9 and 8 surplus occupations, respectively, across the three years of data. Other countries that have reported surpluses in each of the three years of data were Denmark, Sweden, Lithuania and Slovenia.

Figure 12: Number of EU Member States reporting surplus in construction occupations (ISCO 4-digit), by year (2023, 2024, 2025)



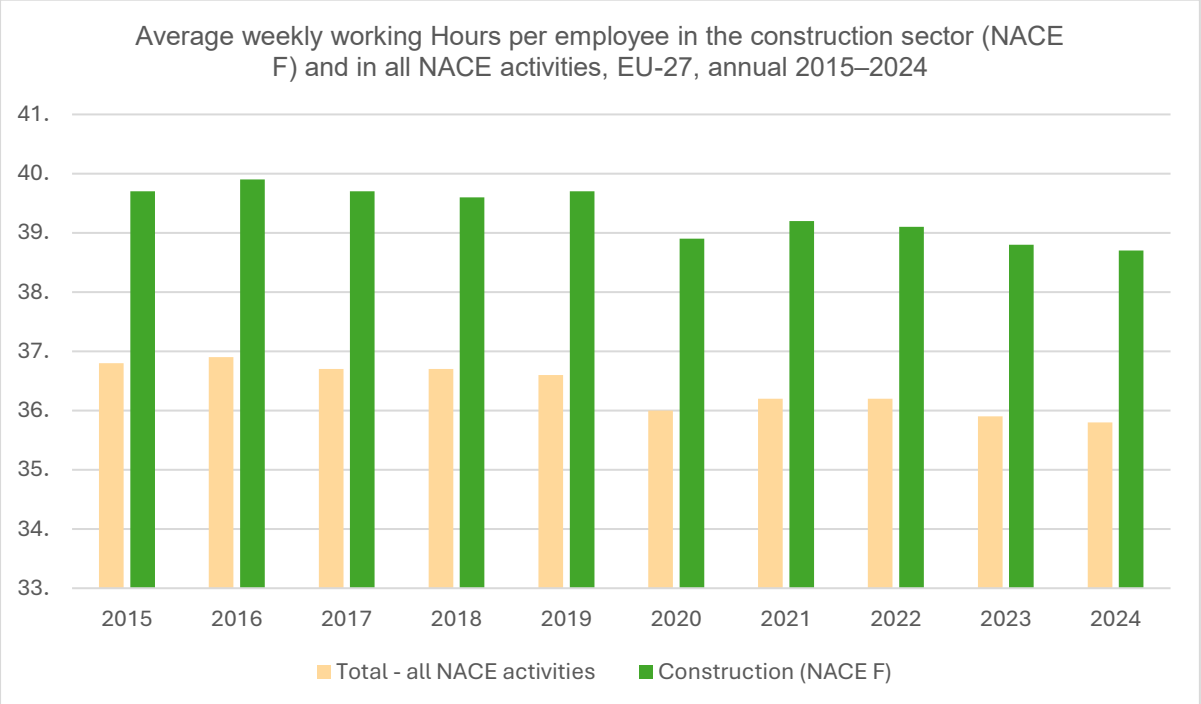
Source: European Labour Authority (2023, 2024, 2025), EURES Report on labour shortages and surpluses 2024, Publications Office of the European Union, Luxembourg

In the context of employment growth, the average of weekly hours worked in the EU construction sector has declined over the past decade (Figure 13). In 2024, the average hours worked in a week in construction (NACE F) were 2.5% lower than in 2015, 37.8 hours in comparison to 39.7. From 2015 to 2019, weekly hours hovered around 39.7 with a peak of 39.9 in 2017. This suggested a standard full-time workload with little variation, and no obvious indications of workforce bottlenecks at the sectoral level. Working hours then dropped by 2% in 2020, from 39.7 to 38.9 hours in the context of COVID-19. This represented a greater drop than for the whole economy (all NACE activities), which declined by 1.6%, from an average of 36.6 in 2019 to 36 in 2020.

Furthermore, average hours worked in construction have not returned to pre-2020 levels, increasing to 39.2 in 2021 but then declining each year to 38.7. However, these changes broadly reflect wider changes in working hours. During this period, working hours across the whole economy (all NACE activities) declined by 2.7% (from 36.8 to 35.8), average hours worked per week remain below pre-COVID levels and have further declined in 2023 and 2024. In this context, the average hours worked in construction have been relatively consistent at 108% of hours worked across the whole economy (all NACE activities) across the period. As with other economic sectors (NACE activities), self-employed workers in construction continue to report working on average 10% more hours than their employed counterparts.

Changes in hours worked and the timing of them are expected to increase. Workers in construction sites are among the most vulnerable to the effects of climate change and extreme weather events. According to the World Health Organization and the World Meteorological Organization, worker productivity drops by 2–3% for every degree above 20°C.[50] In addition, heatwaves can prevent the correct application and handling of construction products and materials, further affecting a worker's workday patterns and hours.

Figure 13: Average weekly working Hours per employee in the construction sector (NACE F) and in all NACE activities, EU-27, annual 2015–2024

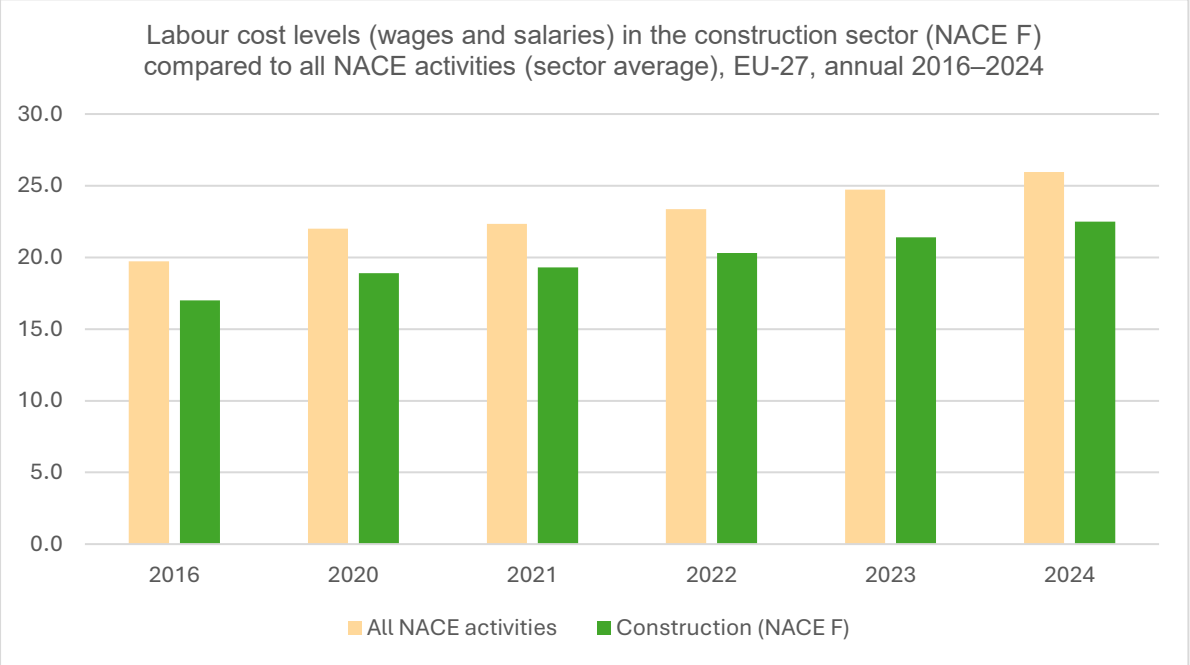


Source: Eurostat Average actual weekly hours worked and economic activity (NACE Rev. 2) (2008-2026) [lfsa_ewhan2]

[50] World Meteorological Organization (2025). Climate change and workplace heat stress. (WHO, Geneva) https://wmo.int/publication-series/climate-change-and-workplace-heat-stress

There is some evidence that average incomes in the sector have also strengthened relative to the wider economy (Figure 14). Labour cost levels track equivalised labour costs. This index suggests that the average labour cost in terms of wages and salaries (total) for construction has increased from 17 in 2016 to 22.5 in 2024 and has consistently remained between 86% and 87% of the average for the whole economy (all NACE activities) during this period. When compared to selected economic sectors (NACE activities), the picture is more mixed. For example, the relative cost of wages and salaries in comparison to mining has declined from 99% in 2016 to 90% in 2024, but has remained the same relative to manufacturing (87% and 88%).

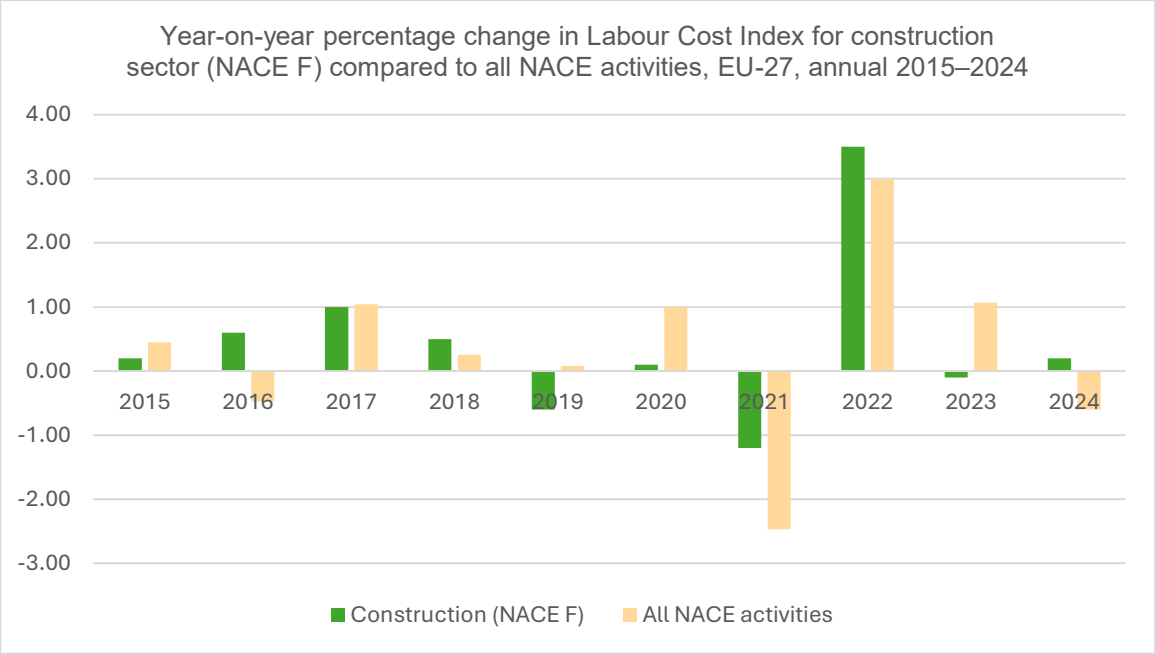
Figure 14: Labour cost levels (wages and salaries) in the construction sector (NACE F) compared to all NACE activities (sector average), EU-27, annual 2016–2024



Source: Eurostat Labour cost levels by NACE Rev. 2 activity [lc_lci_lev]

Annual changes in wages and salaries each year are monitored by the labour cost index. In the construction sector (NACE F), from 2015 to 2024, the costs index for salaries and wages has increased year on year at an average of 3.35, and a median annual change of 3 (Figure 15). The range of annual changes in construction (standard deviation of 1.4) is slightly lower than in the whole economy (all NACE activities) during the period (standard deviation of 1.6). Across the period, the two years with the lowest rate of growth were 2019, which followed two years of relatively strong growth in 2017 and 2018 (3% and 3.5% respectively) and 2021 in the context of COVID-19. However, whilst growth in construction wages was down in 2021, it remained stronger than in the whole economy (all NACE activities). This was then followed by strong year on year growth across 2022 to 2024 of an average of 5.3%, which compares to the average year on year growth of 2.6 from 2015 to 2020.

Figure 15: Year-on-year percentage change in Labour Cost Index for construction sector (NACE F) compared to all NACE activities, EU-27, annual 2015–2024



Source: Labour cost index by NACE Rev. 2 activity - nominal value, annual data [lc_lci_r2]

During this period, there has also been a relative decline in labour productivity in the construction sector (Figure 16). In the construction sector, labour productivity per person in 2024 was 89.4 when compared to 2015, a decrease of 10.6%. By comparison, productivity in the 'industry' special aggregate (NACE B-E) increased by 5% to 105 when compared to 2015, whilst professional, scientific and technical (which is inclusive of architectural, engineering and testing services) increased by 10% to 110 (2023 data). Much of the relative decline in construction productivity has been observed since 2019 (9.8% drop) when productivity dropped from the high of 101 in 2018 to 99 in 2019 and then has declined each year since, except for 2021.

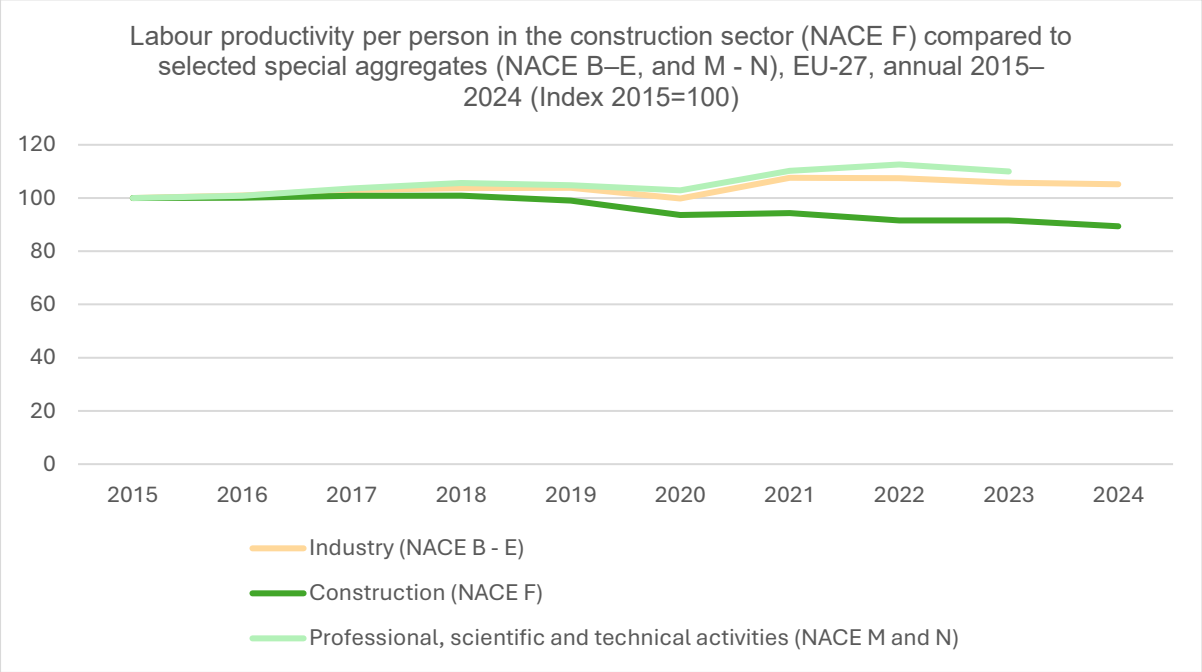
There are likely to be several factors that have influenced productivity decline, including diversity between national economies.[51] One of the most significant and consistently reported factors is the availability of a skilled construction workforce and supply bottlenecks. For example, the 2023 and 2024 RICS Construction Productivity reports highlighted the importance of a skilled workforce to productivity in the European construction sector, alongside the quality of site supervision and coordination.[52] Other potential factors that have also been noted in relation to productivity trends at the European and global level since 2020 include:

- The pandemic, including disruptions to site working along with disruptions in global supply chains, as well as energy price increases from 2021, which were aggravated by the Russian war in Ukraine.[53]

[51] OECD (2025) OECD Compendium of Productivity Indicators 2025 (OECD Publishing, Paris). Retrieved 19.11.25 from: https://doi.org/10.1787/b024d9e1-en. https://doi.org/10.1787/b024d9e1-en
[52] RICS (2024) Construction productivity report 2024 https://www.rics.org/news-insights/rics-construction-productivity-report-2024 and RICS (2023) Construction productivity report 2023 https://www.rics.org/news-insights/rics-construction-productivity-report-2023
[53] Dias da Silva, A. Fabrizio, A. and Mohr, M. (2024) *Recent country-specific and sectoral developments in labour productivity in the euro area*. ECB Economic Bulletin, Issue 5/2024. Retrieved 19.11.25 from https://www.ecb.europa.eu/press/economic-bulletin/focus/2024/html/ecb.ebbox202405_02~d69d7cac99.en.html

- Poor profitability due to increases in material and labour costs, as well as increased interest rates and associated increases in the cost of development and construction financing.[54]
- More limited adoption and impacts of digital tools to support productivity in construction, with a greater emphasis on control of processes and risk, in comparison to other sectors.[55]
- Structural factors, including the complexity, diversity and time-sensitive nature of projects in competitive sectors with high degrees of subcontracting, limit scope for productivity gains between projects.[56]

Figure 16: Labour productivity per person in the construction sector (NACE F) compared to selected special aggregates (NACE B–E, and M - N), EU-27, annual 2015–2024 (Index 2015=100)



Source: Eurostat Labour productivity and unit labour costs by industry (NACE Rev.2) [nama_10_lp_a21]

[54] Moral, M.J. (2025) Weakness in overall construction sector profitability: Low productivity exacerbated by labour shortages. Funcas SEFO Vol. 14, No. 1_January 2025. Retrieved 19.11.25 from https://www.funcas.es/wp-content/uploads/2025/02/Moral-14-1-1.pdf; Van Sante, M (2025). Growth Returns to Europe's construction sector. (ING). Retrieved 19.11.25 from https://think.ing.com/articles/returning-but-low-growth-expected-in-the-european-construction-sector/#a2; and Tostevin, P (2025) Financing, costs and skills: how can construction rise to the challenge? In Impacts the future of global real estate (Issue 8). Retrieved 19.11.25 from https://impacts.savills.com/market-trends/financing-costs-and-skills-how-can-construction-rise-to-the-challenge.html

[55] Sawhney, A and Knight, A. (2024) Digitalisation in construction report 2024 (RICS, London) retrieved 19.11.25 from https://www.rics.org/content/dam/ricsglobal/documents/research/Digitalisation-in-construction-report-2024.pdf . See also Eurofound (2025a), Building on growth potential: Preparing the construction sector for the twin transitions (Publications Office of the European Union, Luxembourg). Retrieved 11.12.25 from https://www.eurofound.europa.eu/en/publications/all/building-on-growth-potential-preparing-the-construction-sector-for-the-twin-transitions

[56] Mischke, J. Stokvis, K. and Vermeltfoot, K. (2024) Delivering on construction productivity is no longer optional (McKinsey & Company) Retrieved 19.11.25 from https://www.mckinsey.com/capabilities/operations/our-insights/delivering-on-construction-productivity-is-no-longer-optional#/

2.2. Employee demographics

The following subsections present an analysis of the demographics of the construction workforce, including composition by age, gender, and migration/mobility. Improving the attractiveness of construction careers for women and young people was highlighted by the Construction Blueprint 'Roadmap and Action Plan' under Strategic Line 5 (Social) '*Make the construction industry more attractive'*.[57] Recommended measures included improving the image and inclusiveness of construction careers for youngsters, women, and migrants.

The Blueprint identified several initiatives implemented by the construction sector and authorities at the EU and national levels. This included measures to support skills development and qualification recognition for target groups,[58] awareness raising amongst students at secondary and higher education,[59] and career outreach initiatives.[60] Other recommended measures included measures to improve work-life balance, gender inclusive recruitment and female role models.

2.2.1. Age of construction workforce

The analysis on Construction Employment by Age Group (2015–2024) shows that older age groups are making up a larger share of the combined construction workforce (including architectural, engineering and testing services) (Figure 17). The share of workers aged 50 to 64 increased from a share of 27% of the workforce to 31%, whilst the share of workers over 65 increased from 2% of the workforce to 3%. There was, however, also an increase in younger workers (15 to 24), from 7.1% to 7.6%. In line with these trends, the share of workers aged 25 to 49, which makes up the largest part of the workforce, declined from 64.1% of the workforce in 2015 to 58.3% in 2024.

The growing share of workers from 50 to 64 also accounted for 60% of the total workforce growth across this period. Whilst the 15 to 24 and 25 to 49 age groups accounted for 11% and 18% of the total workforce growth, respectively. The trends broadly reflect wider population trends towards increased participation in the workforce among those aged 50 and above, for example workforce aged 50 to 64 accounted for 32% of all workers and accounted for 69% of the workforce growth during this period.[61]

[57] Construction Blueprint (2022) Status quo and sectoral skills strategy: roadmap and action plan. Retrieved 19.11.25 from https://constructionblueprint.eu/wp-content/uploads/2020/02/D4.-Roadmap-and-Action-Plan.pdf

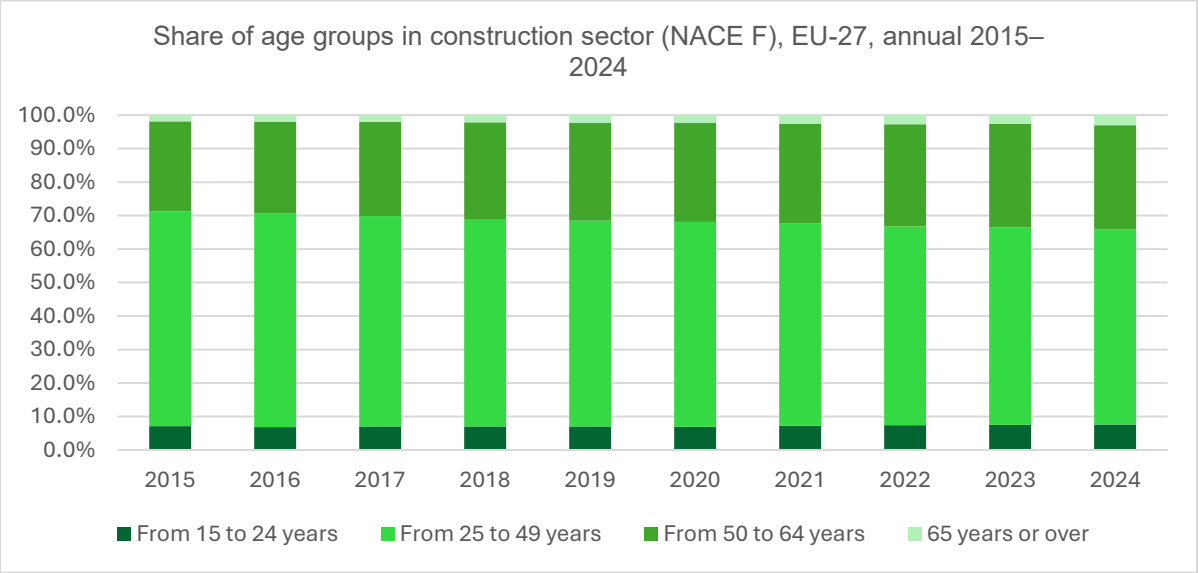
[58] See: 'EU: Passport for work': https://constructionblueprint.eu/2023/03/31/eu-passport-for-work/

[59] See: 'Slovenia: Exhibition of construction machinery': https://constructionblueprint.eu/2023/03/30/slovenia-exhibition-of-construction-machinery/ and 'Slovenian: How strong is the bridge?': https://constructionblueprint.eu/2023/03/30/slovenian-how-strong-is-the-bridge/

[60] See: 'Les experts CAPEB': https://constructionblueprint.eu/2022/12/16/eu-a-french-member-of-the-ebc-launches-a-web-series-les-experts-capeb/ and 'Nous Construisons Demain' https://constructionblueprint.eu/2022/12/16/eu-ebc-participates-in-the-campaign-nous-construisons-demain/

[61] The wider EU workforce has also undergone demographic shifts over the past decade, with a notable rise in the share of older workers. Employment among those aged 65 and over more than doubled from 3.6 million in 2013 to 6.1 million in 2023, increasing their workforce share from 1.9% to 3.0%. Younger workers aged 15–24 have seen a slight rise in employment, from 14.4 million to 16.6 million, maintaining a stable share of around 7.8–8.0%. Meanwhile, the core working-age group (25–49 years) has seen its share decline from 62.8% to 57.2%, with employment levels remaining relatively flat. In contrast, the 50–64 age group grew both in number and share, from 50.9 million (27.4%) to 65.4 million (31.8%). Overall, the ageing of the EU labour force is evident, with older cohorts taking on a larger role.

Figure 17: Share of age groups in the construction sector (NACE F), EU-27, annual 2015–2024



Source: Eurostat Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d]

When looking at figures for the construction sector (NACE F, excluding architectural, engineering and testing services), the trend toward an ageing workforce is both more pronounced and exceeds broader trends in the EU workforce. In the construction sector, workers aged 50 to 64 accounted for 32% of the workforce in 2024. However, this group grew by 33% over the period from 2015 and accounted for 72% of the additional 1.59 million workers in the construction sector. Furthermore, the number of workers aged over 65 increased from 1.4% to 2.6%, which represented an increase of 101%.

Whilst the 25 to 49 age group remains the largest group by far, accounting for 57% of the workforce, it grew at a relatively lower rate over the period (resulting in the declining overall share of the construction workforce). This group increased by only 1% over the (in the context of total construction workforce growth of 13%), which (due to the size of this group) accounted for 5% of the total growth in the construction workforce. The size of the construction workforce aged 15 to 24 grew by 19% between 2015 and 2024 and accounted for 12% of the total increase in the size of the construction workforce. This slightly exceeded the general EU trend, which saw a 15% growth in workers in this age group, but which also accounted for 12% of workforce growth during this period.

The growing role of older workers is further pronounced in the construction of buildings (NACE F.41) and specialised construction activities (NACE F.43). In both subsectors, the growth of the group of workers aged 50 to 54 have exceeded the sector and wider EU workforce trends. For example, workers aged between 40 and 64 in specialised construction activities increased by 35%, which accounted for 60% of the growth of workers in this age group in the construction sector. Similarly, the share of workers aged 50 to 64 engaged in the construction of buildings grew by 33% and accounted for 31% of the growth of workers in this age group in specialised construction activities. By contrast, in civil engineering (NACE F.42), which is a smaller subsector in any case (accounting for 11% of the construction sector), the 50 to 64 age group grew by 24%, whilst in contrast, the 15- to 24-year-old age group increased from a share of 5.8% to 7% of this subsector.

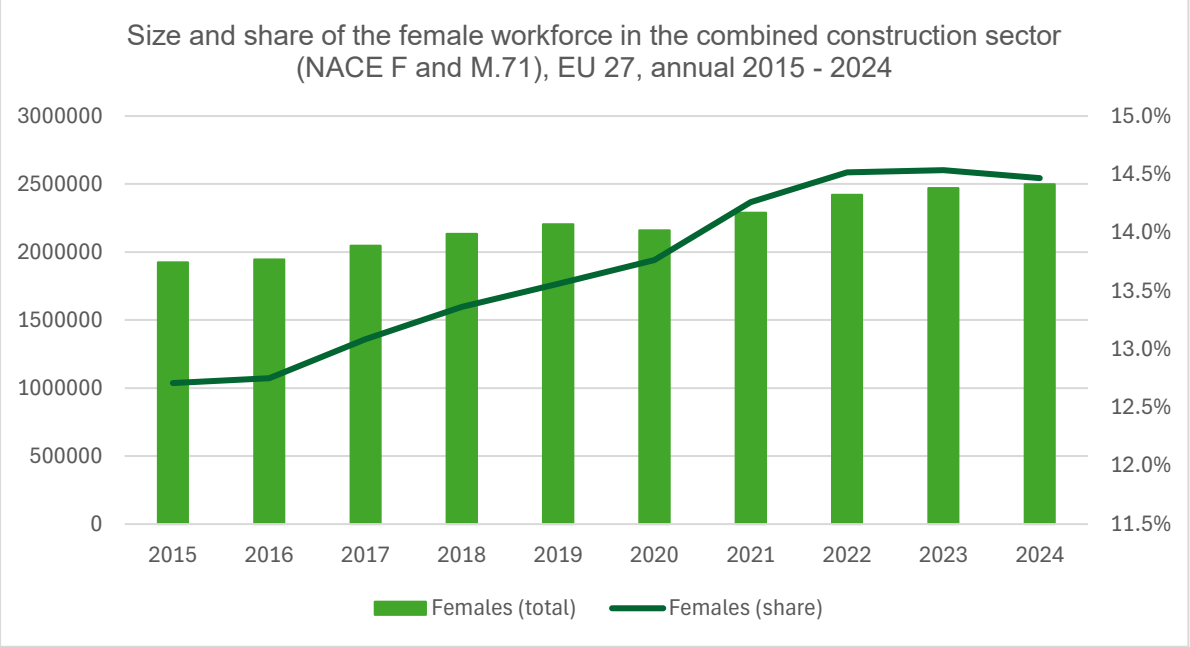
The growing share of older workers from 50 to 64, as well as the increases of those over 65, suggests a large pool of older workers who are staying in construction longer. Factors include later retirement ages and potential improvements in conditions that enable extended work life. For example, Eurofound analysis suggests that employees over 55 in the construction sector do feel empowered in their work but consider themselves to have relatively low rates of career prospects in comparison to younger workers in the sector (and in comparison to other economic sectors) whilst also feeling their work is

high risk which is likely due to physical demands and risks, and work intensity.[62] Some of the recent increases in the 15 to 24 age group are in line with the wider employment trends for youth and may point to improved youth recruitment efforts and vocational training initiatives. However, whilst the employment of those 25 to 49 remains high in terms of overall share, the declining proportion signals demographic shifts, alongside lower retention, and possibly fewer mid-career entrants into the sector.

2.2.2. Women in the construction workforce

In terms of gender split, the sector remains characterised by a low share of female workers. The total female workforce in the combined construction sector has increased from 1.925,100 in 2015 to 2,499,600 in 2024 (Figure 18). This represents an increase of 574,500 female workers in the combined construction sector, a 30% increase in total. In the combined sector (inclusive of architectural, engineering and testing services), female employment as a share the workforce has increased from 12.7% in 2015 to 14.5% in 2024, a 14% increase in share. However, the growth of the female workforce in the combined construction sector, in both absolute terms and relative terms, has plateaued slightly in recent years. For example, the total female workforce grew by 5.1% in 2017 and 4.2% in 2018, which equated to an increase in share by 2.6% and 2.1% respectively, and an increase in share of 6.7% between 2015 and 2019. In contrast, in 2023 and 2024, the total female workforce grew by 2% and then 1.2%, which represented 0.1% increase and then a 0.5% decrease in the share of the workforce, and an increase in the share of 1.4% between 2021 and 2024.

Figure 18: Size and share of the female workforce in the combined construction sector (NACE F and M.71), EU 27, annual 2015 - 2024

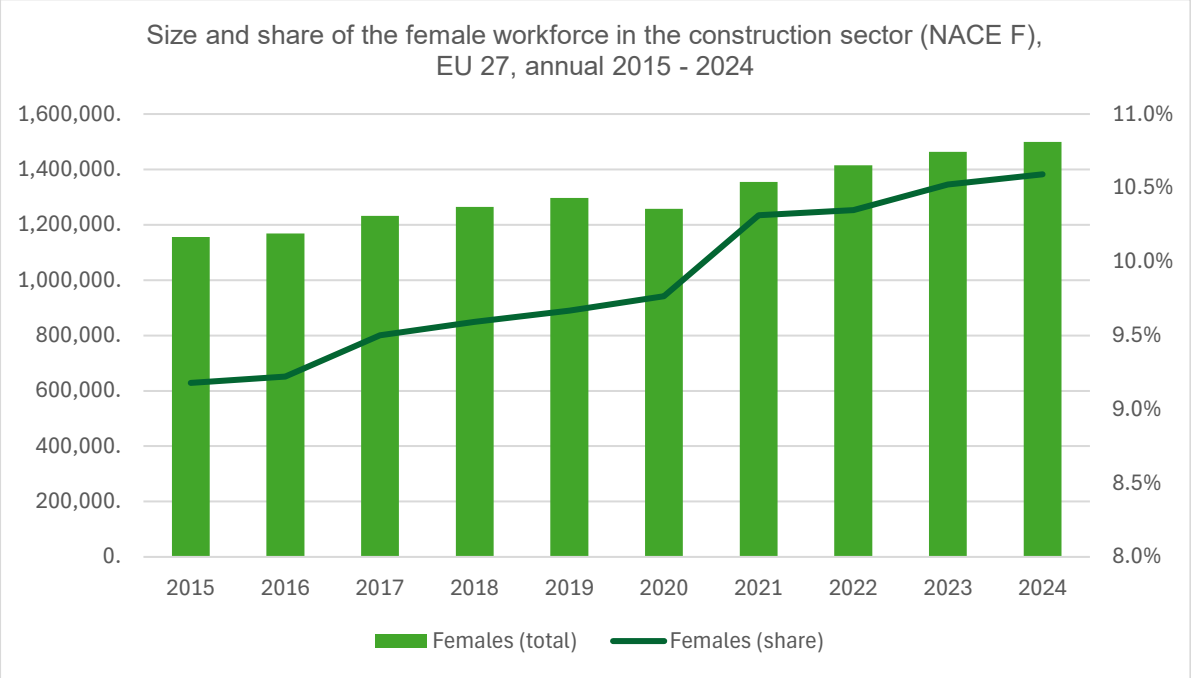


Source: Eurostat Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d]

[62] Eurofound (2025b), Keeping older workers in the labour force (Publications Office of the European Union, Luxembourg). Retrieved 19.11.25 from https://www.eurofound.europa.eu/en/publications/all/keeping-older-workers-labour-force. See also research that has focused on the potential link between an ageing workforce and potential health and safety impacts, such as Ranasinghe, U. et al (2023) A systematic review on workplace health and safety of ageing construction workers, in Safety Science, Volume 167. Retrieved 19.11.25 from https://doi.org/10.1016/j.ssci.2023.106276 and Schwatka NV, Butler LM, Rosecrance JR. (2011) An aging workforce and injury in the construction industry. Epidemiol Rev. 2012;34:156-67. Retrived 19.11.25 from https://doi.org/10.1093/epirev/mxr020

In the construction sector (NACE F only), growth in female employment has exceeded the general increases in female employment in the period, but from a very low base (Figure 19).[63] Female employment in the construction sector rose from 1.15 million in 2015 to 1.5 million in 2025, a 30% increase, and now makes up 11% of the workforce, up from 9.2% of the workforce in 2015. The largest increase in the share of the female workforce in the construction workforce was from 2020 to 2021, where the share of women in the sector grew from 9.8% to 10.3%. However, the share of women in the sector remains relatively low and accounted for 22% of the sector's total growth in workforce over the full period.

Figure 19: Size and share of the female workforce in the construction sector (NACE F), EU-27, annual 2015 - 2024



Source: Eurostat Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d]

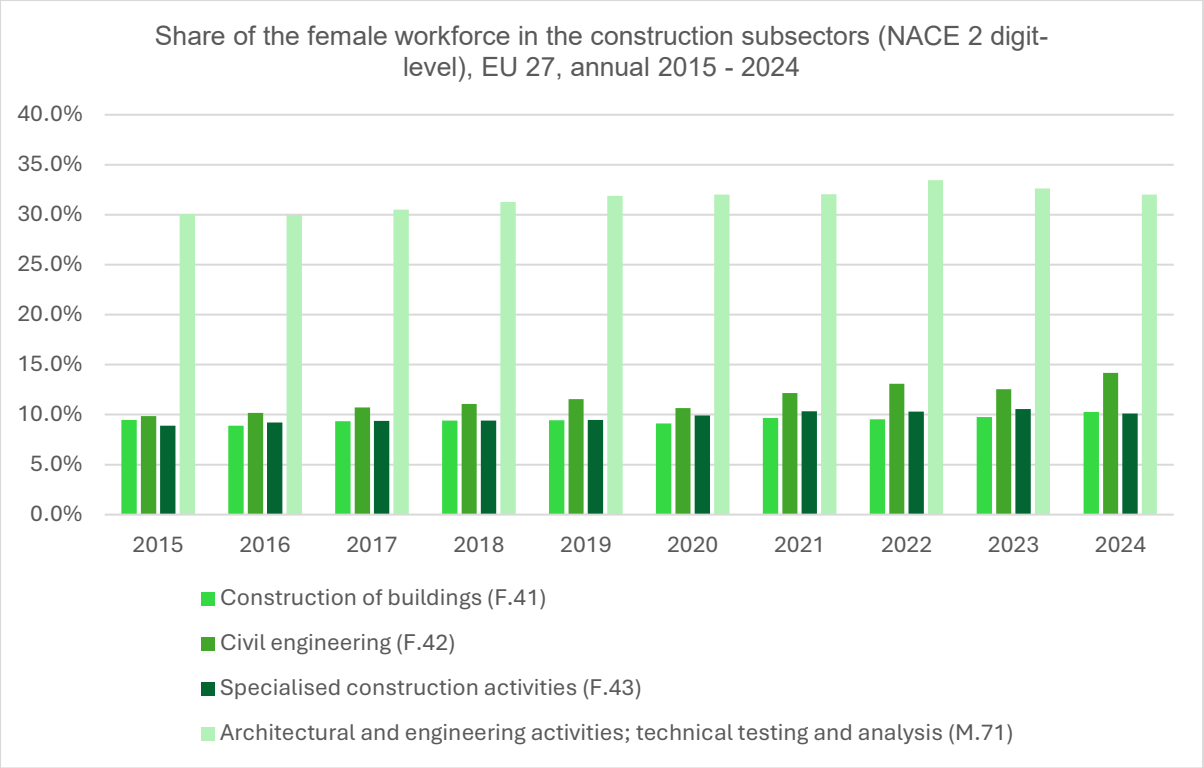
In terms of subsectors, female workers continue to be a minority across all subsectors, but with a larger share in architectural, engineering and testing services (NACE M.71) and, to a lesser extent, civil engineering (NACE F.42) subsectors (Figure 20). However, even 'white-collar' professions contain important challenges for women, with the pay gap in architectural, engineering and testing services standing in 22% in 2024, only slightly lower that 24% in 2014.[64] Female workers make up just over 10% in both the construction of buildings (NACE F.41) and specialised construction activities (NACE F.43) segments (10.3% and 10.1% respectively. The share in both subsectors has increased from 9.5% and

[63] Across the whole economy (all NACE activities), both female and male employment has increased, though men retain larger portion of the workforce. However, the proportion of the workforce that is women has increased steadily. Female employment rose from 84.7 million in 2013 to 95.3 million in 2023, a 12.5% increase. This reflects an increase in proportion of total employment from 45.7% to 46.4%. Employment steadily increased across the whole period under examination though with a slight decline between 2019 and 2020, likely reflective of the COVID pandemic. The most significant annual jump occurred between 2021 and 2022 (with an increase of 1.5 million). Male employment increased from 100.7 million in 2013 to 110.3 million in 2023, a 9.5% rise. This reflects a decrease in proportion of total employment from 54.3% to 53.6%.

[64] Mirza & Nacey Research (2025). The Architectural Profession in Europe 2024 Sector Study (The Architects Council of Europe, Brussels). Retrieved 19.11.25 from https://ace-cae.eu/wp-content/uploads/2025/03/2024-ACE-Sector-Study-EN-01042025.pdf

8.9% in 2015. The largest growth in the share of female workers was in the civil engineering (NACE F.42) subsector, which has increased from 9.8% in 2015 to 14.2% in 2024. The share of female workers in the workforce in architectural, engineering and testing services (NACE M.71) was much higher with 30.1% in 2015, and 32% in 2024. The age structure of the female workforce in construction is slightly different to the male workforce in construction. The share of female employees aged 15 to 24 was 6% in 2024 (compared 8% of the male workforce), whilst the share of women aged 25 to 49 was 63% (compared to 58% of the male workforce).

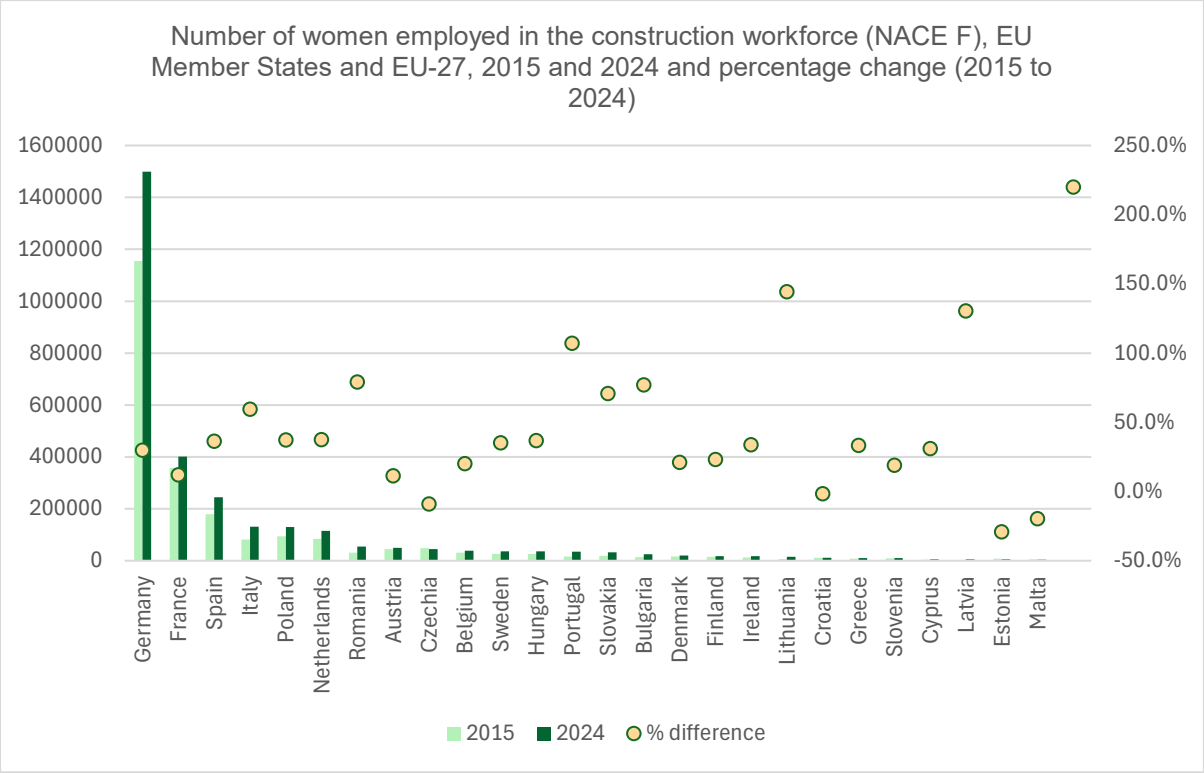
Figure 20: Share of the female workforce in the construction subsectors (NACE 2-digit level), EU-27, annual 2015 - 2024



Source: Eurostat Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) [lfsa_egan22d]

At the national level, consistent data is only available for the construction sector (NACE F, i.e. top-level data). The size of the female workforce in construction is largely a function of the size of the overall sector. Germany employs the most women in construction (400,000) in 2024, followed by France (244,100), Spain (130,800), Italy (299,900) and Poland (115,400) (Figure 21). As a share of women in the total workforce, the EU average is 1.5%. In terms of changes in the number of women employed in construction, the largest increases between 2015 and 2024 in employment of women in construction were in Malta (220% increase from 500 to 1,600), Ireland (144%, 6100 to 14,900) and Hungary (107%, 16900 to 35,000). There were reductions in employment of women in construction in four countries: Austria (-9%, 49,000 to 44,600), Estonia (29.2%, 5,100 to 4,100), Latvia (-19.6%, 7,200 to 5,100), and Lithuania (1.7%, 11,700 to 11,500).

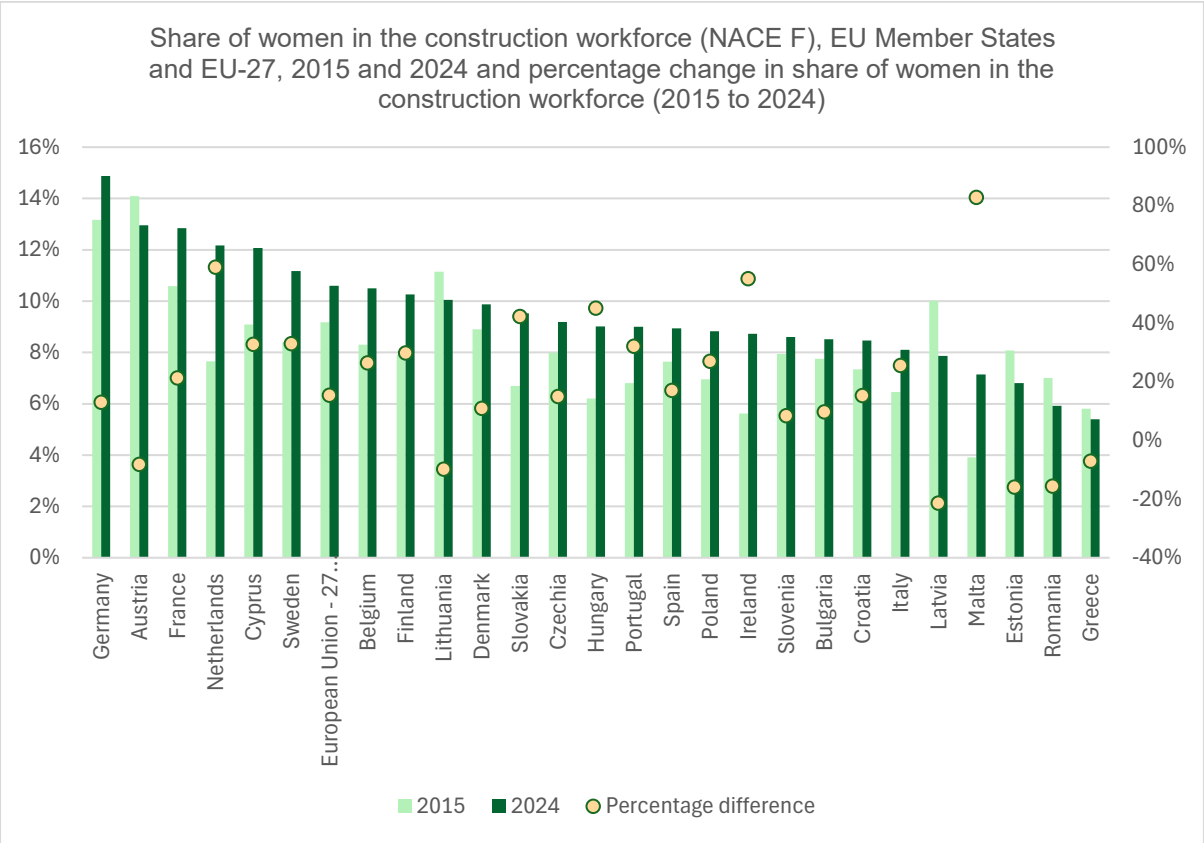
Figure 21: Number of women employed in the construction workforce (NACE F), EU Member States and EU-27, 2015 and 2024 and percentage change (2015 to 2024)



Source: Eurostat Employed persons by economic activity (NACE Rev. 2) (2008-2026) [lfsa_egan2]

Where there was a decline in the total number of women employed in construction (NACE F), there has also been a reduction in the share of female employment in the construction sector (Figure 22). Latvia (-21%), Estonia (-16%), Lithuania (-10%), and Austria (-8%) all had lower shares of women in the construction sector in 2025. In addition, Romania (-15.5%) and Greece (-7%) also had reduced shares of women employed in the construction sector in 2025. In terms of increases, countries with the largest percentage increase in women in the construction workforce from 2015 to 2025 were Malta (83% increase), the Netherlands (60% increase), Ireland (55% increase), Hungary (45%), and Slovakia (42%).

Figure 22: Share of women in the construction workforce (NACE F), EU Member States and EU-27, 2015 and 2024 and percentage change in share of women in the construction workforce (2015 to 2024)



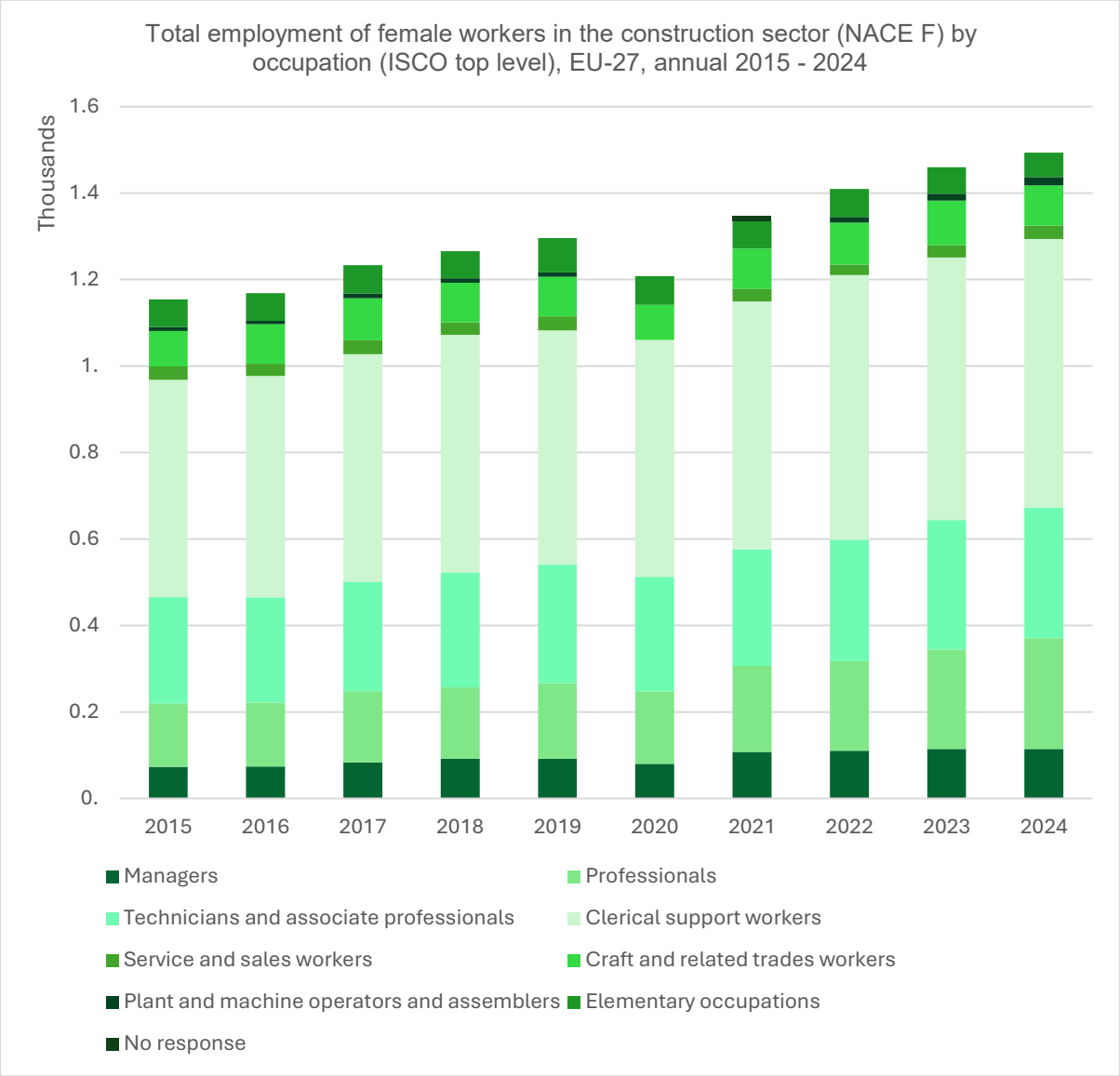
Source: Eurostat Employed persons by economic activity (NACE Rev. 2) (2008-2026) [lfsa_egan2]

In terms of occupations (ISCO top-level occupations employed in the construction sector NACE F), women continue to be employed predominantly as 'Clerical support workers', 'Technicians and professional occupations' (Figure 23). In 2024, in the construction sector:

- 301,200 women were employed as 'Clerical support workers', which represented 41% of women employed in construction.
- 201,200 women were employed in 'Technicians and associate professionals', which accounted for 20% of all women employed in construction.
- 256,600 women were employed in 'Professional' occupations, which represented 17% of all women employed in construction.

After 'Clerical and support workers', female employment grew the most in 'Professional' occupations over the period, a total increase of 110,600 (76% increase over the period) and which accounted for 32% of the total increase in female employment. Women in occupations classified as 'managerial' accounted for 8% of female workers, a total of 114,200 in 2024 and increased by 56% over the period. 6%, (92,800) of female workers in construction were employed in craft-related occupations, which represented 0.7% of the total employment in 'Craft and related trade' occupations in the construction sector.

Figure 23: Total employment of female workers in the construction sector (NACE F) by occupation (ISCO top level), EU-27, annual 2015 - 2024



Source: Eurostat Employed persons by occupation and economic activity (NACE Rev. 2) (2008-2026) [lfsa_eisn2]

2.2.3. Migrant workers in the construction workforce

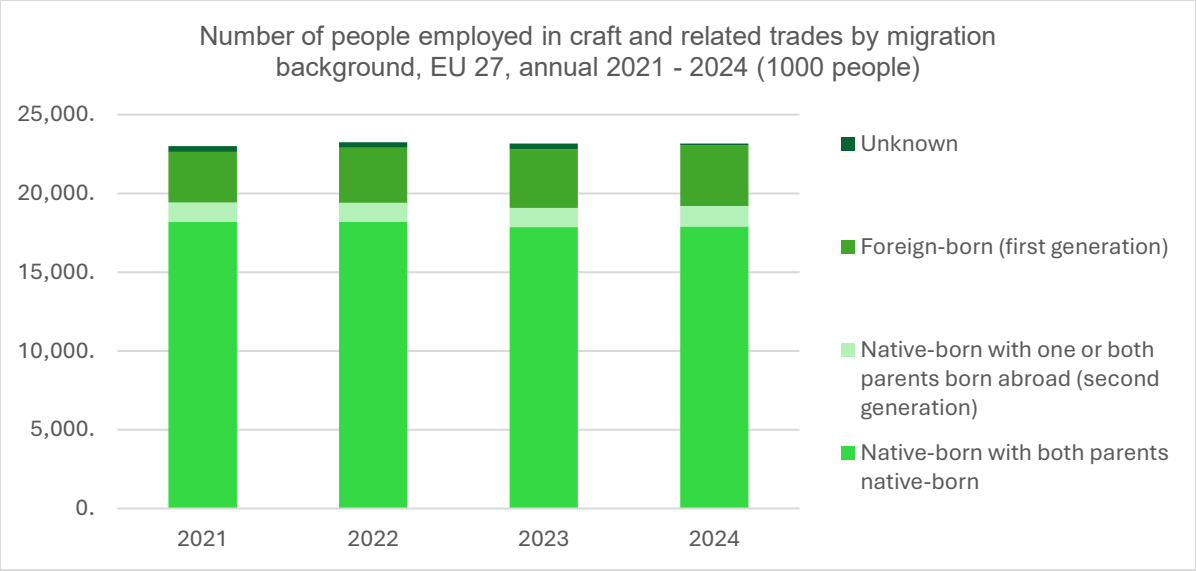
Employment in construction has also historically been characterised by high levels of migrant labour, including intra-European and international. Migration data is only available on top-level occupation codes (ISCO), rather than the construction sector. When looking at people employed in craft and related trades (of which construction trades are a significant element) employment remains predominantly the native-born with both parents native-born, but with a gradual decline in both absolute and relative terms, from 17,919.8 in 2021 to 17,901,600 in 2024 (with a slight increase from 2023), which represented a decrease in share from 79% to 77% (Figure 24). In contrast, the foreign-born (first generation) workers have increased in absolute and relative terms, from 3,206,200 workers in 2021 to 3,866 workers in 2024 and now account for 17% of workers.[65] The second-generation groups – both native-born with one

[65] There are relatively high rates of undeclared work in the construction sector. Lower prices for consumers are the main driver of undeclared work. Other contributing factors may include exclusion

parent born abroad and those with both parents born abroad – remain relatively stable in terms of employment numbers and proportions and now account for 5.6% of the workforce. In contrast, for the whole workforce in 2024, first-generation foreign-born workers accounted for 4.3% of the European workforce, whilst 7.3% of the workforce were second generation (i.e. native born but with one or both parents born abroad).

It is important to acknowledge that ELA identifies construction as one of the main sectors that employ immigrants without contracts and legal salaries, along with agriculture and hospitality.[66] It is estimated that 1 in 5 undeclared jobs in the EU are found in construction.[67] Higher presence of shadow employment is found in low to medium-specialisation roles.[68]

Figure 24: Number of people employed in craft and related trades by migration background, EU 27, annual 2021 - 2024 (1000 people)



Source: Employed persons by migration status, occupation and educational attainment level [lfsa_egaisedm]

Analysis of posted workers has highlighted the significance of mobility of construction workers and services within the European Union.[69] Analysis for the European Labour Authority showed that in 2021,

or restrictions to right to work and shadow employment. See for example European Labour Authority (2023b) Undeclared work in the construction sector Learning resource paper from seminar 16 May 2023, Bratislava and online available at https://www.ela.europa.eu/sites/default/files/2023-12/UDW-learning-paper_undeclared-work-construction-sector.pdf

[66] Stefanov., R. et al (2021) Different forms of cross-border undeclared work, including through third-country nationals (European Labour Authority). Retrieved 11.12.25 from https://www.ela.europa.eu/sites/default/files/2022-01/Study-report-on-different-forms-of-cross-border-UDW.2021_EN.pdf

[67] Williams, C (2020) Tackling Undeclared Work in the Construction Industry: Policy Report (European Federation of Building and Woodworkers). Retrieved 19.11.25 from https://ssrn.com/abstract=3556596. See also European Construction Industry Federation (2020) Tackling undeclared work in the construction industry: Toolkit. Retrieved 19.11.25 from https://www.fiec.eu/application/files/8016/0127/8404/2020_-_TUWIC_Toolkit__EN__low_res.pdf

[68] van Nierop, P, Schönenberg, L, Terziev, P (2021) Counteracting undeclared work and labour exploitation of third country national workers (European Platform tackling undeclared work). Retrieved 19.11.25 from https://www.ela.europa.eu/sites/default/files/2023-12/counteracting-undeclared-work-labour-exploitation-third-country-national-workers.pdf

[69] De Wispelaere F, De Smedt L. & Pacolet, J. (2022), Posted workers in the European Union. Facts and figures. Leuven: POSTING.STAT project VS/2020/0499. Retrieved 19.11.25 from https://www.euro.centre.org/downloads/detail/4467

around one in four portable documents A1 (PDs A1) issued were granted for services in the EU construction sector.[70] This amounts to an approximate estimate of 833,000 PDs A1 issued. 2025 analysis of 2023 data suggests that this shared had increased to 28% of posted persons, and potentially up to 50.5% of postings reported in the prior declaration tools.[71]

The 2021 analysis[72] Germany was the primary receiving country for posted workers in the EU construction sector, followed by Belgium, France, Austria and the Netherlands. The report estimated that posted workers in the Belgian construction sector made up 17% of the workforce. In terms of sending countries, Poland was the main sending country, followed by Denmark, Slovenia, Slovakia, and Portugal. Slovenian postings of workers were equivalent to 52% of employment in the Slovenian construction sector in 2021. The more recent 2025 analysis highlighted that the impact of posting of workers in the construction sector was high for several Member States, particularly in France (data 2022), Austria, the Netherlands, Denmark, and Sweden.

A 2022 analysis by De Wispelaere et al[73] also examined export and import of construction services as a potential proxy for patterns of posting of workers. Whilst not a perfect proxy, the patterns do suggest a more nuanced picture than being majority (or exclusively) from Eastern European Member States, whilst also highlighting the regional dimensions of exports and posting of workers. When analysing 2023 data[74] 30,884.3 million euros of construction services exports by EU-27 countries. Of 63% were intra-EU-27 (EUR 19,571.7 million) and the remaining 37% extra-EU (EUR 11,312.6 million). The largest exporters of construction services were the Netherlands, Belgium, Germany and Ireland. There is also a similar pattern for the importing of services, with the largest being Denmark, the Netherlands, Belgium, Germany and France. Those countries that are net exporters are Poland, Denmark, Romania, Portugal and Spain. The countries with the largest export sector relative to imports were Romania, Lithuania, Estonia, Portugal and Greece.

In practice, construction remains predominantly a domestic activity, with 90% of firms, typically SMEs, providing construction services only locally. Reasons for low-level integration of construction services include, among others, the high number of regulated professions in the sector and complex mutual recognition of professional qualifications, certificates and proof of competence.

[70] European Labour Authority (2023a) Construction sector: Issues in information provision, enforcement of labour mobility law, social security coordination regulations, and cooperation between Member States: ELA Strategic Analysis (Publications Office of the European Union, Luxembourg). Retrieved 19.11.25 from https://www.ela.europa.eu/sites/default/files/2023-09/ELA_construction-sector-report-2023.pdf

[71] European Commission: Directorate-General for Employment, Social Affairs and Inclusion (2025), Posting of workers – Collection of data from the prior declaration tools – Reference year 2023 (Publications Office of the European Union, 2025). Retrieved 15.12.25 from *https://data.europa.eu/doi/10.2767/1766399*

[72] European Labour Authority (2023a) Construction sector: Issues in information provision, enforcement of labour mobility law, social security coordination regulations, and cooperation between Member States: ELA Strategic Analysis (Publications Office of the European Union, Luxembourg).

[73] De Wispelaere F, De Smedt L. & Pacolet, J. (2022), Posted workers in the European Union. Facts and figures. Leuven: POSTING.STAT project VS/2020/0499. Retrieved 19.11.25 from https://www.euro.centre.org/downloads/detail/4467

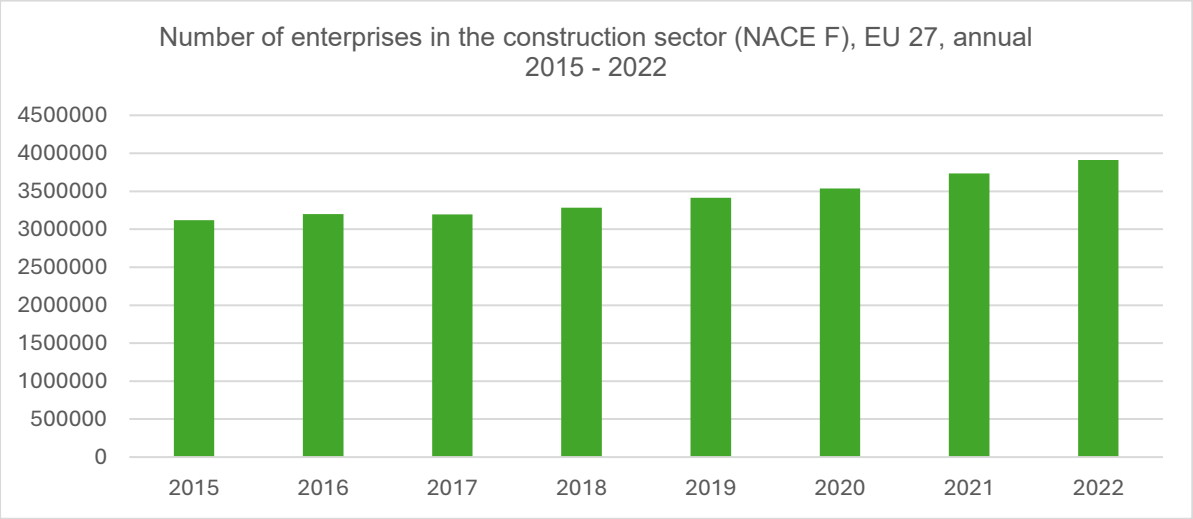
[74] Eurostat International trade in services (since 2010) [BOP_ITS6_DET] https://doi.org/10.2908/BOP_ITS6_DET

2.3. Construction enterprise demographics

The construction sector continues to be characterised by an increasing number and share of small and micro-enterprises. Subcontracting and supply chain arrangements are a long-standing characteristic of the sector. Payments for subcontracting are estimated to make up over a fifth of the total turnover in the construction sector, rising to over a third for the construction of buildings (NACE F.41) subsector.[75] Subcontracting is acknowledged as a core element of the sector, which enables labour flexibility, including contracting of relevant trades and associated skills required for construction projects. At the same time, micro-enterprises can also have fewer resources to support ongoing professional development, whilst long subcontracting chains can also reduce the need or incentives for companies to support re- and upskilling in their own workforce.[76]

Data on the enterprises in the construction sector (NACE F) in the European Union (27 countries) from 2015 to 2022 shows a clear upward trend in the total number of enterprises overall, reflecting growth in the sector (Figure 25). Starting at 3,118,683 enterprises in 2015, there has been steady growth each year to a total of 3,910,992 in 2022, an increase of 25%. The two years with declines in the number of enterprises in this data were the first year, where there was a decline of 1.8% from 2014 to 2017, when the number of enterprises decreased by 0.1%. Notably, there was strong growth in the number of enterprises before, during and after the disruption associated with COVID-19, with growth of 4% in 2019, 3.6% in 2020 and then 5.6% and 4.8% in 2021 and 2022.

Figure 25: Number of enterprises in the construction sector (NACE F), EU 27, annual 2015 - 2022



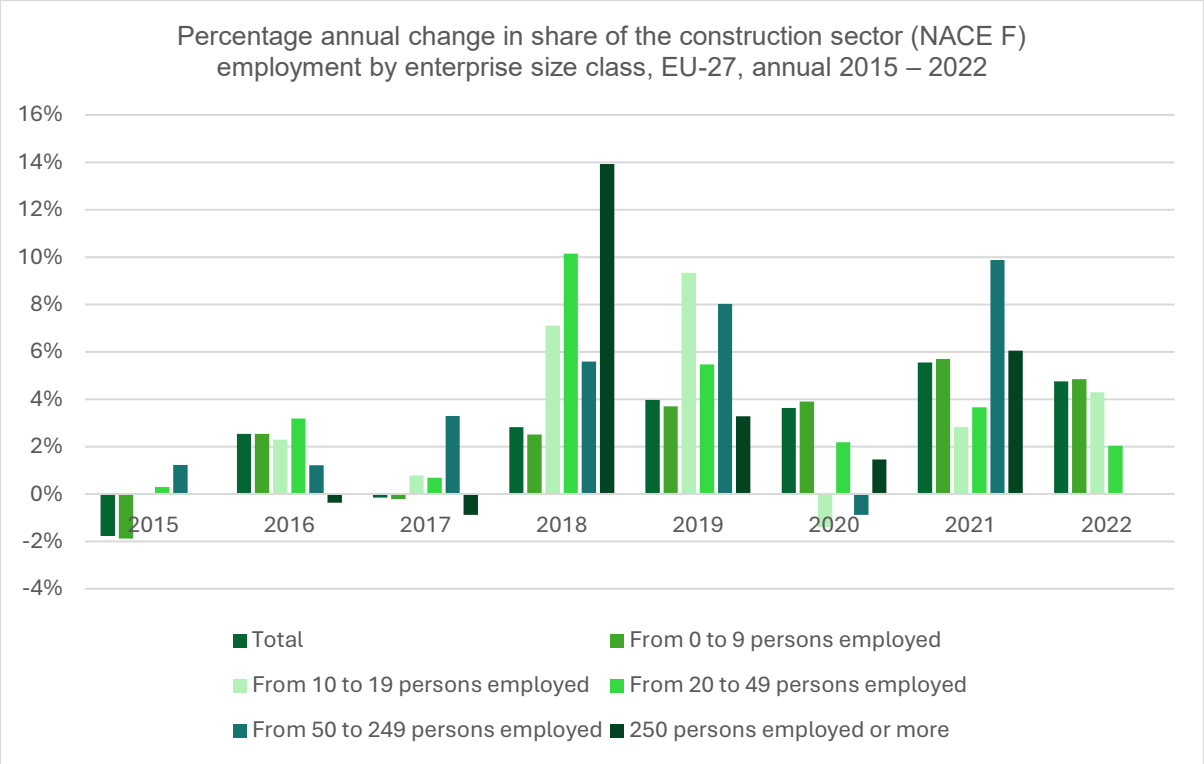
Source: Eurostat Annual enterprise statistics by size class for special aggregates of NACE Rev.2 activities (2005-2020) [sbs_sc_sca_r2] and Enterprise statistics by size class and NACE Rev. 2 activity (from 2021 onwards) [sbs_sc_ovw]

[75] De Wispelaere F, De Smedt L. & Pacolet, J. (2022), Posted workers in the European Union. Facts and figures. Leuven: POSTING.STAT project VS/2020/0499. Retrieved 19.11.25 from https://www.euro.centre.org/downloads/detail/4467

[76] Dumoulin, J, and Pontif, J (2025) EU micro-construction companies: rising to the 2040 climate objectives What Europe's Renovation wave means for micro construction businesses - how to take-up the challenges and thrive (CIMACT and European Builders Confederation). Retrieved 19.11.25 from https://www.ebc-construction.eu/wp-content/uploads/2025/10/EBC_Climact-EU-microconstruction-companies-rising-to-the-2040-climate-objectives-Final-report.pdf and see also European Construction Industry Federation (2020) Tackling undeclared work in the construction industry: Toolkit. Retrieved 19.11.25 from https://www.fiec.eu/application/files/8016/0127/8404/2020_-_TUWIC_Toolkit__EN__low_res.pdf

The construction sector remains dominated by small and medium enterprises. Micro-enterprises of 0 to 9 employees make up 94% of the sector. The relative share of enterprises by size has also remained broadly steady across the period. There was a slight dip in shares of smaller firms in 2018 and 2019 (93.8% and 93.6% respectively), down from 94.2 in 2015, before a return to 94% from 2021 onwards.[77] Within micro-enterprises in 2021, 65% were 1-person companies, whilst those employing 2 to 9 made up 29% of all enterprises.[78] In the context of COVID-19, there was a slight drop in the number of enterprises employing 10 to 19 people, from 140,855 to 138,894, which represented a drop of 1.4% but came in the context of growth of 7% and 9% in the preceding two years (Figure 26).[79] The decline in the number of enterprises between 10 and 19 persons was primarily linked to enterprises in the construction of buildings (NACE F.41) and civil engineering (NACE F.42) subsectors, where the number of enterprises with 10 to 19 employees declined by 0.8 and 0.6, respectively.[80]

Figure 26: Percentage annual change in share of the construction sector (NACE F) employment by enterprise size class, EU-27, annual 2015 – 2022



Source: Eurostat Annual enterprise statistics by size class for special aggregates of NACE Rev.2 activities (2005-2020) [sbs_sc_sca_r2] and Enterprise statistics by size class and NACE Rev. 2 activity (from 2021 onwards) [sbs_sc_ovw]

In terms of employment by size class, most workers in the construction sector work in micro-enterprises. In 2022, the share of persons employed in micro-enterprises (0-9) was 47%, which represented a very slight drop in share from 2015 (47.9% to 46.9% in 2022). The share of persons employed in the largest

[77] Eurostat Annual enterprise statistics by size class for special aggregates of NACE Rev.2 activities (2005-2020) [sbs_sc_sca].
[78] Eurostat Enterprise statistics by size class and NACE Rev. 2 activity (from 2021 onwards) [sbs_sc_ovw]
[79] Eurostat Annual enterprise statistics by size class for special aggregates of NACE Rev.2 activities (2005-2020) [sbs_sc_sca and Enterprise statistics by size class and NACE Rev. 2 activity (from 2021 onwards) [sbs_sc_ovw]
[80] As well as other Specialised construction activities (NACE F.43) which also saw a 14% decline, which represented a decline of just over 3000 enterprises, but this was the second year of data at level 3.

firms has increased slightly over the decade from 11% of the workforce in 2015 to 13% of the workforce in 2022. In 2020, during the COVID-19 the main changes were a decline of 1% in the number of people employed in small firms (10 to 19) and medium firms (50 to 249), whilst the number of people employed in micro-enterprises increased by 3%, and 2% in enterprises from 20 to 49 and the largest enterprises of over 250.

Construction continues to have the highest shares of self-employed workers, accounting for 22% of the workforce in 2022.[81] In the context of the continued growth of the number of enterprises, there has also been a slight decline in the share of the construction sector (NACE F) workforce that are employees in recent years. Since 2015, this share has increased slightly from 77.3% to 77.6%. However, there have been two notable trends during this period. From 2015 to 2019, there was an increasing share each year of approximately .5 percentage points (pp) to a high of 79%. Then, in the context of COVID-19 in 2020, there was a drop of .5pp to 28.5% followed by further small declines in shares in 2021 to 77.6%. Whilst this slight decline in share of the employee workforce was observed across most NACE activities in 2020, the construction sector (NACE F) is the only sector where the share has continued to decline in both 2021 and 2022.

There also continue to be significant differences in patterns of self-employment within the sector.[82] For example, in the civil engineering (NACE F.42) subsector, 96% of workers were employees in 2021, whilst in the construction of building sector, 81% of workers were employees. In the specialised construction activities, 73% were employees, but with further differences within the detailed specific subsectors. In the installation subsector, including electrical and plumbing, 80% of workers were employees and in other specialised construction (including roofing), 78% were employees. However, for the building completion and finishing subsector, inclusive of plasterers and glazing and some insulation and cladding activities, the share drops to 62%.

The employment differences between the construction subsectors are also reflected in enterprise demographics between the construction subsectors. More specifically, enterprises engaged in civil engineering (NACE F.42) continue to be typically much larger than those engaged in the construction of buildings (NACE F.41) and specialised construction activities. The overall average number of persons employed by enterprises in the construction sector (NACE F) in 2021 was 4.[83] For civil engineering, the average number of persons employed was 14, reflecting the larger scale of projects in these sectors. In contrast, specialised construction activities (NACE F.43) account for 60% of employment in the sector, with an average of 3 employees per enterprise. Electrical and plumbing enterprises employed 4 people on average, whilst enterprises engaged in building completion and finishing, including activities such as plastering, floor and wall covering and glazing, employed an average of 2 people. Roofing and joinery installation enterprises employed on average 4 people.

This pattern is further reflected in the number and share of enterprises by size class in the sector. Of the 110,358 civil engineering (NACE F.42) enterprises in 2022, 82% were micro-enterprises that employed between 0 and 9 people, in comparison to 94% of enterprises for the overall sector. Furthermore, civil engineering subsector enterprises make up 2.8% of all construction sector (NACE F) enterprises but 34.5% of all enterprises employing over 250 employees. However, there has been an increase in the share of micro-enterprises (0-9 employees) in the civil engineering subsector over the period, with an increase from 78.5% to 82% in 2022, albeit with the reduction in share in 2018 and 2019 noted above. In contrast, specialised construction activities makes up 72.6% of all construction

[81] Enterprise statistics by size class and NACE Rev. 2 activity (from 2021 onwards) [sbs_sc_ovw]. By comparison 84% in wider NACE aggregate ‘Industry, construction and market services (except public administration and defence; compulsory social security; activities of membership organisations); Sectors higher shares of self-employed/ lower shares of employees of are real estate (37%); Professional, scientific and technical activities (which includes architectural testing) 32%; Arts entertainment and recreation (30%); Education (29%)
[82] Enterprises by detailed NACE Rev. 2 activity and special aggregates [Eurostat sbs_ovw_act]
[83] 2021 was the last year of full data

enterprises, but only 40% and 40.5% of enterprises are medium or large (respectively) and are made up predominantly by micro-enterprises (73% of the sector). Enterprises in the architectural, engineering and testing services sector (M.71) are mainly micro-enterprises, making up for 96.4% of the sector in 2021. According to the Architects Council of Europe, 70% of architectural, engineering and testing services enterprises were 1 person enterprises in 2024.[84] This share has remained relatively steady across the decade, albeit with some fluctuations between medium and large enterprises.[85]

Similarly, the composition and the share of total employment by size class also differ between the respective subsectors. The main outlier in terms of share of employees is the civil engineering (NACE F.42) subsector, where firms of over 50 people make up 67% of the employment of the sector, with 43% of employment in firms of over 250. Conversely, in civil engineering, 8% of workers are employed in smaller enterprises of 10 to 19 people. By contrast, in the construction of buildings (NACE F.41) subsector, 12% of workers are employed in enterprises of over 250 people and in the specialised construction activities (NACE F.43) subsector, the share is 7%. In specialised construction activities, 54% of workers are employed in micro-enterprises, and 45% in the construction of buildings subsector.

Architectural, engineering and testing services employment also continued to be characterised by employment in micro-enterprises (0-9). In 2023, micro (0-9) and small (10 – 19) enterprises made up 97% and 2% of enterprises in the sector. The average number of persons employed in enterprises in 2023 was 3. Employment in micro-enterprises made up 47% of architectural, engineering and testing services employees. Employees made up 72% of people employed in the architectural, engineering and testing services sector, in comparison to 77% of the construction sector (NACE F). The architectural, engineering and testing services sector also continued to be bifurcated in its patterns of employment. 21% of architectural, engineering and testing services employees were employed in the largest enterprises (over 250 people), with a further 13% in medium enterprises of 50 to 249 people (33% combined).

2.4. Education and training in construction

There is evidence of increasing levels of education in the construction sector (NACE F) workforce.[86] Workers with upper secondary and tertiary education (levels 3 and 4 International Standard Classification of Education (ISCED)) remain the largest group of workers in the construction sector (NACE F) and represented 56% of workers in 2022 (Figure 27).[87] The second largest group is those with primary and lower secondary education (levels 0-2), who made 24% of the sector in 2022. Those with a tertiary education (levels 5-8) then made up the remaining 19%.[88] There is a significant difference between the education of male and female workers in the sector. For males, 27% had education levels

[84] Mirza & Nacey Research (2025). The Architectural Profession in Europe 2024 Sector Study (The Architects Council of Europe, Brussels). Retrieved 19.11.25 from https://ace-cae.eu/wp-content/uploads/2025/03/2024-ACE-Sector-Study-EN-01042025.pdf

[85] Medium enterprises of 50 to 249 decreased from A 41.6% share in 2015 to a 40% share in 2022 whilst enterprises that employed 250 or more increased from a 17.6% share to 18.3% share in 2022. There are gaps in the data in 2020 which means that further analysis of trends during the COVID-19 period are not possible.

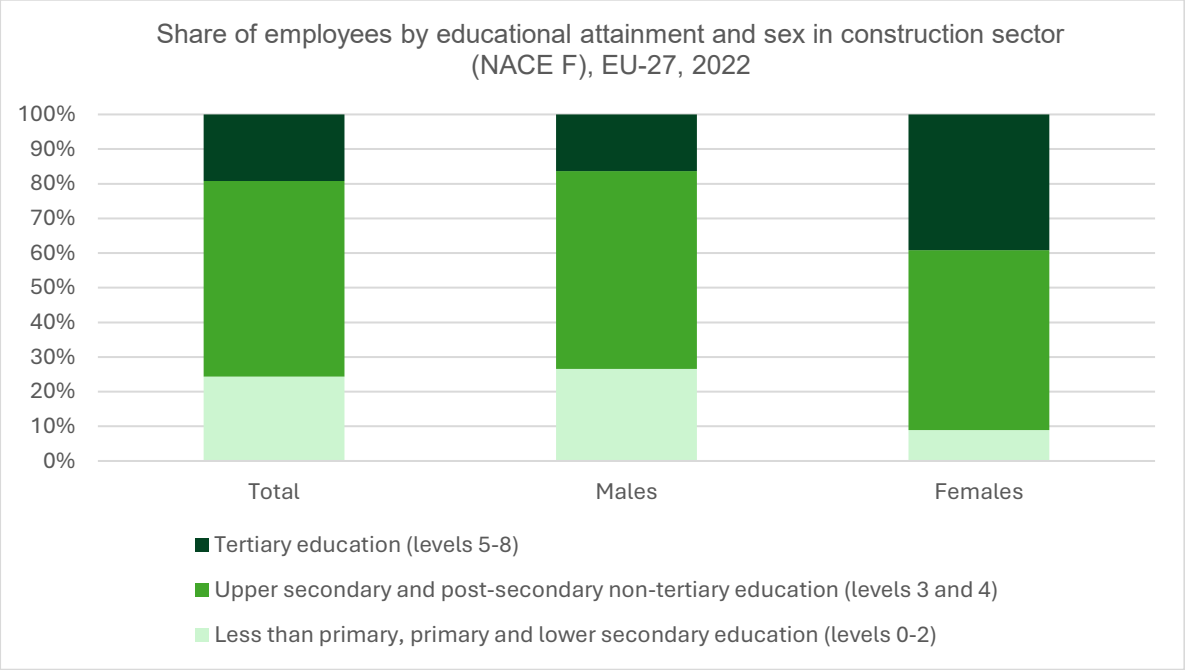
[86] See also Eurofound (2025a), Building on growth potential: Preparing the construction sector for the twin transitions (Publications Office of the European Union, Luxembourg). Retrieved 11.12.25 from https://www.eurofound.europa.eu/en/publications/all/building-on-growth-potential-preparing-the-construction-sector-for-the-twin-transitions

[87] Employees by sex, economic activity and educational attainment (2022) [earn_ses22_04]. To note data is only for employees in companies of 10 employees or more so do not fully reflect the construction sector that is characterised by large numbers of small and micro enterprises, particularly for specific sub sectors and trades.

[88] Whilst the data is not fully comparable across years, the share of workers with a tertiary education (levels 5-8) does appear to have increased, up from 17.9% of workers in 2018. Previous years had the share of workers with tertiary education (levels 5-8) at 16.4% in 2010 and 19.5% in 2014.

at primary and lower secondary levels, and 9% of females. For upper secondary and post-secondary, 57% of males and 52% of females, whilst for tertiary, 16% of males and 39% of females.

Figure 27: Share of construction employees by educational attainment and sex EU-27, 2022



Source: Eurostat Employees by sex, economic activity and educational attainment (2022) [earn_ses22_04]

2.4.1. Enrolment and graduations from construction programmes[89]

In terms of enrolments in 'Engineering, manufacturing and construction' (F-07) programmes[90], there has been some growth in enrolments in tertiary education (levels 5-8) between 2015 and 2023 (Figure 28). In 2023, there were 2762,331 students enrolled in 'Engineering, manufacturing and construction' (F-07) tertiary education (levels 5-8) programmes in the EU-27, an increase of 96,268 (3.6%). However, there was a decline in enrolment both in short-cycle tertiary education (levels 5-8) and in Bachelor's. In 2023, there were 1,664,704 students enrolled in undergraduate level programmes, which represented a drop of 57,800 (3.4%) since 2015. For short-cycle tertiary programmes, there were 231,614 enrolments in 2023, a decline of 11,636 from 2016 (3.4%). For Master's, there were 750,420 enrolled, which represented an increase of 14,541 (2% over 2015), and at the Doctoral level, there were 115,593 enrolments, an increase of 10,970 (10.5%) since 2015.

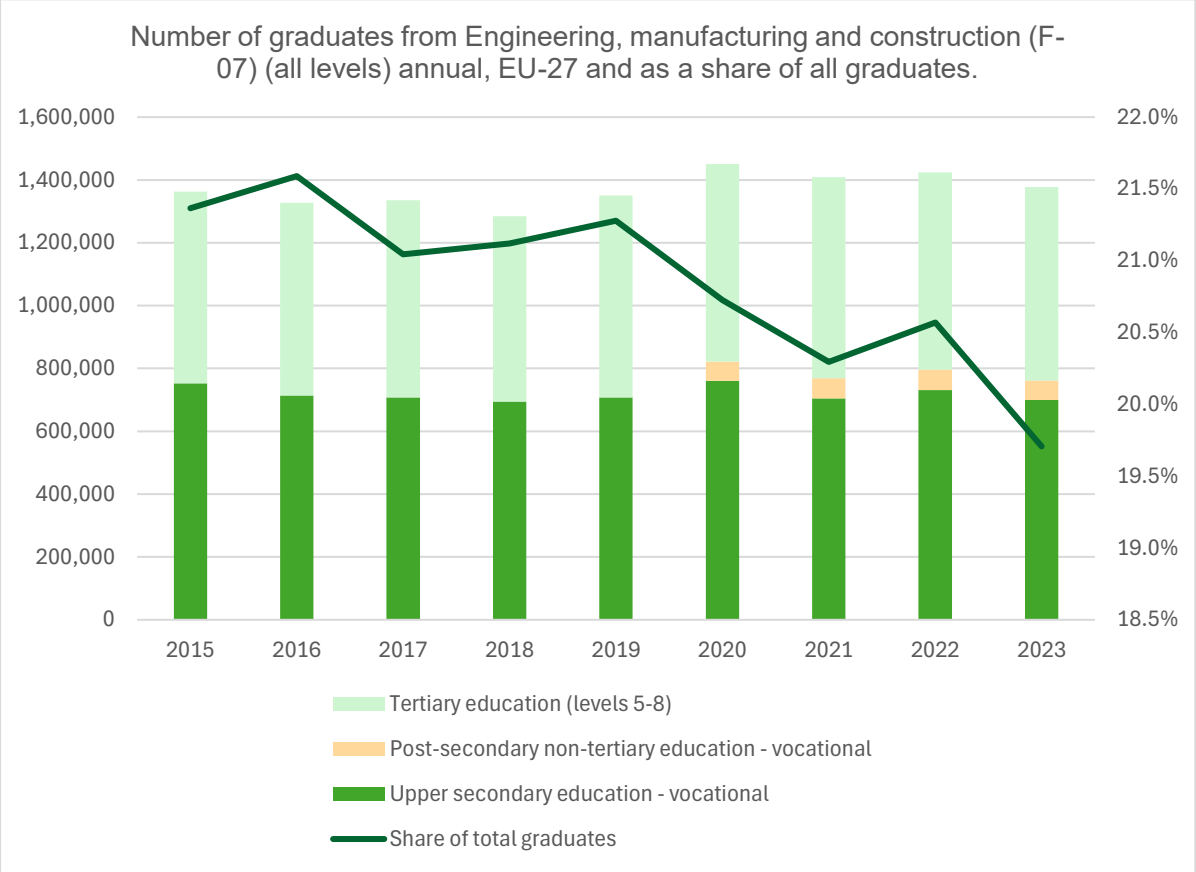
The decline in the number of enrolments in 'Engineering, manufacturing and construction' (F-07) tertiary programmes is also set in contrast to a general increase in higher education enrolments. Across the period, tertiary enrolments across all programmes increased by 9.3%, including a 6.7% for Bachelor's programmes and a 25.7 increase in short-cycle tertiary enrolments. In this context, the share of enrolments in 'Engineering, manufacturing and construction' has declined slightly from 16% in 2015 to 15% in 2023. For tertiary education (levels 5-8) programmes enrolments, the share of enrolment in 'Engineering, manufacturing and construction' (F-07) programmes was 15.5% in 2015 before increasing

[89] This section uses the International Standard Classification of Education (ISCED) including ISCED-F 2013 for the fields of education and ISCED 2011 for levels of levels of education.
[90] ISCED-F-07 Inclusive of Engineering and engineering trades (071), Manufacturing and progressing (072) and Architecture and construction (073).

to a high of 16.7 in 2019 and then dropping to 14.7% in 2025. For short-cycle tertiary enrolment, the share has declined from 21.6% in 2016 to 16.4% of enrolment in 2023.

These trends are reflected in graduations from 'Engineering, manufacturing and construction' programmes. As illustrated by Figure 28, the total number of graduates from 'Engineering, manufacturing and construction' programmes (F-07, all levels) for the EU-27 was 1,377,635 in 2023, which is slightly up from 1,363,211 in 2025 (1%). However, the share of 'Engineering, manufacturing and construction programmes as a share of all EU graduates dropped from 21.4% to 19.7%, a drop in share of 7.8%. The decline in share has also been repeated for both 'Upper secondary – vocational', and 'Tertiary' and Bachelor's. Bachelor's was the most pronounced, where there were 12,273 fewer graduates in 2023 than in 2015, equivalent to 4% reduction in total graduates, and a reduction in the share of all graduates by just under 10%. At 'Upper secondary education – vocational', there were 699,127 graduates in 2023, which was a decline of 7% from 2015, but this was in the context of an increased share of all graduates by 2.8%. Further details of the different levels are also presented in Table 3.

Figure 28: Number of graduates from Engineering, manufacturing and construction (F-07) (all levels) annual, EU-27 and as a share of all graduates.



Source: Eurostat Graduates by education level, programme orientation, sex and field of education [educ_uoe_grad02]

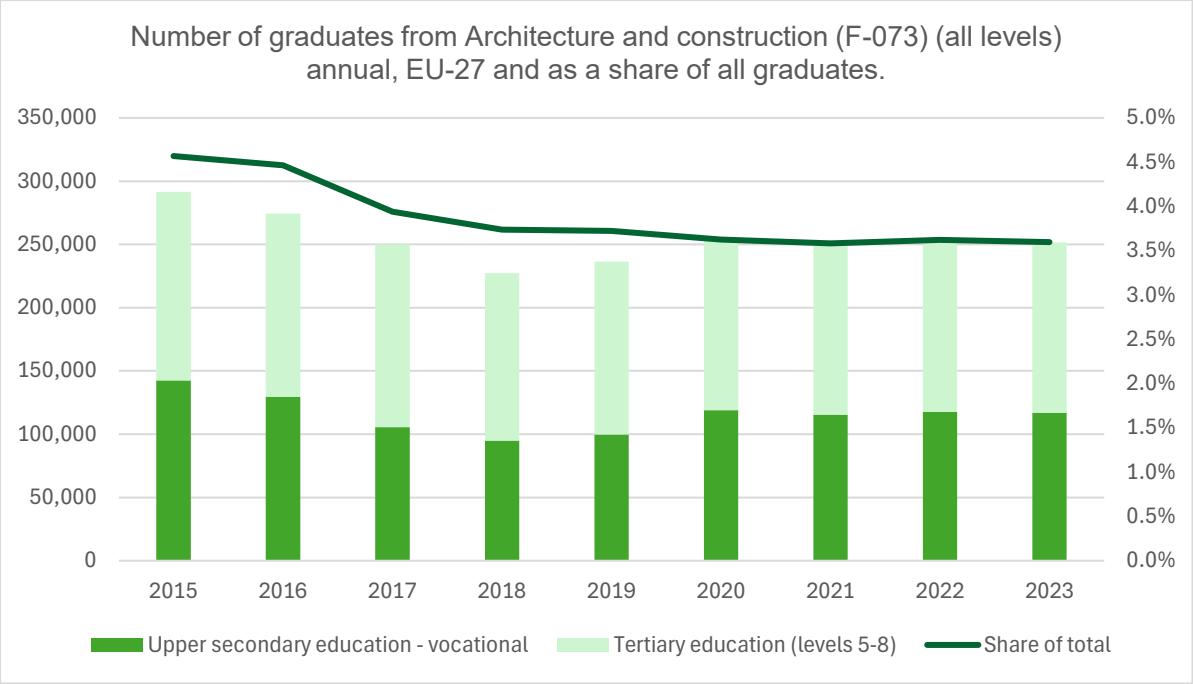
Table 3: Engineering, manufacturing and construction (F-07) graduates 2023 by level and comparisons to 2015

ISCED-2011 level	2023 Total graduates	2023 share of all graduates	Percentage change from 2015	Percentage change in share of all graduates to 2015
Upper secondary education - vocational	699,127	31.9%	-7.1	2.8%
Short-cycle tertiary education	88,029	19.3%	6	-7
Bachelor's or equivalent level	293,078	13.4%	-4	-9.8
Master's or equivalent level	218,463	13.5%	0.3	-14
Doctoral or equivalent level	16,674	16.2%	8.7	11.7%

Specifically for ‘Architecture and construction’ programmes (F-073) (so excluding other programmes included under the top-level ‘Engineering, manufacturing and construction’ F-07 group), there has been a similar trend in the declining number of graduates from all levels (Figure 29). As illustrated by Figure 29 in 2023, there was a total of 251,584 graduates from ‘Architecture and construction’ programmes. This was a 14% decrease in the total number of graduates in comparison to 2015. The total number of enrolments in ‘Architecture and construction’ at bachelor’s level in 2023 in the EU-27 was 351,067, which represented a decline of 37,525 from 2015 (9.7%). At the Master’s level, there has been a decline of 4.2% since 2015 to a total of 191,827 in 2023 (down by 8,502). For Doctoral, there has been a decline of 12.2% to a total of 20,653 in 2023 (down by 12.2%). In this context, the share of enrolment in ‘Architecture and construction’ programmes at bachelor’s level has declined from 3.7% in 2015 to 3.1% in 2023.

In addition, the share of graduates declined from 4.6% to 3.6%. The declining share was across all levels, except for short-cycle tertiary, which represents a small segment in terms of numbers and share (see Table 4 for further details). In addition, ‘Architecture and construction’ forms a smaller share of the ‘Engineering, manufacturing and construction’ (F-07) graduates. The share of ‘Architecture and construction’ (F-073) graduates at the Tertiary level (5-8) (as a share of Engineering, manufacturing and construction F-07) dropped from 24.4% to 21.9%, including a decline in share at Bachelor’s from 25.4% to 21.3% and at Master’s from 27.6% to 24.7%.

Figure 29: Number of graduates from Architecture and construction (F-073) (all levels), annual, EU-27 and as a share of all graduates.



Source: Eurostat Graduates by education level, programme orientation, sex and field of education [educ_uoe_grad02]

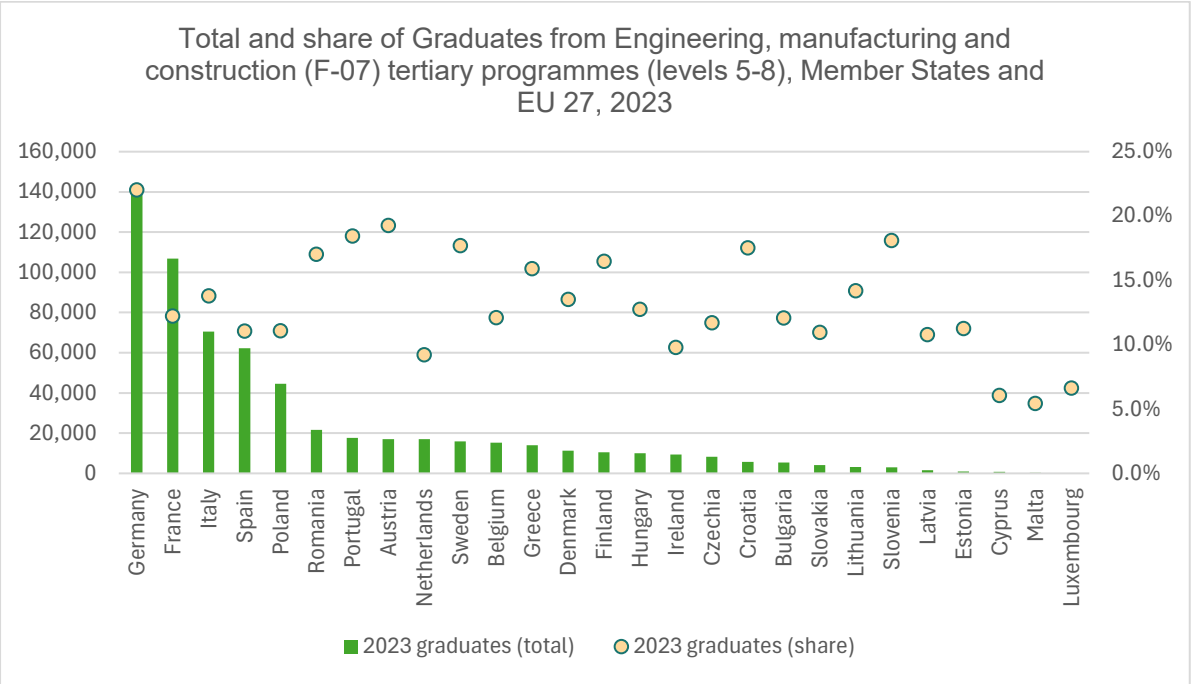
Table 4: Architecture and construction (F-073) graduates 2023 by level and comparisons to 2015

ISCED-2011 level	2023 Total graduates	2023 share of all graduates	Percentage change from 2015	Percentage change in share of all graduates to 2015*
Upper secondary education - vocational	116,889	5.3%	-18.0%	-9.2%
Short-cycle tertiary education	15,598	3.4%	40.3%	23.1%
Bachelor's or equivalent level	62,345	2.8%	-19.8%	-24.6%
Master's or equivalent level	53,934	3.3%	10.3%	23.1%
Doctoral or equivalent level	2,818	2.7%	9.5% *(2017)	16.1% *(2017)

In 2023, there were 616,244 graduates from 'Engineering, manufacturing and construction' (F-07) at tertiary levels (5-8), 14% if all EU-27 graduates at this level. At the national level, there was variation in terms of the share of graduates from 'Engineering, manufacturing and construction' (F-07) at the tertiary level (5-8) (Figure 30). The highest share of graduates with construction-related tertiary qualifications

were Germany (26%), Austria (24%), and Sweden (23%), Portugal, Croatia and Slovenia (21%). The lowest shares were in Malta and Cyprus (8%), Luxembourg (10%), and Ireland (12%).[91]

Figure 30: Total and share of Graduates from Engineering, manufacturing and construction (F-07) tertiary level programmes (levels 5-8), Member States and EU 27, 2023

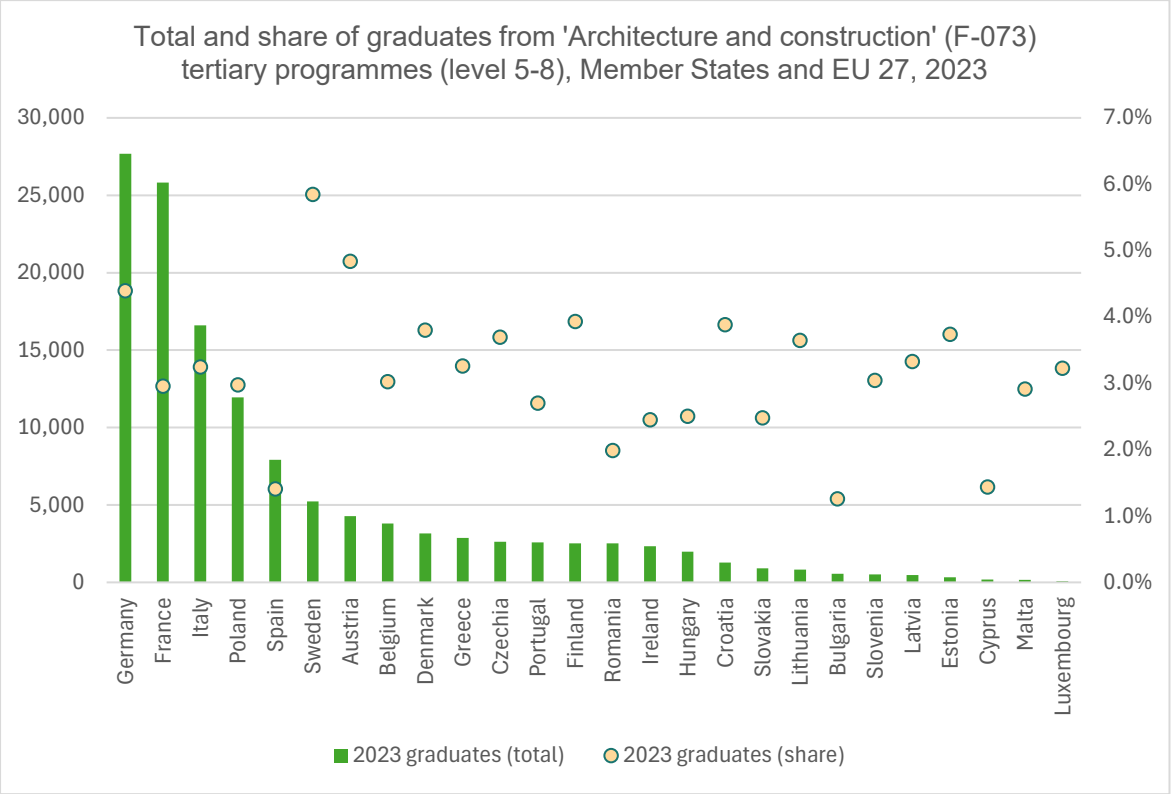


Source: Eurostat Graduates by education level, programme orientation, sex and field of education [educ_uoe_grad02]

For 'Architecture and construction' programmes (F073), there were 129,205 tertiary (levels 5-8) graduates in 2023 (Figure 31). This represented 3% of all EU graduates at this level and 21% of the 'Engineering, manufacturing and construction' graduates (F-07). There are variations in the share of graduates at the Member State level (Figure 31). The countries with the highest share of 'Architecture and Construction' graduates in 2023 were Germany (29%), Croatia and Greece (23%). In contrast, the countries with the lowest levels were Luxembourg (7%), France 8%, and Spain 10%.

[91] Data not available for the Netherlands.

Figure 31: Total and share of graduates from 'Architecture and construction' (F-073) tertiary programmes (level 5-8), Member States and EU-27, 2023

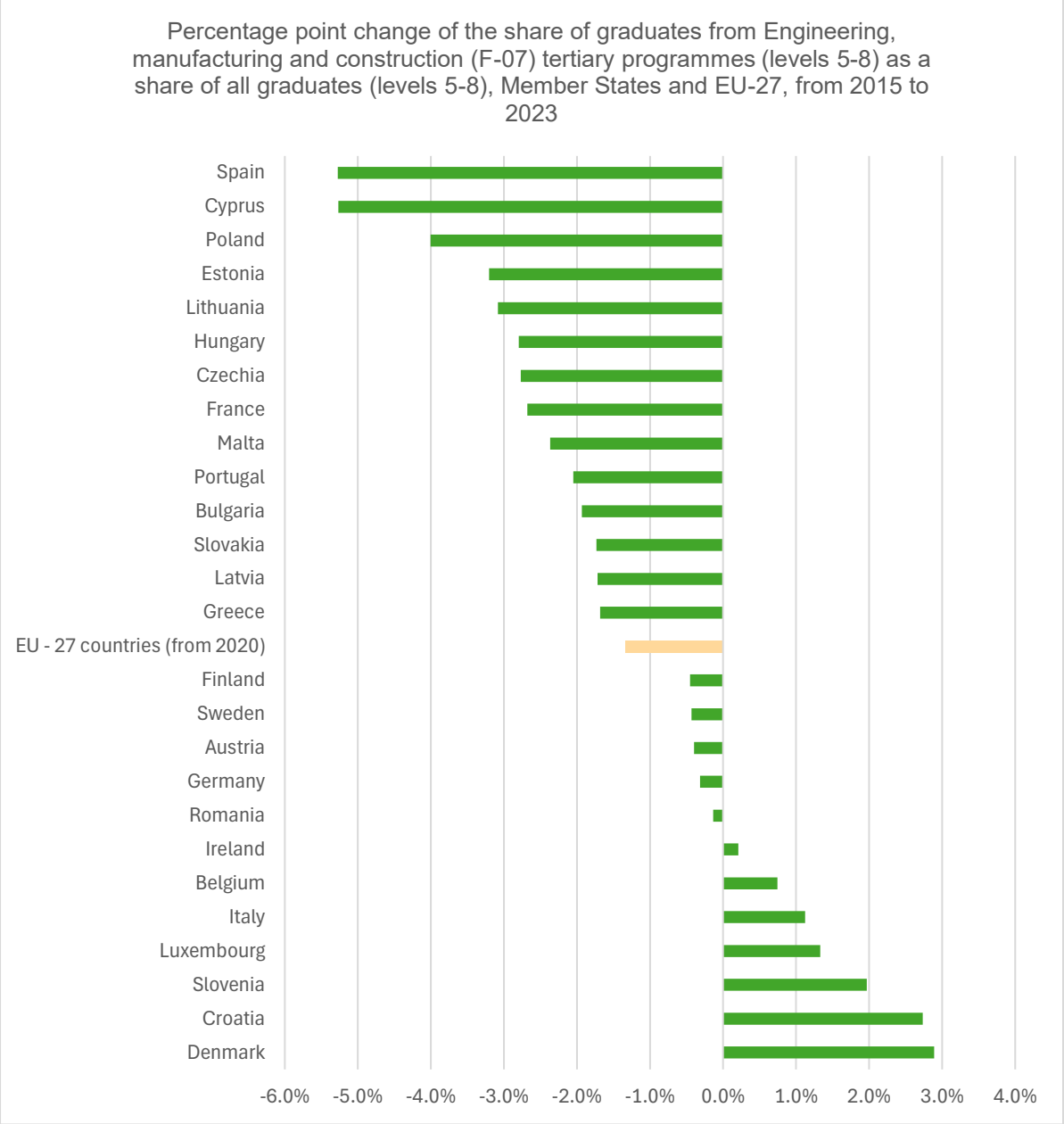


Source: Eurostat Graduates by education level, programme orientation, sex and field of education [educ_uoe_grad02]

In the context of the overall decline in the share of graduates from Engineering, manufacturing and construction (F-07) programmes at the EU-27 level, there are some variations at Member State level between 2015 and 2024 (Figure 32). For graduates from Engineering, manufacturing and construction (F-07) programmes, Denmark (2.9pp), Croatia (2.7pp) and Slovenia (2pp) reported the largest growth in share of graduates for engineering, manufacturing and construction programmes at levels 5 to 8. In contrast, the largest drops in share were reported in Spain (-5.3pp), Cyprus (-5.3pp) and Poland (-4pp).

For Architecture and construction (F-073) graduates at the Bachelor's level specifically (Figure 33) the countries with the largest decreases in share of graduates at Bachelor's level were Spain (-9pp), Cyprus (-8pp), Italy (2.7pp), Portugal (2pp), and Poland (1.7pp) (Figure 33). Only Malta (3.4pp) reported an increased share of over 1pp, whilst Ireland reported the next largest increase of 0.6pp.

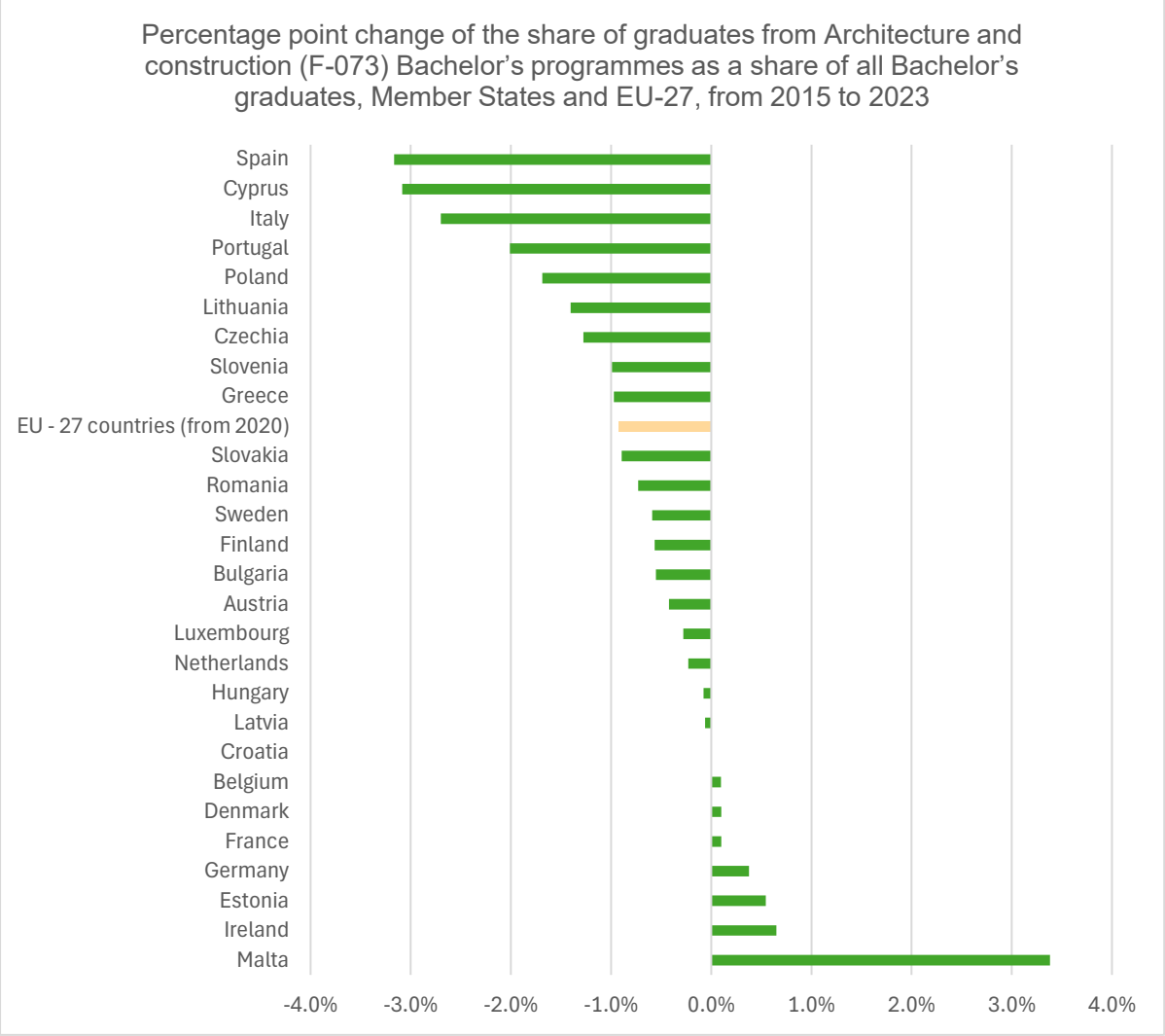
Figure 32: Percentage point change of the share of graduates from Engineering, manufacturing and construction (F-07) tertiary programmes (levels 5-8) as a share of all graduates, Member States and EU-27, from 2015 to 2023



Source: Graduates by education level, programme orientation, sex and field of education [educ_uoe_grad02][92]

[92] Data not available for the Netherlands.

Figure 33: Percentage point change of the share of graduates from Architecture and construction (F-073) Bachelor's programmes as a share of all Bachelor's graduates, Member States and EU-27, from 2015 to 2023



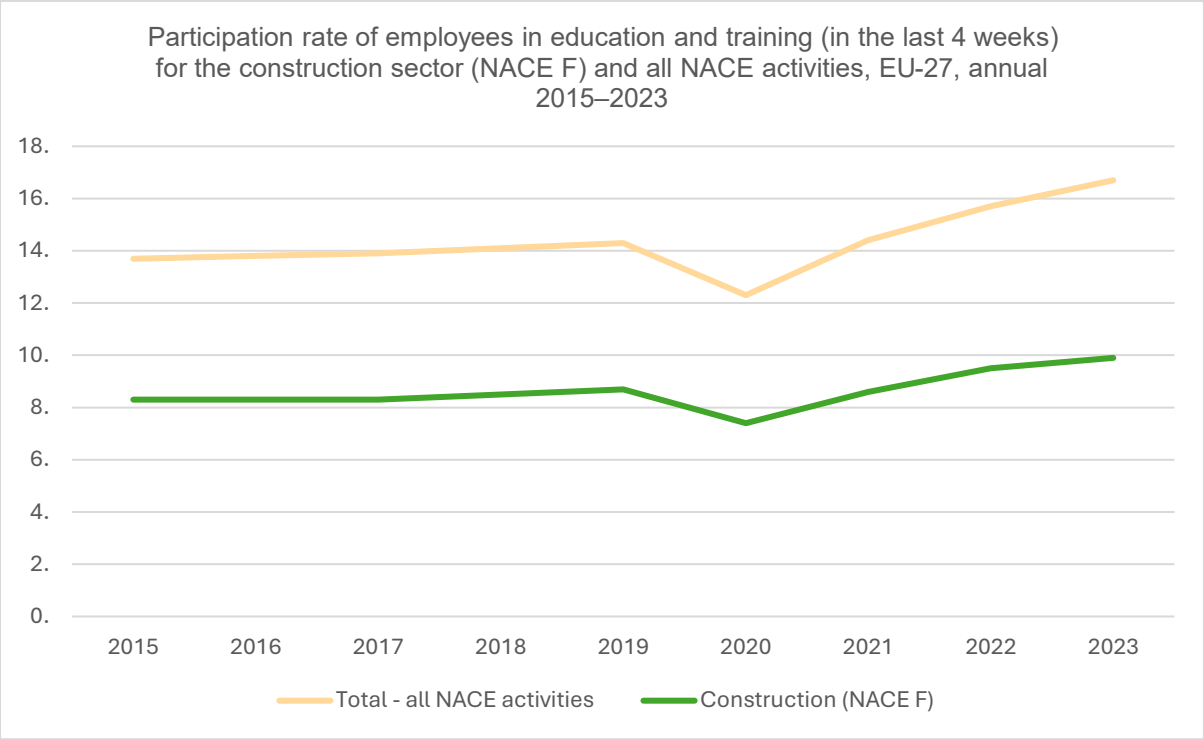
Source: Graduates by education level, programme orientation, sex and field of education [educ_uoe_grad02][93]

2.4.2. Participation in training for construction sector employees

The participation rate of construction sector (NACE F) employees in training across the European Union (27 countries) has shown a generally steady trend from 2015 to 2019, hovering around 8.3% to 8.7% (Figure 34). There was a noticeable drop to 7.4% in 2020. However, since then, the rate has rebounded strongly, reaching 9.9% in 2023 — the highest across the period. However, the rates of participation in construction steadily remain lower than the whole economy (all NACE activities). Participation in education and training for the whole economy is 16.7%, or 41% higher than in construction. In addition, participation rates for the whole economy (all NACE activities) have increased from 13.7% in 2015, an increase of 21%, in comparison to an increase of 19% in construction.

[93] Data not available for Netherlands.

Figure 34: Participation rate of employees in education and training (in the last 4 weeks) for the construction sector (NACE F) and all NACE activities, EU-27, annual 2015–2023

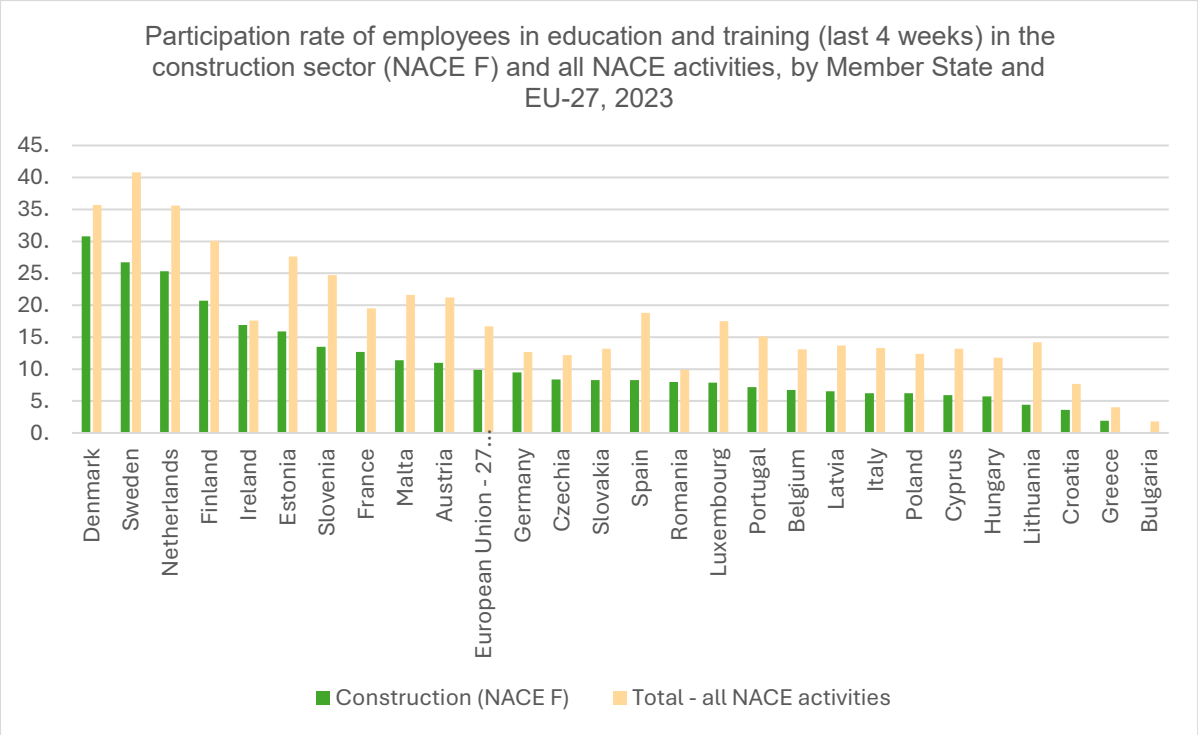


Source: Eurostat Participation rate of employees in education and training (last 4 weeks) by NACE Rev. 2 activity (2008-2026) [trng_lfs_08b]

As with education, there are variations between Member States in the share of construction employees participating in education and training (Figure 35).[94] The countries with the largest shares are Denmark (31%), Sweden (28%), the Netherlands (25%), and Finland (21%). The countries with the lowest shares were Greece (2%[95]), Croatia (3.6%), Lithuania (4.4% and Hungary and Cyprus (5.7 and 5.9%). The countries with the largest percentage difference in the share of workers participating in training in construction and in the whole economy (all NACE activities) were Lithuania, Spain, Cyprus, Luxembourg and Italy.

[94] Data for Construction (NACE F) not available for Bulgaria.
[95] Based on 2022 data.

Figure 35: Participation rate of employees in education and training (last 4 weeks) in the construction sector (NACE F) and all NACE activities, by Member State and EU-27, 2023

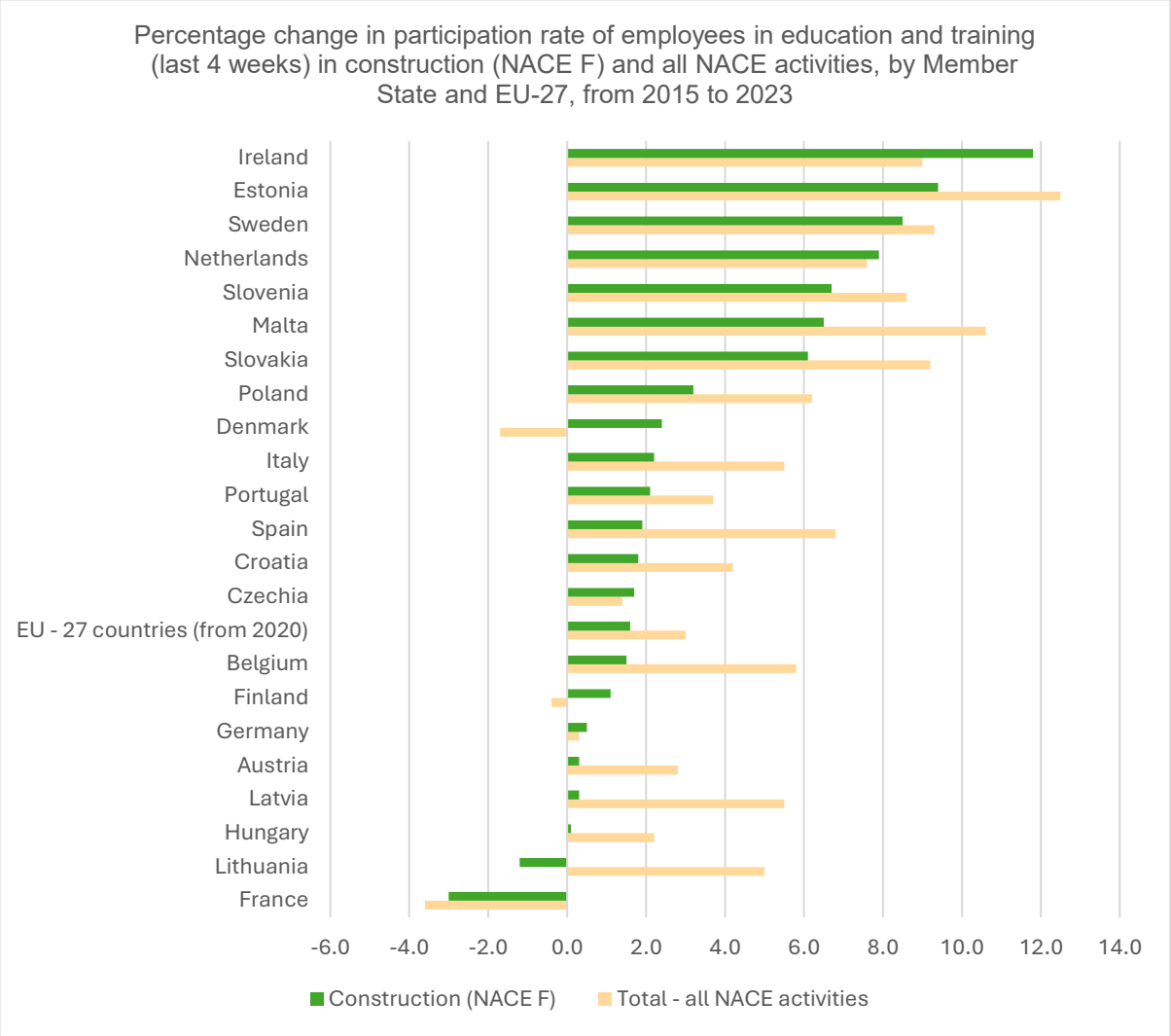


Source: Eurostat Participation rate of employees in education and training (last 4 weeks) by NACE Rev. 2 activity (2008-2026) [trng_lfs_08b][96]

The countries with the largest growth in the share of workers participating in training between 2015 and 2023[97] were Ireland (increase from 5% to 17%, Estonia (6% to 16%), and Slovakia (2% to 8%) (Figure 36). Two countries reported a decline in shares of construction employees participating in education and training: France (decline from 16% to 13%) and Lithuania (decline from 5.6% to 4.4%). In almost all countries, participation in the construction sector (NACE F) declined relative to the increases in participation rates reported across the whole economy (all NACE activities). Denmark (4.1pp), Ireland (2.8pp), Finland (1.5pp) reported the largest positive increase in construction participation rates when compared to the overall changes in participation rates across the whole economy (all NACE activities), alongside Germany (0.2pp), France (0.6pp), the Netherlands and Czechia (0.3pp).

[96] Data for Construction (NACE F) not available for Bulgaria.
[97] Construction data not available for Romania, Luxembourg, Cyprus, Greece, Bulgaria.

Figure 36: Percentage change in participation rate of construction employees in education and training (last 4 weeks) in construction (NACE F) and all NACE activities by Member State and EU-27, 2015 to 2023



Source: Eurostat Participation rate of employees in education and training (last 4 weeks) by NACE Rev. 2 activity (2008-2026) [trng_lfs_08b][98]

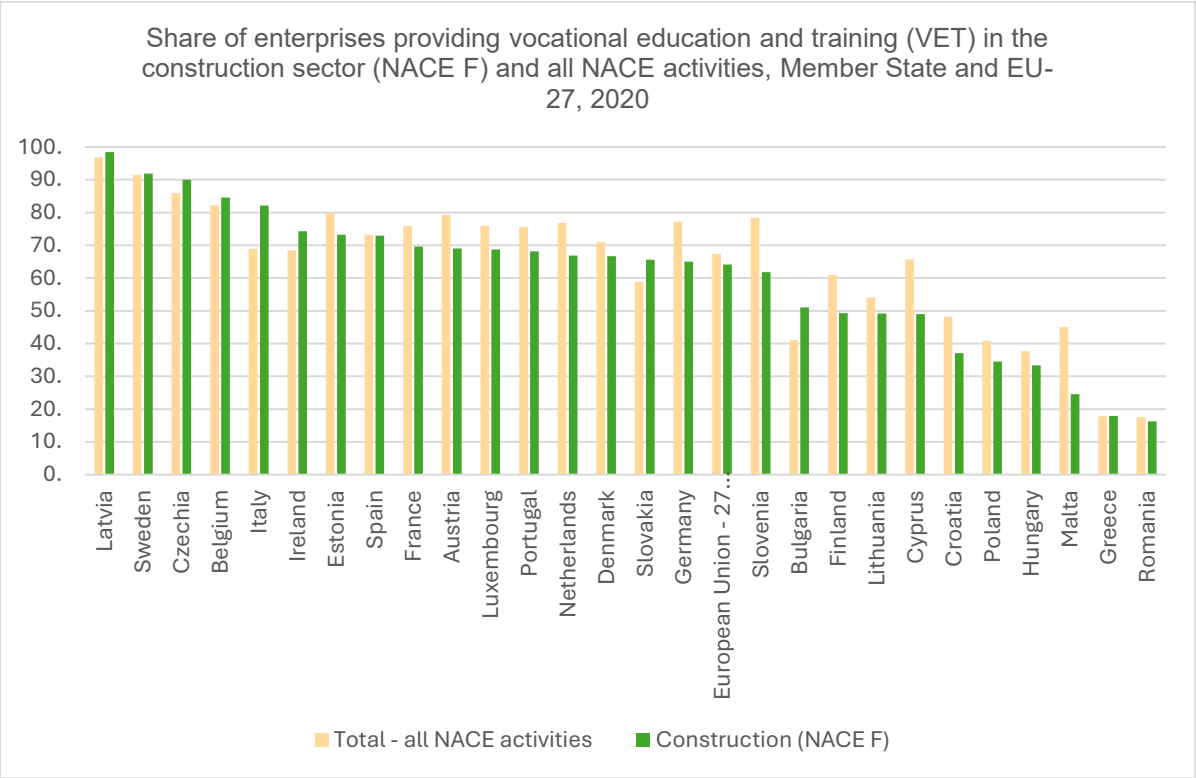
Data is collected on the share of labour costs attributed to vocational training by sector.[99] The last available data for this is for 2020, and is data collected at four-year intervals. In 2020, vocational training costs made up 0.47% of labour costs (employee wages and salaries 75%). This was a significant decline in comparison to the previous year of available data. In 2016, vocational training accounted for 0.79% of labour costs (wages and salaries 74.27%). There are also differences in the share of costs for vocational training by construction subsectors. Vocational training accounts for 0.35% in the construction of buildings (NACE F.41) subsector, 0.57% in civil engineering (NACE F.42), 0.48% in specialised construction activities, and 0.71% in architectural, engineering and testing services. By comparison in industry (excluding construction), the share of vocational training costs was 0.50% (wages and salaries 75.55%). As this data was collected for 2020, it may be affected by the COVID-19 context.

Data was collected on the share of enterprises providing training, including by type of training, in 2015 and 2020 (Figure 37). In 2020, the share of enterprises in the construction sector (NACE F) that offered

[98] Construction data not available for Romania, Luxembourg, Cyprus, Greece, and Bulgaria.
[99] Eurostat: Structure of labour cost by NACE Rev. 2 activity - % of total cost [lc_nstruc_r2]

some form of training was 64% in comparison to 67% across the whole economy (all NACE activities). The share of enterprises in the construction sector that did not offer some form of continuous Vocational Education and Training (cVET) increased during this period from 31% to 36%. By comparison across all NACE activities, the share of enterprises that did not offer some form of cVET increased from 29.5% to 33%. The Member States with the highest share of construction enterprises offering cVET were Latvia (98%), Sweden (92%) Czech Republic (90%). The lowest share of construction enterprises offering cVET were Romania (16%), Greece (18%), and Malta (25%). A higher share of construction enterprises offered cVET than in the wider economy (all NACE activities) in 9 Member States, including Italy, Bulgaria, Slovakia, and Ireland.

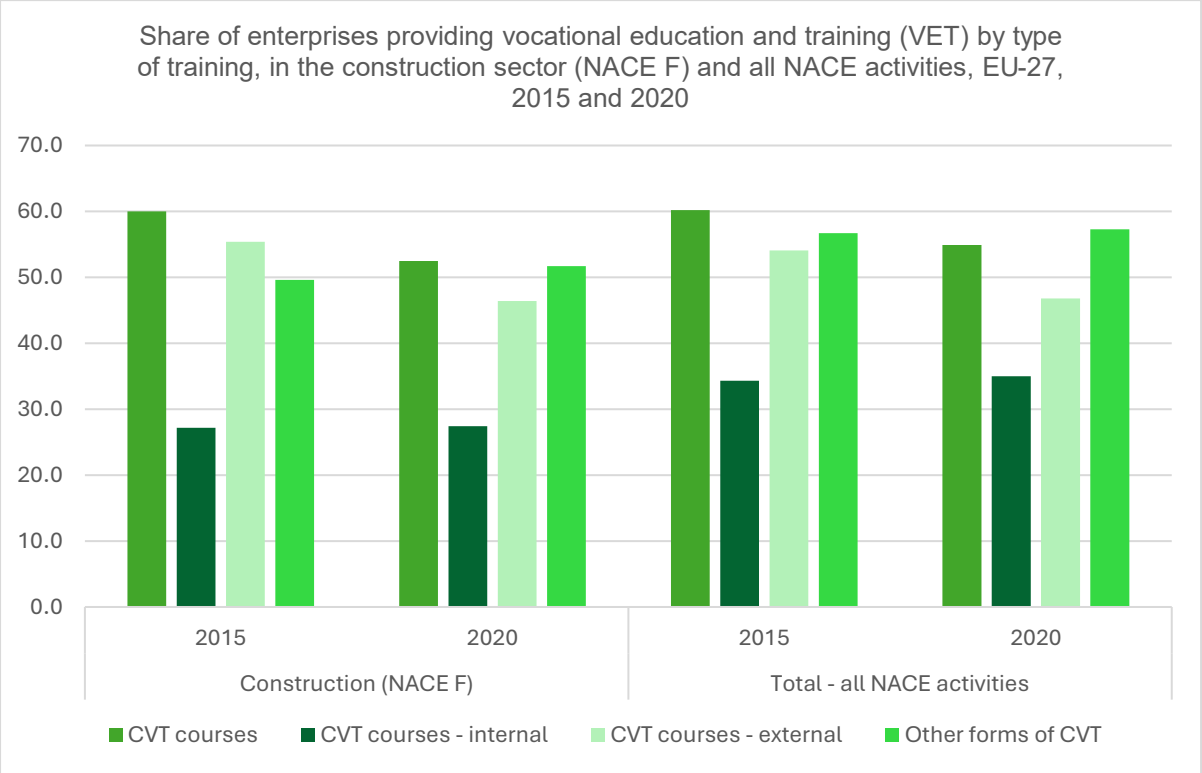
Figure 37: Share of enterprises providing vocational education and training (VET) in the construction sector (NACE F) and all NACE activities, Member State and EU-27, 2020



Source: Eurostat Enterprises providing training by type of training and NACE Rev. 2 activity - % of all enterprises [trng_cvt_01n2]

Overall, construction enterprises are slightly more likely to offer external cVET courses than other types of cVET provision (Figure 38). 46% of construction (NACE F) enterprises reported offering external cVET courses in 2020, in comparison to 47% of all enterprises (all NACE activities). However, in the context of COVID-19, the share of enterprises offering external cVET courses was lower than in 2015, when the share of construction enterprises offering external cVET was 55.4%. The share of construction enterprises offering other forms of cVET increased slightly in 2020 to 51.7% (from 49.6% in 2015). The share of construction enterprises offering internal cVET increased very slightly to 27.4% from 27.2%. In comparison, the share of enterprises across the whole economy (all NACE activities) offering internal cVET also increased slightly in 2020 to 35% from 34.3% in 2015.

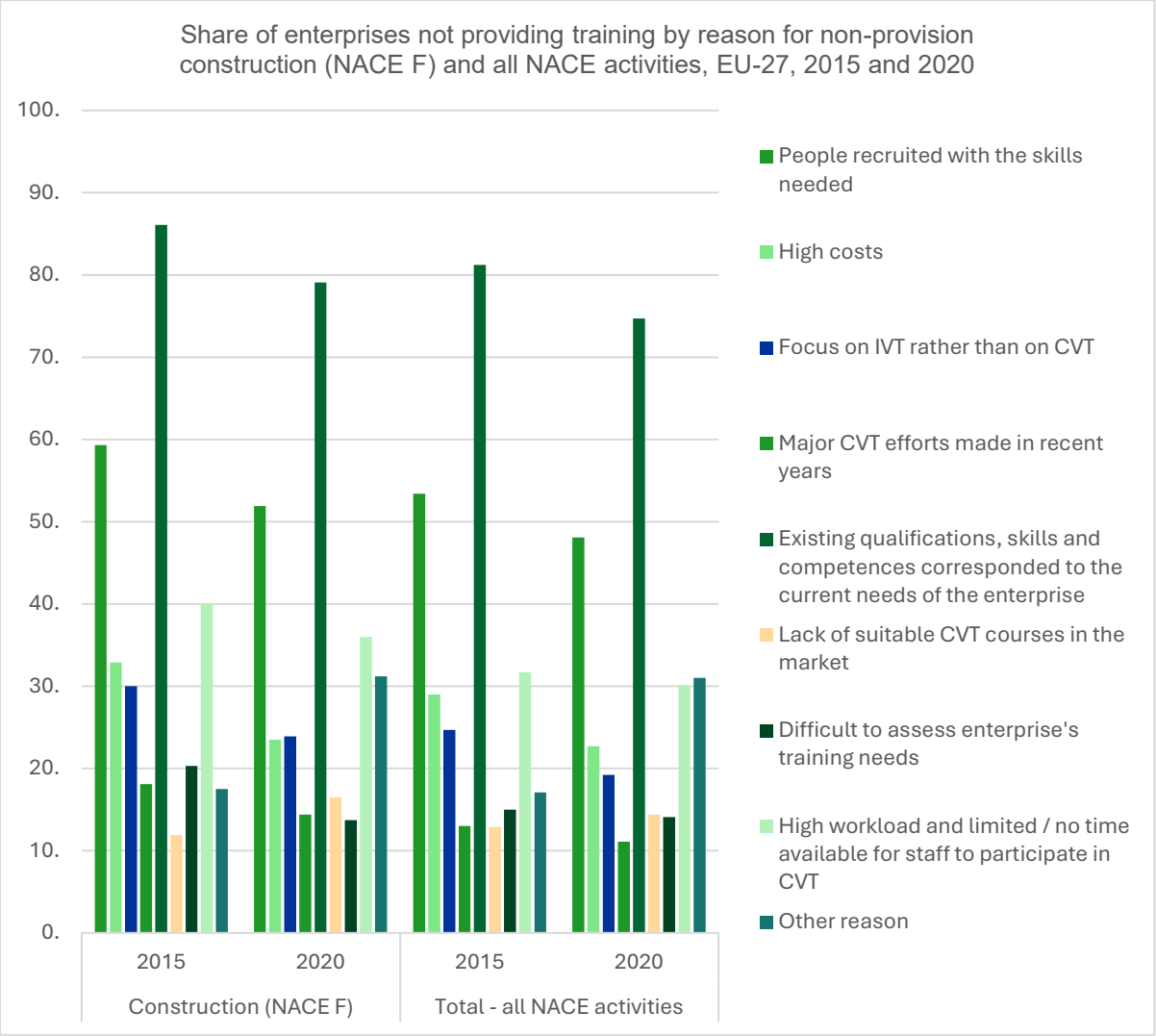
Figure 38: Share of enterprises providing vocational education and training (VET) by type of training, in the construction sector (NACE F) and all NACE activities, EU-27, 2015 and 2020



Source: Eurostat Enterprises providing training by type of training and NACE Rev. 2 activity - % of all enterprises [trng_cvt_01n2]

The main reason cited for the non-provision of training in construction was that existing qualifications, skills, and competences matched the current needs of enterprises (79.1%), followed by recruiting people who already had the necessary skills (51.9%) (Figure 39). High workload and limited time for staff to participate in training were also a persistent barrier (36%), whilst the high costs of cVET courses were cited by 23.5% of enterprises in 2020. The category of “other reasons” for non-provision rose sharply to 31.2% in 2020, in the context of COVID-19.

Figure 39: Share of enterprises not providing training by reason for non-provision construction (NACE F) and all NACE activities, EU-27, 2015 and 2020



Source: Eurostat Enterprises not providing training by reason for non-provision and NACE Rev. 2 activity - % of non-training enterprises [trng_cvt_02n2]

3. Construction employment estimates

This section presents quantitative estimates for the potential volume of employment in the European construction sector, including both the construction sector (NACE F) and the combined construction sector (inclusive of M.71) from 2030 to 2050.

3.1. Previous estimates

There are a small number of studies that have estimated future employment needs in the European construction ecosystem. Most estimates of future employment expect both absolute and relative growth in employment in the construction sectors, but also with potential for relative contraction in the size of the sector. There is variation in estimates depending on when those were made, their timelines, the focus of analysis, including in relation to specific subsectors, and assumptions such as levels of investment, growth and productivity.

The Cedefop Skills Forecast is the key resource for estimating potential future employment trends in Europe. The forecast is based on the Cambridge Econometrics E3ME model, which is a top-down general econometric model that simulates medium- and long-term effects of economic and environmental policies.[100] The Cedefop Skills Forecast 2025 provides sectoral estimates up to 2035 at 2-digit NACE level, including the construction sector (NACE F) and architectural, engineering and testing services (M.71), as well as analysis by occupation and demographic groups. The current estimate from the 2025 Forecast suggests that at the EU level, the total volume of people employed in the construction sector (NACE F) and the combined construction sector for the EU is going to increase over the next decade:[101]

- Employment in construction (NACE F) was expected to increase by 1% from 2022 (which is the last year of historic data derived from the labour force survey in the Cedefop model) to 2030 (from 14,269,950 to an estimated 14,418,424, workers (an estimated increase of 148,474 workers) and then a further increase of 50,020 resulting to a total of 14,468,444 workers in 2035, a total increase of 1.4% from 2022 (198,494 additional workers).
- Employment in architectural, engineering and testing services sector (NACE M.71) is expected to increase by 15% between 2022 and 2030, from 3,178,343 to an estimated 3,663,379 workers (an estimated increase of 485,036 workers), and then a further increase of 310,862 to a total of 3,974,241 in 2035, a total increase of 25% from 2022, an additional 795,898 workers.

Combined, this scenario would represent an increase in the combined construction workforce by 3.6% between 2022 and 2030, an additional 633,510 workers. The forecast then estimates a total increase of 5.7% or an additional 994,392 workers in the combined construction sector by 2035. Combined, this additional workforce represents 9.3% of the expected growth in the EU workforce across the whole economy (all NACE activities) (a total of 10,693,129 additional workers).

[100] The E3ME model is a top-down econometric model used to simulate and assess the medium to long-term effects of environmental and economic policies up to 2050. The macro-economic model comprises the accounting framework of the economy, based on national accounts, coupled with balances for energy and material demands and environmental emission flows, historical data sets, covering the period since 1970 and sectoral disaggregation using the NACE classification of economic activities at 2-digit level. E3ME has an econometric specification where which short-term deviations move towards long-term trends. See https://web.jrc.ec.europa.eu/policy-model-inventory/explore/models/model-e3me/

[101] European Centre for the Development of Vocational Training (Cedefop). *Cedefop Skills Forecast 2025*, Thessaloniki: Greece, Downloaded from: https://www.cedefop.europa.eu/en/events-and-projects/projects/skills-forecast

The growth of employment in architectural, engineering and testing services, relative to the construction sector, could change the composition of the combined construction sector slightly. The respective shares of the architectural and engineering and testing sector is expected to increase from 18% of the combined construction workforce in 2022 to 21% in 2030, and to 22% in 2035. In addition, the growth in the architectural, engineering and testing services sector accounts for 80% of the expected growth in the combined construction sector workforce to 2035.

The Cedefop Skills Forecast 2025 model estimates that the average replacement rate of the workforce due to retirement will be 3.1% per year. If applied to the combined construction sector, this would imply that just over 550,000 workers will be replaced per year, a total of 7,726,531 workers across the period. In addition to the potential growth, this would mean that a total of 8,720,923 new workers will enter the sector between 2022 and 2035.

The base Cedefop Skills Forecast 2025 model[102] includes factors that are relevant to the construction sector, including the impacts of the Fit for 55 agenda, with an emphasis on energy generation. Assumptions relating to the Fit for 55 are based on a mixed policy scenario that balances the impact of regulatory action and carbon pricing. Assumptions include the extension of the Emissions Trading System[103] price signals to road transport and buildings, and on intensification of energy and transport policies to achieve emissions targets, including:

- Energy balances by sector, energy carrier and Member State
- Power generation mix by technology by Member State
- Emission results by Member State
- Carbon pricing levels and coverage
- Additional EU investment requirements (e.g. power plants, energy efficiency)
- GDP impacts. Changes to consumer expenditure, investment and trade

The model also makes assumptions of the continuation of existing trends in automation and digitalisation, with increased capacity in advanced digital skills and technologies, as well as increased automation.[104] The 2025 Forecast also assumes a slight decline in the European population to 2035 based on EUROPOP2023 projections and a return to GDP growth of 1.7% in 2025 based on forecasts.

Previous estimates illustrate the impact of different assumptions, baselines, and historic trends at different points in time on forecasts. For example, a previous Cedefop analysis in 2023, based on the 2020 Forecast[105] suggested there was a potential that green transition effects in the construction sector

[102] For more information see Cedefop (2024) 2025 skills forecast technical report (December 2024) available at https://www.cedefop.europa.eu/files/skills_forecast_2025_technical_report.pdf and the Cedefop (2023a) Skills Forecast Methodological Framework (April 2023) available at https://www.cedefop.europa.eu/files/skills_forecast_methodological_framework.pdf

[103] As part of the 2023 revisions of the ETS Directive, a new emissions trading system named ETS2 will be introduced in 2027. Separate from the existing EU Emissions Trading System (EU ETS), this new system will cover and address the CO2 emissions from fuel combustion in buildings, road transport and additional sectors (mainly small industry not covered by the existing EU ETS).

[104] Analysis of the impact of the circular economy conducted on behalf of the Commission in 2018 suggested a potential reduction in employment needs in the construction sector through productivity gains through efficient building techniques, modular construction, alongside other assumptions in relation to demand. Cambridge Econometrics, Trinomics, and ICF (2018) Impacts of circular economy policies on the labour market Final report. Retrieved 19.11.25 from https://circulareconomy.europa.eu/platform/sites/default/files/ec_2018_-_impacts_of_circular_economy_policies_on_the_labour_market.pdf

[105] Cedefop (2023b) The greening of the EU construction sector: Skills intelligence data insight. Retrieved 19.11.25 from https://www.cedefop.europa.eu/en/data-insights/greening-eu-construction-sector

could lead to a decrease in the total size of the workforce of around 1% between 2021 and 2035. This would have translated into a decline of around 180,000 jobs (but with ongoing replacement demand over the period). However, Cedefop analysis in 2021, which looked more closely at the impacts of the Green Deal, suggested that plans for investment in energy efficiency could increase employment in construction by 3.8% by 2030 compared with the baseline estimate at the time (2020) and also with further potential for greater increases.[106] This degree of growth implied an additional 519,063 jobs based on the NACE F base Cedefop estimates for 2030 (to a total employment level of 14,937,487).

The report 'Skills and quality jobs in construction in the era of the European Green Deal (EGD) and post-COVID recovery'[107] that was published by the International Trade Union Confederation's Just Transition Centre in collaboration with the European Federation of Building and Woodworkers in 2023, and with financial support from the European Commission, also made estimates of employment and recruitment needs associated with the renovation wave by 2030. The core estimates were underpinned by an input model based on the level of intended investment set out by the Renovation Wave objectives and targets, based on energy renovation of 2% of building stock.[108] The method used in this report has informed the approach presented in the following subsection (Section 3.2).

The analysis suggests a significant increase in the construction workforce, specifically in the specialist construction subsector, would be needed to meet Renovation Wave targets. The report estimated an increase in the building and construction and specialist construction workforce engaged on renovation of buildings of between 5% (486,600) and 15% (1,549,000) by 2030, a total workforce engaged on renovation activities of between 10,085,026 and 9,022,488.[109] This is in addition to the 1,259,647 estimated new recruitments to support the replacement of job leavers and retiring workers.

Eurofound analysis of the wider impact of the Fit for 55 package suggests that the share of EU employment in construction is expected to increase from 6.8% in 2019 to 7.1% in 2030, which would equate to a total employment in the construction sector of 14,668,600.[110] In the main scenario, there

[106] Cedefop (2021). *The green employment and skills transformation: insights from a European Green Deal skills forecast scenario*. Publications Office, Luxembourg). Retrieved 19.11.25 from http://data.europa.eu/doi/10.2801/112540

[107] Mella, A. and Werna, E (2023) Skills and Quality jobs in construction in the framework of the European green deal and the post covid recovery. (Brussels, EFBWW and the JTC of the ITUC). Retrieved 19.11.25 from https://www.ituc-csi.org/IMG/pdf/230630_-_jtc_study_report_may_2023.pdf

[108] The estimates are based the following model. Direct jobs = Total EE Investments × Emp Multiplier (16.5, 18 and 19,5 jobs per Million Euros invested). The first scenario assumes a leverage factor of 3 meaning that 1 euro of public investment gathers 3 Euros of private investments. EE renovation leverage factors vary between 1 to 1.5 and 1 to 4 according to existing research. In addition, the estimates also include calculations for output multipliers, indirect and induced employment.

[109] The report appears to estimate that 72% of workforce in the NACE F.41 (construction of buildings) and NACE F.42 (Specialised construction activities (NACE F.43)) are engaged in energy efficient construction and renovations. Whilst the input methodology appears to be sound some clarifications are needed in the way the report has calculated employment shares in the construction sector including those engaged on energy efficient renovations. For example, the report implies that energy efficient renovation is based on adding two principal sub sectors, Construction of buildings (NACE F.41) and Specialised construction activities (NACE F.43). However, it also implies that the workforce engaged on energy efficiency renovations is estimated to be 72% of these sub sectors. Based on the 2024 sector breakdown this would represent 8,893,728 workers engaged on energy efficient renovations, with an additional 4,037,158,72 workers engaged in other construction activities (NACE F). It is not clear where the 72% share originates or how this is applied in terms of calculating estimated workforces. For example, based on the CEDFOP NACE F estimates for 2030 assuming the workforce shares from 2014 apply would suggest that the projected estimate of 10,381,265 workers combined with the additional is below the most recent Cedefop skills forecast estimate. These discrepancies may be illustrative of uncertainty in estimates linked to COVID-19 disruptions.

[110] Eurofound (2023), Fit for 55 climate package: Impact on EU employment by 2030, (Publications Office of the European Union, Luxembourg). Retrieved 19.11.25 from https://www.eurofound.europa.eu/en/publications/all/fit-55-climate-package-impact-eu-employment-2030

are expected to be an extra 2.1% or 312,000 construction jobs linked to energy efficiency and green transition investments (over the baseline), an estimated total of 14,980,600. The report suggests an implied labour intensity of seven jobs per €1 million invested and allocated public investments of 43 billion, of which renovation of buildings is 27 billion (63%), construction of power plants is 5 billion (12%) and grid networks 10 billion (23%).[111] As noted, the most recent estimate by Eurofound suggested that the objectives of the EU Renovation Wave alone will require between 486,000 and 1,549,000 additional workers, with this figure rising to 7 million when replacements as a result of the demographic ageing of the construction workforce are taken into account.[112]

3.1.1. National level factors

The models examining the specific impacts of the green transition and Renovation Wave are influenced by inputs of public investment.[113] The 2023 review of National Energy and Climate Plans (NECPs) [114] and the 2022 review of National Renovation Plans[115] and the 2025 EU-wide assessment of the final updated National Energy and Climate Plans[116] noted that actual rates of investment and renovation likely lag targets and milestones. These reviews have also noted no standard or consistent approach to renovation rate indicators across the EU, and few updates to long-term strategies to 2050. The review noted the importance of skills for the clean energy transition, but also noted the different approaches and granularity of national estimates of employment and skills needs.[117]

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[111] The actual scale of investment and implied labour intensity is less clear in terms of detailed or specific estimates for the demand of skills in the construction sector.

[112] Eurofound (2025a), Building on growth potential: Preparing the construction sector for the twin transitions, (Publications Office of the European Union, Luxembourg)

[113] Analysis of the Member State cohesion policy funding (Cohesion policy support for energy efficiency and building renovation 2021 – 2027 (2023)) also suggests that of the €20bn EU funds, three quarters (€15.3bn) will go to projects subject to minimum energy savings criteria (medium depth renovation). Member states have prioritised public sector investment in their planning for cohesion policy funding. Public sector infrastructure attracts the highest share of funding at €10.6bn (53% of funding for energy efficient renovation). Renovation of the housing stock attracts €6.4bn (32%).

[114] See Commission Staff Working Document EU-wide assessment of the final updated national energy and climate plans Delivering the Union's 2030 energy and climate objectives Brussels, 27.5.2025 SWD(2025) 140 final. Retrieved 19.11.25 from eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52025SC0140

[115] "As a new requirement introduced EPBD, MSs shall provide the expected share of renovated buildings in 2020. This share may be expressed in different ways, e.g. as a percentage, an absolute number of buildings or renovated floor area per type of building and is a first important milestone that set the benchmark for the subsequent milestones in 2030 and 2040. However, only less than half of strategies (13 out of 29) included this information, using a variety of indicators and calculation methodologies." Castellazzi, L, et al (2022) Assessment of first long-term renovation strategies under the Energy Performance of Building Directive (Art. 2a), EUR 31309 (Publications Office of the European Union, Luxembourg) Retrieved 19.11.25 from https://publications.jrc.ec.europa.eu/repository/handle/JRC128067

[116] Forthcoming integrated national energy and climate progress reports are due to Expected impacts on jobs, labour markets and skills (1) include skills elements. As part of this Member States may provide quantitative elements on the expected evolution of labour market as a result of policies (e.g. sectors that will grow, others that will shrink, and by how much) and describe measures adopted/to be adopted to accompany this transition, including as regards education and training policies as well as social protection Unclear how consistent the approach to calculating skills needs will be between reports. See Commission Implementing Regulation (EU) 2022/2299 of 15 November 2022 laying down rules for the application of Regulation (EU) 2018/1999 of the European Parliament and of the Council as regards the structure, format, technical details and process for the integrated national energy and climate progress reports C/2022/8251 OJ L 306, 25.11.2022, pp. 1–98 available at http://data.europa.eu/eli/reg_impl/2022/2299/oj

[117] In the context of construction Bulgaria was noted for establishing specific objectives and need in relation to construction sector employment whilst specific recommendations to address labour shortages and skills to support renovation agendas were noted for Hungary and Cyprus for example. Areas that were noted that are likely to drive demand for skills of relevance to the construction sector,

In this context, up-to-date and consistent data on rates of renovation are not available. There will be variations in the construction workforce required to deliver renovation at national levels, depending on the depth and building stock. For example, the target of 3% to 4% deep renovation of the EU residential building stock per year[118] is estimated to mean in the order of 23,000 units daily until 2050.[119]

Eurostat data for 2022 shows that 47.5% of the EU population lived in flats, including 27% that were in blocks of flats of more than 10 dwellings, more than one third (36%) lived in detached houses and whilst 16% lived in semi-detached or terraced houses.[120] There are also significant variations in terms of this mix between countries, from Ireland, which has the lowest share of flats (7%), through to Spain, which has the highest share of flats (45%).

Other factors that are likely to drive diversity of demand for construction skills between different countries include:

- The specific types of occupations and construction methods likely to be in demand for future renovation and new build, e.g. prevalence of district heating or modular construction methods.
- The profile of national construction sectors, including supply of workers and required skills, and differential rates of shortages and surpluses in terms of workers and demand.
- Other national factors shaping domestic construction sector demand, e.g. investment in new build construction and infrastructure construction, or trends in urbanisation[121]

3.2. Sector-level estimates and scenarios (2030)

This section further examines forecasts on the potential volume of people who will be employed in construction. It primarily examines the potential impacts of investments associated with the Renovation Wave (2020) and the Fit for 55 agenda on levels of employment and further illustrates potential impacts of increases in investment that might be linked to the affordable housing strategy and action plan. The approach builds on the method used in the report 'Skills and quality jobs in construction in the era of the EGD and post-COVID recovery'[122] (2023) and updates some of the assumptions.

The model is not founded on comprehensive data or assumptions about potential levels of public investment associated with relevant EU or national strategies. It incorporates current economic outputs and examines the potential impacts of additional investment associated with the energy efficiency of building, including the Renovation Wave. It presents an estimate to 2030 and assumes that investment associated with meeting Renovation Wave objectives is the main investment variable during this time.

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in addition to renovation needs, included installation of recharging networks for decarbonisation of transport systems (Bulgaria); construction of nuclear power plans (Italy, Slovenia, Czech republic) and skills for the clean energy transition including digitalisation and electrification more generally; recommendation to ensure that adaptation measures address construction standards and design of energy systems (Spain and Romania).

[118] BPIE (Buildings Performance Institute Europe) (2021). Deep Renovation: Shifting from exception to standard practice in EU Policy. Retrieved 19.11.25 from https://www.bpie.eu/ publication/deep-renovation-shifting-from-exception-to-standard-practice-in-eu-policy/

[119] See for example Renovation Roadmap: Making Europe's homes fit for the 21st century available at https://www.corporateleadersgroup.com/system/files/documents/renovation-roadmap-making-europes-homes-fit.pdf https://www.corporateleadersgroup.com/system/files/documents/renovation-roadmap-making-europes-homes-fit.pdf

[120] Eurostat Distribution of population by degree of urbanisation, dwelling type and income group [ilc_lvho01]

[121] See for example Urbanisation in Europe available at https://knowledge4policy.ec.europa.eu/foresight/topic/continuing-urbanisation/urbanisation-europe_en

[122] Mella, A. and Werna, E (2023) Skills and Quality jobs in construction in the framework of the European green deal and the post covid recovery. (Brussels, EFBWW and the JTC of the ITUC). Retrieved 19.11.25 from https://www.ituc-csi.org/IMG/pdf/230630_-_jtc_study_report_may_2023.pdf

However, additional investments may come on stream, or the timelines for potential investments may change, so it is not intended as a precise planning estimate, including investments associated with the affordable housing strategy.

As a result, this exercise is intended as an indicative estimate that builds on previous estimates to further examine potential trends in construction sector employment and drivers. Beyond the complexity of assumptions in levels of investment, as well as other potential policy or economic impacts, other inevitable limitations in the estimates include:

- **Inconsistent data sources**: the estimate necessarily relies on some inconsistent data sources, making comparisons and accuracy difficult.
- **Outdated economic multipliers**: defining employment and output multipliers runs the risk of using figures based on outdated data, which may miss recent economic developments.
- **High scenario sensitivity**: Any scenarios examined will be highly sensitive to small changes in assumptions, which may cause significant errors.

The model primarily focuses on direct and indirect jobs, which include both the narrow and combined construction sectors as well as wider supply chain elements (such as logistics and manufacturing). The limitations in the model will directly affect both the direct and indirect job estimates, as each relies on multipliers and productivity measures that amplify uncertainty in the assumptions. With these caveats in mind, the model used to estimate job creation resulting from investment is described below.

3.2.1. Method

In 2024, direct employment in the combined construction sector was equal to 17 million[123], as made up of the 'M.71: Architectural and engineering activities; technical testing and analysis', 'F.41: Construction of buildings', 'F.42: Civil engineering', and 'F.43: Specialised construction activities' NACE Construction subsectors.[124] This will be used as a baseline figure for construction sector employment.

Direct Jobs are expected to be those employed in the construction and combined construction sector (NACE F and M.71). These include jobs in the construction sector (NACE F) as well to a degree jobs in the combined construction sector (inclusive of NACE M.71). This includes all occupations employed in these economic sectors, including ancillary roles such as administration and management roles as well as engineering, science and technical roles (particularly those associated with M.71). Construction sector jobs are calculated by the following formula:

$$\text{Direct jobs}_i = \text{Total Energy Efficiency investment}_i \times \text{Employment multiplier (jobs per €)}$$

These were based on existing research on construction job creation. This lumps all types of spending together, assuming an average labour intensity.[125]

Existing literature is uncertain on the magnitude of the employment multiplier. This estimate currently uses a multiplier of 10-14, which may be considered conservative. For example, the report 'Skills and Quality Jobs in Construction: In the framework of the European Green Deal and the post-COVID recovery' uses a multiplier of 16.5-20. To address this uncertainty, we also use three different employment multipliers across this range, representing maximum, medium and minimum scenarios.

Indirect jobs are those that may be engaged in the combined construction sector (inclusive of NACE M.71), where the sector is not necessarily directly engaged in construction activities. Indirect jobs also include the broader construction supply chain or industrial ecosystem. This includes manufacturing of supplies and equipment, wider logistics and supply chains that are associated with and spurred by construction activity, and real estate and buildings management. The approach to calculating these

[123] Rounded from 16,819,400 (2024)
[124] Eurostat statistics: Employment by sex, age and detailed economic activity (lfsa_egan22d)
[125] Spending could go to labour vs. materials in different proportions.

Backwards Linkages using output multipliers for construction, following the JTC report approach, is as follows:

$$\text{Indirect jobs}_i = \frac{(\text{Output multiplier}_i \times \text{Total EE investment}_i)}{\text{Labour productivity}_i}$$

Output multipliers estimate how much additional output is generated across sectors per €1 of construction spending. Further analysis is needed to be confident in output multipliers. The current output multiplier in the construction sector used in this estimate is 0.96.[126] Using this figure, we then multiply overall spending in construction and divide by labour productivity to derive an estimate of job numbers. Limitations include:

- A single output multiplier assumes fixed economic relationships, which may not hold over time, including in the context of green-specific renovations or consistently across different national contexts.
- There may not be a one-for-one transfer of labour productivity to jobs, with some friction between productivity and jobs, meaning the estimate for indirect jobs is likely too high.

The analysis also includes data for **induced jobs** for completeness. Induced jobs result from the income effects or construction and supply chain workers spending their wages and creating jobs in consumer industries. This is the most speculative aspect of job calculations and is not the focus of this analysis.

$$\text{Induced jobs}_i = \left(\frac{(\text{Direct jobs}_i + \text{Indirect jobs}_i) \times \text{Expenditure multiplier}_i \times \text{Avg. gross earnings}_i}{\text{Labour productivity}_i}\right)$$

Methodology

A fixed expenditure multiplier of 0.6 was used, meaning 60% of income is spent domestically.[127] Average national wages and productivity were used to estimate how much spending supports one job. Limitations:

- Induced jobs are the most speculative due to wide variability in consumer behaviour, especially in the context of the EU, with significantly different economies and cultures examined.
- The 0.6 multiplier may not hold in all contexts—e.g., during high inflation or economic uncertainty, people may save more or pay off debt.
- Rising wages mean more spending is needed to support each job, likely reducing induced job counts if updated.

Finally, total jobs can be calculated by approximating jobs created in the future with adjustments made for changing labour productivity and job leavers. Labour productivity is assumed to increase at 0.5% a year, and we have assumed an annual job leaver rate of 8%.

Main Variables and Assumptions

Several assumptions containing a degree of uncertainty underpin the estimates. These include:

[126] The output multiplier is potentially a significant variable in this estimate and likely requires dedicated in-depth investigation. The figure currently used in this report is derived from recent analysis of social and economic impacts of spending in the construction sector available at Final-Report-Economic-social-and-environmental-multipliers-for-the-construction-and-built-environment-in-Scotland.pdf

[127] Mella, A. and Werna, E (2023) Skills and Quality jobs in construction in the framework of the European green deal and the post covid recovery. (Brussels, EFBWW and the JTC of the ITUC). Retrieved 19.11.25 from https://www.ituc-csi.org/IMG/pdf/230630_-_jtc_study_report_may_2023.pdf

- Total energy efficiency (EE) and other construction sector public investment
- Employment Multiplier
- Output multiplier
- Expenditure multiplier
- Replacement rate

Determining Investment Inputs: Built up from multiple sources the investment inputs for the European construction sector vary from a picture of current trends of **€39.2 billion a year in public investment** and **€68 billion a year in private investment** to the full meeting of the investment and renovation targets amounting to **€90.75 billion a year in public investment** and **€184.25 billion a year in private investment**. A mid-range between these two points would therefore be around **€60.49** billion a year in public investment **and €122.81 billion a year in private investment**.

Calculating Direct Jobs: Applying these investment profiles – inclusive of maximum, medium, and minimum scenario multipliers – we can calculate direct jobs created by the investment:

- **Direct Jobs** = Total Investment (in € million) × Jobs per €1 million
- **Direct Jobs (max)** = 275,000 million × 14 jobs/million = 3,850,000 jobs.
- **Direct Jobs (med)** = 183,300 million × 12 jobs/million = 2,199,600 jobs.
- **Direct Jobs (min)** = 107,200 million × 10 jobs/million = 1,072,000 jobs.

In practice, the estimates of the rate of the number of jobs may be conservative. Some estimates place the impact of investment specifically in relation to renovation as high as 18 jobs per million of investment, but with variations at Member State levels.[128]

In other words, about **2.2 million direct jobs** generated by €183,300 billion in construction sector spending a year (using the ~12 jobs/€1M).

Calculate Indirect Jobs: Jobs occur in supply chains (producing materials, equipment, etc.). Using a hypothetical *output multiplier* in the construction sector, which we have assumed to be 0.96. With our medium scenario of 183 billion in construction output, **supply-chain output = €183 billion × 0.96 = €176 billion** in related sectors.

Next, we convert that output to jobs by assuming a labour productivity in suppliers. According to Eurostat statistics, labour productivity in the construction sector sits at €50,154 (i.e. ~1 job per 0.05 million output)[129]. Then:

- **Indirect Jobs** = Supply-chain Output / Output per Job
- **Indirect Jobs (max)** = 264,000 million / €50,154 = 5,263,787 jobs.
- **Indirect Jobs (med)** = 175,968million / €50,154 = 3,508,553 jobs.
- **Indirect Jobs (min)** = 102,912million / €50,154 = 2,051,920 jobs.

So approximately **3.5 million indirect jobs** are created in manufacturing and logistics in our medium scenario.

[128] Renovate Europe (2020) Building renovation: a kick-starter for the EU recovery. Retrieved 10.12.25 from https://www.renovate-europe.eu/2020/06/10/building-renovation-a-kick-starter-for-the-eu-economy/

[129] Based on Eurostat data for GVA and Employment in the construction sector.

Calculating Induced Jobs: Induced jobs from construction and supplier workers spending their wages in the whole economy (all NACE activities). We have assumed that **60% of extra income is spent domestically** (expenditure multiplier = 0.6). We also link average wage and productivity to spending that creates jobs.

For our medium scenario total new income from the direct and indirect jobs: (2,199,600 + 3,508,553 jobs) × €37,900 = €215 billion in wages. 60% of this is spent on domestic goods/services: **€215 billion × 0.6 = €130 billion** of extra consumer spending. Now convert that to jobs at ~€50,000 output per job:

- **Induced Jobs (med)** = €130 billion / € 50,154 = 2,588,096 jobs.

Following this same rule for our maximum and medium scenarios:

- **Induced Jobs (max)** = €350 billion / € 50,154 = 4,132,222 jobs.
- **Induced Jobs (min)** = €70 billion / € 50,154 = 1,416,396 jobs.

Summation – Total Job Impact: Adding up the three categories yields our summation of total created jobs a year:

- Total Job Impact (Max): 11,490,775 jobs
- Total Job Impact (Med): 8,296,249 jobs
- Total Job Impact (Min): 5,996,949 jobs

3.2.2. Results

Based on this[130], we can produce an estimate for the total employment that is associated with the construction sector after the five-year period from 2025 to 2030:

Table 5: Construction sector jobs estimate

Employment	Minimum Scenario	Medium Scenario	Maximum Scenario
Direct Jobs	15,700,000	20,500,000	27,500,000
Indirect Jobs supported	5,800,000	10,000,000	15,000,000
Induced Jobs	3,800,000	7,100,000	11,500,000

When taking these estimates, if direct jobs are associated with the combined construction sector, including construction (NACE F) and architectural, engineering and testing services (NACE M.71) sectors, this would imply a decline in the total size of the combined construction workforce of approximately 1.2 million (over 2024 data). However, the assumptions in relation to investment inputs are primarily relevant to the construction subsector and, more specifically, the specialised construction activities subsector, so they may underestimate subsequent outputs.

[130] Incorporating a job-leaver rate of 8% per year. Estimated from an annualised quarterly job leaver rate of ~2%. and a rising labour productivity of 0.5% a year. Based on assumptions made in previous work on forecasting construction labour growth presented in the report, Skills and Quality jobs in construction in the framework of the European Green Deal and the post-COVID recovery. (Brussels, EFBWW and the JTC of the ITUC). Retrieved 19.11.25 from https://www.ituc-csi.org/IMG/pdf/230630_-_jtc_study_report_may_2023.pdf

If direct jobs in this model are associated with the construction sector segment (NACE F), the total number of jobs associated with the sector increases by approximately 1.9 million (up from 13.8 million) in comparison to 2024, a total increase of 14%. In comparison, the base 2030 Cedefop Skills Forecast 2025 estimates a workforce in the construction sector of 14.4 million in 2030, meaning a 8% difference between the two estimates (a total of circa 1.3 million workers). However, by way of illustration, this would be less than some estimates of the relative increase in the size of the workforce. This includes previous Cedefop estimates, such as the analysis of green employment and skills transformation based on the 2020 Forecast[131], and the more recent estimates from the Cedefop Skills Forecast 2025.

If all the estimated indirect jobs in the minimum scenario are associated with architectural, engineering and testing (M.71) sector, this would imply a close to doubling of the total level of employment (from 2.9 million to 5.8 million) from 2024. By way of illustration, this would exceed the estimated 20% increase in size of this sector forecasted in the Cedefop 2025 Skills Forecast to 2030 (total of 3.7 million), and 25% increase by 2035 (total of ~4 million). In practice, indirect jobs would also include additional sectors and activities outside the scope of this report, including supply chain and logistics, manufacturing, real estate and building management sectors.

The medium scenario is based on an increase in investment over current levels to achieve renovation wave objectives. This would result in an increase of circa 3 million workers directly employed in the combined sector in comparison to 2024, an increase of approximately 20%. The maximum scenario would imply an additional 7 million direct workers across the combined construction sector. In both these cases, a share of indirect jobs could be associated with the architectural and engineering segment, however, both are based on hypothetical and significant and short-term increases in investment that would likely be associated with the direct employment segment.

Whilst the analysis should be treated as indicative estimates, it illustrates the potential scale of employment demand in the construction sector, should investment be increased to meet the Renovation Wave and broader Fit for 55 objectives. Clearly, the maximum scenario of an increase in workforce of circa 60% is unlikely to be feasible, as it is based on a significant increase in public and private investment that has not been achieved previously and is unlikely in the near term. However, it illustrates that the scale of envisaged investment may drive and depend on a supply of additional workers to meet targets, including if investment timelines are extended.

3.2.2.1. Estimates for women in the construction workforce

We can estimate the future proportion of women in the construction sector using the trend formed from the past 10 years.[132] This linear trend model for the proportion of women in the construction sector over time would take the form:

$$\hat{p}_t = \beta_0 + \beta_1 \cdot t$$

Where:

- $\hat{p}_t$ forecasted proportion of women in the construction sector at the time t
- β_0 intercept (baseline level when $t = 0$)

[131] Cedefop (2021). *The green employment and skills transformation: insights from a European Green Deal skills forecast scenario*. Publications Office, Luxembourg). Retrieved 19.11.25 from http://data.europa.eu/doi/10.2801/112540

[132] Employed persons by detailed economic activity (NACE Rev. 2 two-digit level) (2008-2026) (lfsa_egan22d) – Composite construction sector made up of 'Architectural and engineering activities; technical testing and analysis', 'Construction of buildings', 'Civil engineering', and 'Specialised construction activities' NACE Construction subsectors.

- β_1 slope (average change in proportion per unit of time)
- t time in years fitted from 2013 to 2023

From this fitted model, we can derive an estimate of the proportion of women in the combined construction sector in 2030 of 15.9%. This compares to 14.5% of the combined construction workforce in 2024, so it would represent a 9.6% increase in the share of the female workforce in construction over the next five years. Whilst this is less than the total 14% increase in share of the female workforce in the combined construction sector between 2015 and 2024 (increase from 12.7% to 14.5%), it exceeds the 6.7% increase in share observed between 2015 and 2019 when the share rose from 12.7% of the workforce to 13.6%. It also exceeds the 8.3% increase in share from 2015 to 2020, the 5.1% increase in share between 2020 and 2024 and the 6.7% increase between 2019 and 2024 and would significantly exceed the 1.4% increase in share from 2021 to 2024.

Based on the above scenarios, this means that in the minimum scenario, there will be ~2.5 million women in the construction sector. If these direct jobs in the low scenario are applied to the combined construction sector, this would represent a generally flat female workforce in terms of overall size (in contrast to the potential decline in the size of the combined construction workforce). If direct employment in the low model is attributed only to the construction sector (NACE F), based on an estimate of a 12% share of the construction workforce in 2030 (up from 11% in 2024), female workers in the construction sector in the low scenario would be circa 1.9 million. This would represent an increase of approximately 300,000 female workers, or a 20% increase over the 2024 female construction sector workforce.

In the medium scenario, there will be ~3.2 million women employed in jobs in the combined construction sector. If applied to the combined construction sector, this would represent an increase of approximately 400,000 female workers, equivalent to a 16% increase in the size of the female workforce. In the maximum scenario, there would be a total of ~4.3 million women in the construction sector, which would be equivalent to a 1.3 million increase in the size of the female workforce in the combined construction sector, a 52% increase. As noted above, in both these scenarios, women would make up just under 16% of the combined construction workforce.

As with all the estimates in this analysis, it is important to note the limitations of trend analysis. A key limitation of using a linear trend is that it assumes the proportion of women in construction will continue indefinitely based on historic trends. However, participation may slow, stagnate, or accelerate depending on broader structural factors such as government policy, economic cycles, cultural change, or industry-specific recruitment practices. Other factors may include greater potential growth in terms of the size of the potential pool of female labour relative to males, who are already heavily represented in the construction workforce.

In the absence of robust counterfactual data, alternative models are also unlikely to be more robust. For example, we may assume that, based on previous growth in the share of occupations associated with women, the share of women in the workforce will further increase, and these historical trends are reflected in this model. This would require further assumptions about gender-based labour market dynamics that are beyond the scope of this specific report, including potential pipeline effects of policy interventions and would require further dedicated research and analysis.

3.2.2.2. Leavers and replacement rates

Leavers and replacements will also drive the need for training of new workers, including in the context of an ageing workforce. There was a total of 4.5 million job-leavers in the EU in the first quarter of

2025[133] out of a total employed population of 198 million[134]. This amounts to a leaving rate of 2.3%. Annualising this comes to 9.2%. As an estimate of job leavers, this figure is useful but does not account for age structures, misses sectoral differences, and reasons for exits (e.g. redundancy or contract expirations). Because of this, it should be seen as an indicator of flows out of employment into non-employment rather than a true measure of overall labour turnover.

To be conservative – accounting for the potential for this measure to be an overestimate – we have set this figure to 8% annually. As such, assuming a baseline of 17 million, the average number of job leavers directly employed in the construction sector a year is around 1.3 million. This is higher than the number of jobs created in the minimum scenario, implying a decrease in direct employment over this period. In the medium scenario, averages around 700,000 new job starters per year in the construction sector after increased jobs minus job leavers at this rate. Similarly, the maximum scenario averages about 2.1 million new job starters per year.

Over the next five years, workforce requirements will vary by scenario as total jobs in the sector diverge. To meet growth demands and replace leavers under these scenarios, the sector may require training as many as 19 million staff under a maximum scenario. Under the medium scenario, training of 11 million staff may be required. And, under the minimum scenario – in which employment in the sector would decline – training of 5 million staff would be required.

- In the minimum scenario, a total of 6.5 million job leavers against 1.1 million jobs created a year means a shortfall of 230,000 jobs annually and a decrease in employment.
- In the medium scenario, a total of 7.4 million job leavers against 2.2 million jobs created a year means an average of 730,000 new jobs annually, a total of 3.6 million additional workers over 5 years.
- In the maximum scenario, a total of 8.6 million job leavers against 3.9 million jobs created a year means an average of 2.1 million new jobs annually, a total of 10.7 million over the next five years.

Table 6: Worker replacement and training needs estimates

Employment Change	Minimum Scenario	Medium Scenario	Maximum Scenario
Total Job Leavers	6,500,000	7,400,000	8,600,000
Annual growth in the workforce	-230,000	730,000	2,100,000
Total change (2024-2030)	-1,200,000	3,600,000	10,700,000
Total workers to be trained	5,300,000	11,000,000	19,300,000

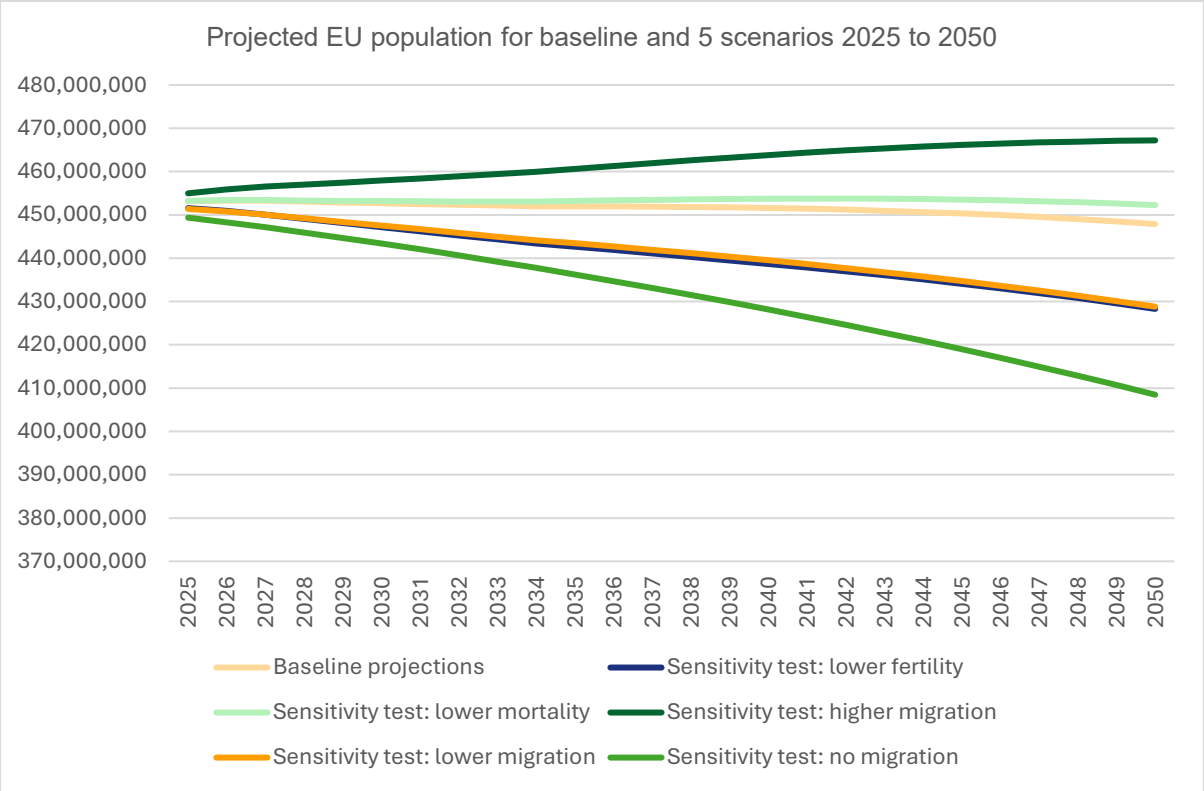
Annex B, Table 15, presents a table with full breakdown of the headline scenario results.

[133] Eurostat: Recent job leavers by sex and age - quarterly data (lfsi_lea_q)
[134] EU labour market - quarterly statistics (September 2025) available at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_labour_market_-_quarterly_statistics#:~:text=the%20EU%20countries.-,Employment%20rate%20and%20labour%20market%20slack%20up%20in%20the%20EU,stable%20compared%20with%20Q4%202024.

3.3. Longer-term estimates (2050)

This section presents estimates for the potential volume of construction sector employment to 2050. Figures are presented as illustrative or indicative of potential long-term trends. Longer-term estimates have a much higher degree of uncertainty. Macro factors that affect longer-term predictions include dimensions, including uncertainty about potential EU population levels, including the probability of a declining EU population (Figure 40), associated impacts on median age and working age populations, and economic wealth.

Figure 40: Projected population for baseline and 5 scenarios, 2025 to 2050



Source: Eurostat Demographic balances and indicators by type of projection [proj_23ndbi]

3.3.1. Method

This analysis employs a structural regression and Monte Carlo simulation framework to forecast construction employment across the European Union from 2025 to 2050. The baseline structural model relates employment growth to output growth[135], productivity growth[136], and changes in labour supply[137] incorporating stochastic shocks to reflect uncertainty. Historical Eurostat data are used to estimate elasticities and covariances among these drivers, while the Monte Carlo process carries these uncertainties forward to generate probabilistic employment forecasts. The resulting fan chart captures both the central forecast and the expected range of outcomes under this implied macroeconomic variability.

[135] Eurostat: Production in construction - annual data [sts_copr_a] (2008-2024)
[136] Eurostat: Labour productivity per hour worked - annual data – Percentage change on previous period [tipsna70] (2008-2024)
[137] Eurostat: Population change - Demographic balance and crude rates at national level [demo_gind] (2008-2024) and Population on 1st January by age, sex and type of projection [proj_23np] (2025-2050)

Given the absence of consistent historical data on EU-wide green construction spending, the commitment by policymakers towards green policy spending is incorporated deterministically with assumed investment values and job creation as opposed to empirically estimated coefficients. Annual spending on green investment is assumed to sequentially increase over the period from 10 billion euros to 20 billion euros, with an average expenditure per year of 15 billion and a total spend over the whole period of 405 billion.

Job creation is assumed to be made up of investment in construction over productivity, meaning there is an assumed relationship between spending and productivity that remains constant through the period. In these scenarios, for each forecast year, annual green investment is expressed in billions of euros and converted into jobs by dividing average productivity per worker.[138]. This yields the absolute number of new construction jobs created by the investment in that year.

These jobs expressed as a proportion growth relative to current employment is then added to the baseline employment growth implied by the structural regression model. Iteratively calculating this across all years included in the Monte Carlo simulation produces a distribution of possible employment outcomes that includes projected green investment as a determinant.

The equation below shows the baseline structural model used:

$$\ln(\text{Employment Growth}_t) = \beta + \beta_1 \ln(\text{Output Growth}_t) + \beta_2 \ln(\text{Productivity Growth}_t) + \beta_3 \text{Labour Supply}_t + \epsilon_t$$

To properly model the effect of stochastic policy shocks on construction employment, we have projected random policy shocks in the future based on the frequency of policy shocks in the past. Three significant events were highlighted as having led to policy shocks affecting employment in the construction sector in the past. These include:

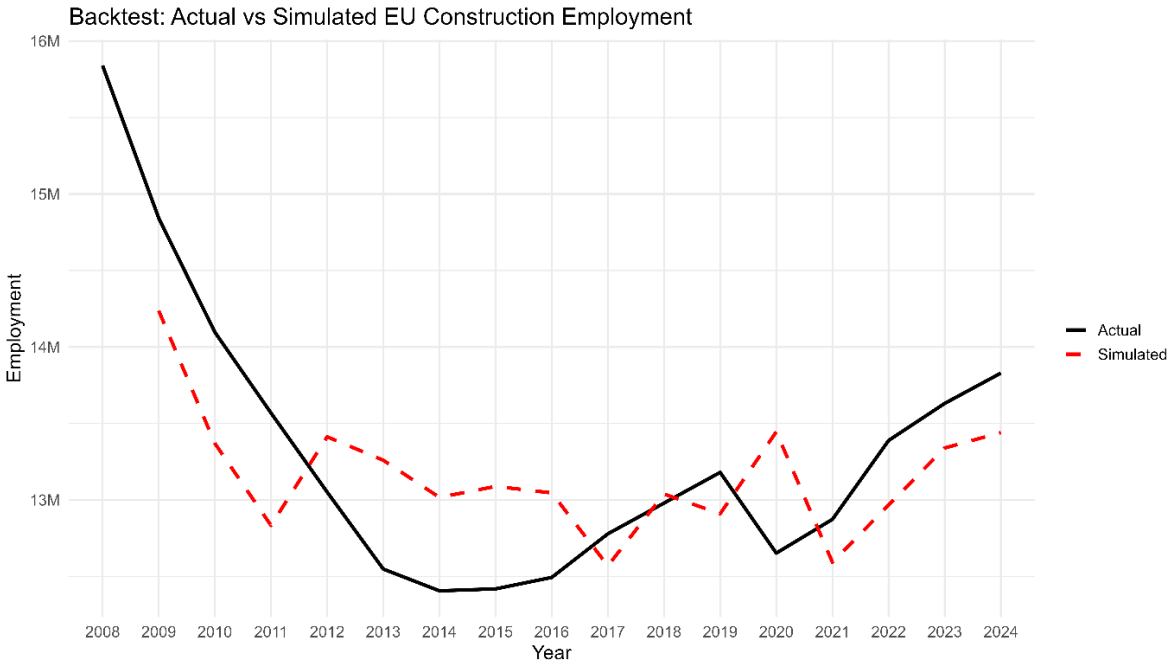
- The 2008 Global Financial Crisis – policy responses included the European Economic Recovery Plan and the European Globalisation Adjustment Fund (EGF).
- The Eurozone Sovereign Debt Crisis – this led to reduced public investment in multiple countries, including Greece, Spain and Portugal, which would have adversely affected employment in the construction sector.
- The COVID-19 pandemic – widespread disruptions to the economy, including the construction sector, led to policy interventions aimed at stabilising the economy.

Given these policy shocks, we have projected forward policy shocks occurring in around 20% of the years between 2025 and 2050. These are modelled as having an initial impact and then having a decaying effect as time goes on. Other factors that may also affect future trends include the complex impacts of policy measures, such as the introduction of the European Trading System 2 in 2027.

This model is reflected in the Figure 41, which shows the actual trend of employment in construction from 2008 to 2024 against the simulated employment using this structural model of employment based on construction output, labour productivity and labour supply in the same years. This baseline structural regression model achieved an adjusted R-squared of approximately 0.18, indicating that around 20% of the historical variation in employment can be explained by the included macroeconomic drivers, i.e. output growth, productivity growth, and changes in labour supply.

[138] Eurostat (August 2025): Businesses in the construction of buildings sector – Productivity - "The apparent labour productivity of the EU's construction of buildings sector in 2022 was €51 500 per person employed"

Figure 41: Simulated vs Actual Data for Construction Employment (based on Structural Baseline Model)



Source: Ecorys analysis

This level of fit is somewhat weak, however, we are drawing from multi-country data where employment responds to a mix of cyclical and structural forces not fully captured by standard macro variables. Additionally, we are only using annual data, reducing the indicative power of the data. This is particularly the case in the construction sector, which is notable for uncertainty and variability. This back-testing exercise suggests that the model tracks medium-term employment dynamics reasonably well but struggles with short-term fluctuations caused by shocks such as financial crises or sudden policy interventions, which is most obvious in 2020/21 because of COVID-19.

The model assumes that past relationships between employment, output, and productivity remain broadly stable through 2050. This may not be the case in the context of technological change, demographic shifts, or automation in construction, however, given the significant uncertainties in the evolution of these factors, it would be prohibitively difficult and complex to attempt to estimate these changes, and as such, a historical model has been chosen as the best alternative.

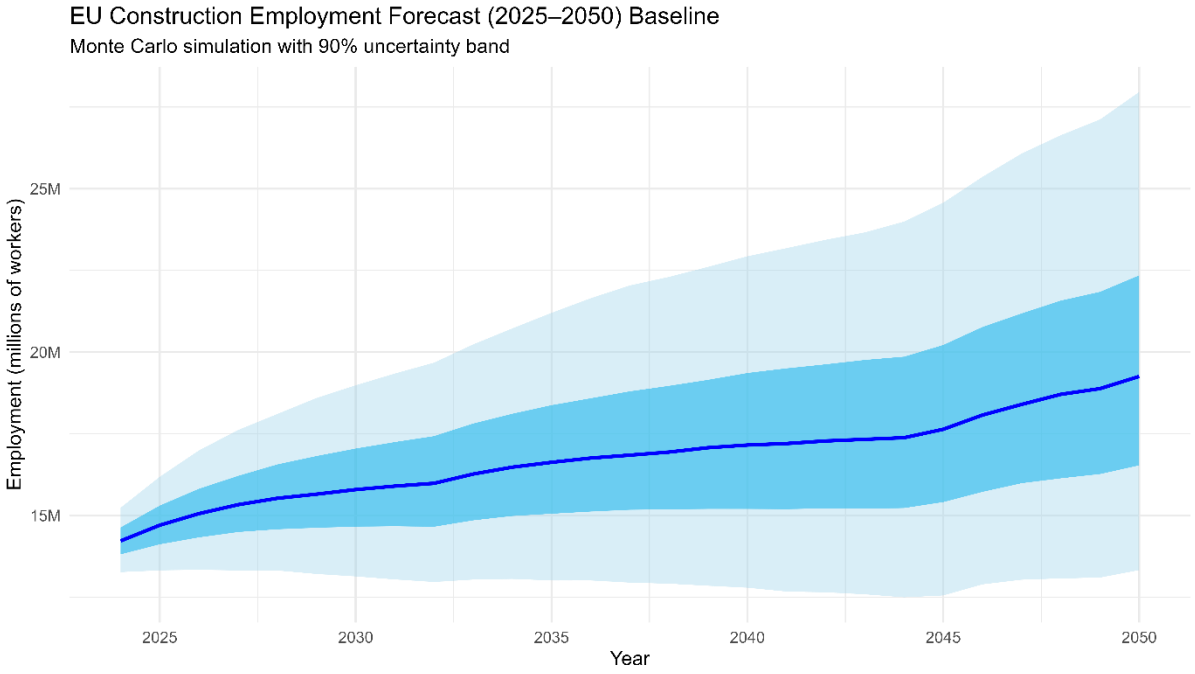
The green investment scenarios are also hypothetical and rely wholly on assumptions around increased investment derived from expected expenditure rather than empirically validated data; actual outcomes would depend on the design, timing, and efficiency of policy spending as well as how expenditure may vary based on the changing priorities of EU policymakers. Additionally, while Monte Carlo methods capture parametric uncertainty, they cannot fully represent structural breaks or unprecedented events. As such, the forecasts should be interpreted as somewhat indicative envelopes of plausible outcomes given a set of held assumptions rather than precise predictions.

3.3.2. Results

The Monte Carlo simulation produced a range of possible employment trajectories for the combined EU construction sector (NACE F and M.71) from 2024 to 2050, reflecting both the uncertainty in the baseline structural model and the hypothesised green investment scenarios. In the baseline scenario. Overall, the simulation results indicate EU construction employment growing at **~1.9% per year** to 2050 under baseline macroeconomic assumptions. This would suggest a median projected employment in

the construction sector of **19.3 million** by 2050. The 5th and 95th percentile outcomes illustrate the model's uncertainty surrounding these projections, resulting in a **fan chart** where the lower bound for the 5th percentiles reaches **13.3 million** and the upper bound for the 95th percentile reaches **27.9 million** in 2050.

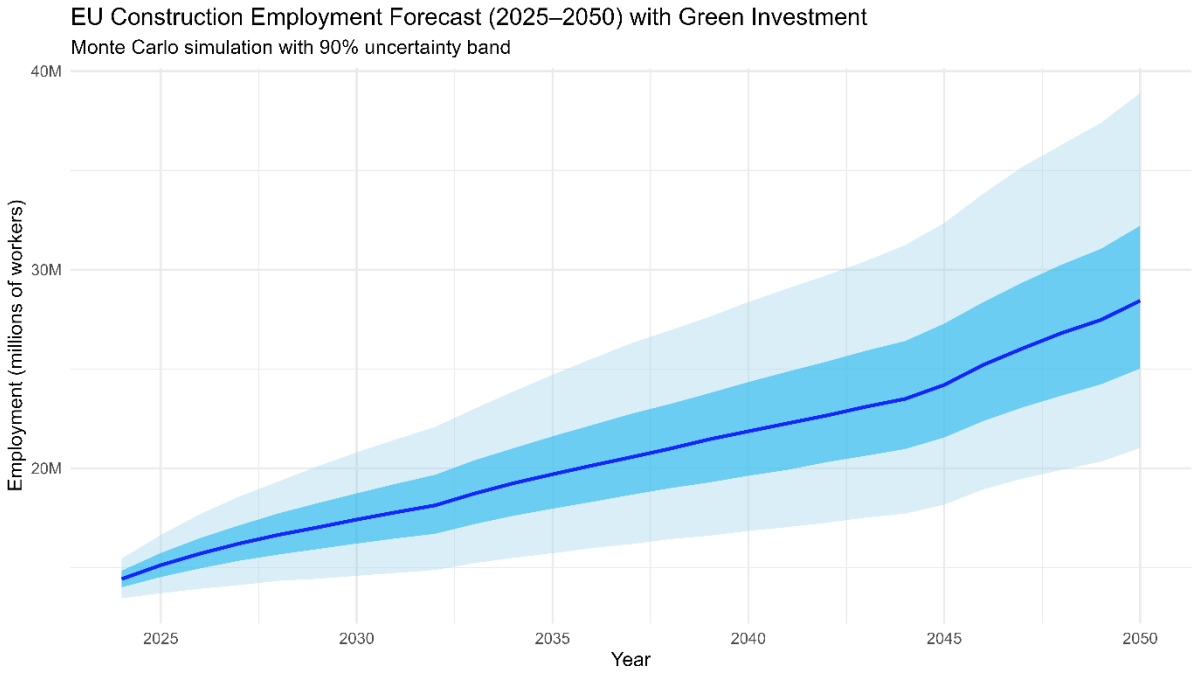
Figure 42: Construction employment forecast (2025-2050) Baseline



Source: Ecorys analysis

For the green investment scenario across 10,000 simulation iterations, the median forecast under this model suggests that total construction employment will grow from approximately **~13.8 million** in 2024 to a median projected employment of **28.4 million** by 2050 (Figure 43). The 5th and 95th percentile outcomes illustrate the model's internal uncertainty surrounding these projections, resulting in a **fan chart** where the lower bound for the 5th percentiles reaches **21 million,** and the upper bound for the 95th percentile reaches **38.8 million** in 2050. This indicates that under the assumed variability and stochastic shocks, there is a **~9 million** variation around the central forecast, highlighting the sensitivity of employment to fluctuations in output growth, productivity, and labour supply and the uncertainty inherent in these predictions.

Figure 43: Construction employment forecast 2050 with Green Investment



Source: Ecorys analysis

In both cases, projections should be interpreted as indicative ranges rather than precise predictions, given the model's assumptions and the inherent uncertainty in long-term labour and investment dynamics. In the case of the green investment scenario, this should be further treated as indicative of potential scale and impacts of potential investment commitments that have not yet been fully realised. These models are most useful as comparative scenarios to approximate the potential difference in construction employment with and without green investment. Where, according to these simulations, the median employment in construction in 2050 with green investment is 29 million, it is only 19 million without. It is clear, therefore, that the potential scale of the green investment may have on employment in construction.

Table 7: Simulated 2050 combined construction sector (NACE F and M.71) employment

Construction employment	Baseline scenario	Green investment scenario
Median projected employment	19.3 million	28.4 million
Lower bound (5th percentile)	13.3 million	21 million
Upper bound (95th percentiles	27.9 million	38.8 million

Annex B, Table 16 further presents a comparative summary of the headline figures from the 2050 simulations.

4. Occupations and skills profiles

This section presents in more detail how these estimates may translate into demand for specific construction sector occupations, and how skills requirements may evolve.

4.1. Background

As with the sector forecasts, the Cedefop Skills forecast also provides estimates on the future composition of occupations in the construction sector.[139] Whilst the data and associated estimates at the detailed occupation level are not intended to be fully accurate at the detailed level, they provide an important reference point for any sectoral elements in relation to the composition of employment in the construction sector (NACE F) into the future.

Table 8 below presents the Cedefop estimates for selected construction sector occupations in 2030.[140] Building and related trades are likely to continue make up most of the occupations in the sector (54% followed by Electrical and electronic trades (12%) and Science and engineering associate professionals (11%). The composition of occupations is broadly expected to remain similar. The main growth occupations are likely to be in the science and engineering professional occupations, with a 1% increase in the share of the Science and engineering associate professionals, as well as Electrical and electronic trades workers and an associated 1% decrease in share for both Building and related trades workers and labourers.

Table 8: Cedefop Skills Forecast 2025 construction sector occupation forecasts

ISCO 2-digit occupation in construction sector (NACE F)	ISCO detailed occupations	2022 (actual)	Shares	2030 (Cedefop estimate)	Estimated percentage change
Building and related trades workers, excluding electricians	71	5,906,106	41%	5,789,738	-1.6%
Electrical and electronic trades workers	74 (7411)	1,301,827	9%	1,327,376	1.7%
Labourers in mining, construction, manufacturing and transport	93 (9312 & 9313)	818,573	6%	753,429	-6.7%
Metal, machinery and related trades workers	721 (7214; 7215)	551,220	4%	542,069	-1.6%
Production and specialised services managers	1323	514,633	4%	535,076	3.5%

[139] European Centre for the Development of Vocational Training (Cedefop). *Cedefop Skills Forecast 2025*, Thessaloniki: Greece, Downloaded from: https://www.cedefop.europa.eu/en/events-and-projects/projects/skills-forecast

[140] Others notable occupations (2022 data) include:
Business and administration associate professionals: 684,139 (6.38%)
Business and administration professionals: 418,594 (26.77%)
Chief executives, senior officials and legislators: 256,070 (2.77%)
Numerical and material recording clerks: 568,141 (2.56%)
Food processing, wood working, garment and other craft and related trades 716,026 (8.59%)

Science and engineering associate professionals	31 (3112; 3123);	1,204170	8%	1,221,911	1.4%
Science and engineering professionals	214 (2142; 2161; 2162)	547,345	4%	599,804	8.7%

Source: Cedefop Skills Forecast 2025[141]

Previous estimates also provide an illustration of potential trends in relation to occupations. For example, the Cedefop report 'The green employment and skills transformation: insights from a European Green Deal skills forecast scenario' (2021), based on the 2020 forecast, previously suggested that there would be an 3.1% increase in building and related trades workers, excluding electricians, over the base scenario at the time (i.e. the 2020 forecast). In addition, there is also expected to be increased demand for science and engineering professionals (2.4%) and associated professionals (3%) (all economic activity sectors), the 5th and 2nd highest increases over the base scenario. Whilst not directly comparable, these previous estimates are illustrative of how the impacts of investment and policy interventions on the size of the construction workforce may translate into demands for occupations.

The Eurofound analysis of the Fit for 55 package also presented forecast job creation and destruction in 2020-30 linked to the implementation of the European Green Deal in the most heavily impacted sectors by occupation level. This implies that whilst skilled manual roles will continue to make up most of the sector workforce and associated growth, relative growth may be highest in non-manual roles:

- Highly skilled non manual 22%
- Skilled non manual 19%
- Skilled manual 54%
- Elementary 5%

In the Eurofound analysis of the Fit for 55 package, most of the additional employment projections are in medium-paid, and especially in low-medium-paid, jobs (quintile 2). Of which the construction sector in particular accounts for much of this additional growth.

[141] European Centre for the Development of Vocational Training (Cedefop). *Cedefop Skills Forecast 2025*, Thessaloniki: Greece, Downloaded from: https://www.cedefop.europa.eu/en/events-and-projects/projects/skills-forecast

4.2. Occupations based on scenario forecasts (2030)

Table 9 below distributes our forecast for **construction sector jobs** (2030) (Section 3.2) across construction sector (NACE F) occupations. The minimum jobs scenario is based on 100% of direct jobs, whilst the medium and maximum scenarios are based on 82% of direct jobs share in line with the 2024 split. The estimated occupation shares based on the 2024 data at the top level,[142] with further estimates of craft and related trades workers at the 2-digit level based on occupation shares reported at the 3-digit level in 2022:[143]

Table 9: Construction occupation estimates

Occupation category	Share	Jobs (Minimum scenario)	Jobs (Medium scenario)	Jobs (Maximum scenario)
Building and related trades workers, excluding electricians	~0.45	7,044,149	7,549,338	10,144,569
Electrical and electronic trades workers	~0.1	1,565,366	1,677,631	2,254,349
Labourers in mining, construction, manufacturing and transport	~0.07	1,095,756	1,174,341	1,578,044
Metal, machinery and related trades workers	~0.04	626,147	671,052	901,739
Production and specialised services managers	~0.06	939,220	1,006,578	1,352,609
Science and engineering associate professionals	~0.11	1,721,903	1,845,394	2,479,784
Science and engineering professionals	~0.06	939,220	1,006,578	1,352,609
Plant and machinery	~0.06	939,220	1,006,578	1,352,609
Clerical	~0.05	782,683	838,815	1,127,174
Total	100%	15,653,663	16,776,306	22,543,487

Source: Ecorys analysis

[142] 2024 ISCO level 2 in construction shares (Eurostat lfsa_eisn2):
- Managers: 6%
- Professionals: 6%
- Technicians and associate professionals: 11%
- Clerical support workers: 6%
- Craft and related trades workers: 56%
- Plant and machine operators and assemblers: 6%
- Elementary occupations: 7%

[143] Labour force survey via CEDFOP Skills Forecast 2025.

Drilling down further into the building and related trades codes (i.e. ISCO 71) at the three-digit level is presented in Table 10 below:[144]

Table 10: Building and related trades occupation estimates

Occupation Category (ISCO)	Occupation Roles	Approx. Share	Direct jobs (minimum)	Direct jobs (Medium)	Direct jobs (Maximum)
Building frame trades (711)	Bricklayers, masons, carpenters	~55%	3,874,282	4,152,136	5,579,513
Building finishing trades (712)	Roofers, insulators, plumbers	~33%	2,324,569	2,491,281	3,347,708
Painters & related trades (713)	Painters, decorators, surface cleaners	~12%	845,298	905,921	1,217,348
Building and related trades workers, excluding electricians.		100%	7,044,149	7,549,338	10,144,569

Source: Ecorys analysis

If potential composition effects estimated in the Cedefop skills forecast and other analyses were to be factored in, this would imply a relative increase in share for science and engineering professionals and associates, as well as electrical and electronic trades workers. This also assumes a further 1pp reduction in the relative share of the construction sector (NACE F) in the medium and maximum scenarios (to 81% of share, from 82%). Potential shares and associated employment rates are presented in Table 11 below:

Table 11: Construction occupation estimates with compositional change

Occupation category	Share	Jobs (Minimum scenario)	Jobs (Medium scenario)	Jobs (Maximum scenario)
Building and related trades workers, excluding electricians	~0.42	6,574,539	7,046,048	9,468,265
Electrical and electronic trades workers	~0.12	1,878,440	2,013,157	2,705,218
Labourers in mining, construction, manufacturing and transport	~0.07	1,095,756	1,174,341	1,578,044
Metal, machinery and related trades workers	~0.04	626,147	671,052	901,739
Production and specialised services managers	~0.06	939,220	1,006,578	1,352,609
Science and engineering associate professionals	~0.12	1,878,440	2,013,157	2,705,218

[144] Shares in occupation codes based on https://www.cedefop.europa.eu/en/data-insights/impact-european-green-deal-selected-occupations-construction-workers#_who_are_they

Science and engineering professionals	~0.06	939,220	1,006,578	1,352,609
Plant and machinery	~0.06	939,220	1,006,578	1,352,609
Clerical	~0.05	782,683	838,815	1,127,174
Total	100%	15,653,663	16,776,306	22,543,487

Source: Ecorys analysis

4.3. National occupation estimates

As noted previously, a significant variation is possible at the national level in terms of specific occupation and skills requirements to support and renovation wave objectives and construction sector development more generally. The BUILD UP Skills projects[145] focussing on national skills roadmaps, identify priority occupations and estimates of workforce needs to meet national renovation targets. A summary of occupations identified from a selection of countries is presented in Table 12 below and a more detailed comparison, including against detailed occupation codes, is presented in Annex B.[146]

The reports highlight the full range of specialist construction occupations, including general workers. Reports note the likely importance of:

- Insulation occupations, including roofers and other building finishes occupations.
- Installation of new types of heating sources, including associated plumbing and electrical requirements, with structural aspects, e.g., for mounting of solar panels.[147]
- Roles and skills to meet energy efficiency design requirements and standards, including documentation of work.

Most of the status quo reports include some form of quantitative estimate about the scale of future demand for occupations to meet renovation wave objectives. However, given the diversity of categorisations and methods, it is not possible to construct a systematic comparison between them. By way of example, some of the estimates presented in the national analyses:

[145] For details of projects funded through the 2021 & 2022 calls see https://build-up.ec.europa.eu/en/skills/skills-projects?f%5B0%5D=programme%3Alifecet2030

[146] A table with full detailed comparison of occupation is presented in Annex A. As the reports use a range of terminologies to describe the likely occupations these have been approximated to the main ISCO classification structure.

[147] The 2025 EU-wide assessment of the final updated national energy and climate plans also noted the expectation that decarbonisation and electrification of heating or installation of renewables in buildings will drive demand for occupations. In the context of construction Bulgaria was noted for establishing specific objectives and need in relation to construction sector employment whilst specific recommendations to address labour shortages and skills to support renovation agendas were noted for Hungary and Cyprus for example. Areas that were noted that are likely to drive demand for skills of relevance to the construction sector, in addition to renovation needs, included installation of recharging networks for decarbonisation of transport systems (Bulgaria); construction of nuclear power plans (Italy, Slovenia, Czech republic) and skills for the clean energy transition including digitalisation and electrification more generally; recommendation to ensure that adaptation measures address construction standards and design of energy systems (Spain and Romania)

- **Bulgaria**:[148] the status quo analysis (December 2023) estimated a need to further qualify, re- or upskill 52,368 specialists and workers, including detailed estimates for specific occupations, including electrical and energy engineering, alongside builders (interiors, exteriors, roofing, glazing).
- **Croatia**:[149] the status quo report (July 2023) included estimates of labour days per renovation that enable some overall quantification of needs, producing a total of 22,000 workers, including 9,400 workers for renovation and construction of external envelopes, 6,000 for insulation of roofs and installations of doors, and the remaining on other tasks.
- **Czech Republic**:[150] the status quo analysis (December 2023) identified the greatest increases in percentage terms were likely to focused in bricklayers, insulators, HVAC and electrical occupations.
- **Hungary**:[151] the status quo analysis (June 2023) estimated that approximately 60% of construction professionals are engaged in renovation of residential buildings annually (68,400) and that a total of 136,000 skilled professionals will be needed in the next decade, an additional demand of 4,800 over current amounts.

Three reports presented data that included baselines and expected future needs, which can be compared following the comparative coding of the described occupations against the main ISCO classification structure. These suggested potentially significant increases in the number of workers in specific occupations to meet renovation wave objectives. For example:

- **Ireland**:[152] the status quo report (June 2023) estimated the number of workers required to reach 2030 Housing for All and Climate Action Plan targets is 304,430. The forecasted number of workers in 2030 is 183,851, meaning an additional 120,579 workers will be required across all construction professions and trades. Within this, an 85% uplift has been estimated for identified priority occupations, including construction managers. Notable occupations include civil and construction engineers, bricklayers, carpenters and joiners, plasterers, electricians and labourers.
- **Romania**:[153] the status quo report (October 2023) makes specific estimates for roles, including a significant increase in concrete occupations (to the order of 927% due to a small starting workforce) and insulation workers and HVAC and refrigeration, alongside core building frame and construction trades.

[148] BUILDUPSkillsBG: Rebooting the Bulgarian BUILD UP Skills Platform for Dialogue and Qualification Roadmap. Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/buildupskillsbg
[149] CRO skills – rebooting the National Platform and Roadmap. Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/cro-skills-reload
[150] BUILD UP Skills (BUS) initiative in CZ and SK - Rebooting the National qualification platforms and Roadmaps towards implementation of nearly Zero Energy Buildings and support for Renovation Wave. Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/doubledecker
[151] ConstructSkills4LIFE: Rebooting the National Platforms for the development of construction skills for all life cycle phases of buildings in Hungary. Education and training of building professionals in Hungary Status. Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/constructskills4life
[152] BUSI2030: Build Up Skills Ireland 2030. Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/busi2030
[153] BUS4RoBOOST: BUILD Up Skills for mainstreaming long-term renovation of Romanian building stock. Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/bus4roboost

- **Spain**:[154] the status quo report (July 2024), similarly to Ireland, also applies a consistent uplift, in this case of 124% for selected roles, including construction supervisors, building finishers and related trades, metal construction workers, and drivers of supply chain and equipment, as well as smaller estimates of 25% increases for electricians and construction managers.

Table 12: Examples of occupations identified in BUILD UP Skills status quo reports (2024)

	Czech Republic	Croatia	Greece[155]	Poland[156]	Bulgaria	Ireland
Blue-collar	Bricklaying	Well insulation	Construction of buildings	General construction workers	Electrical installations - Heat engineering	Plumber
	Insulator	Roof insulation	Electrical	Roofers	Electrical installations - renewable energy sources	Electricians
	Chimney sweeping Plumbing and heating	Carpentry	Other specialised construction	Carpenters	Builders – interior lining and floorings	Bricklayers & plasterers
	HVAC	Solar thermal heating	Water, gas heating, aircon	Sanitation workers	Builder – exterior cladding and flooring	Painters & decorators
	Painters decorators	Biomass heating	Joinery	Electricians	Builder – roofing	Carpentry and joiners
	Roofing carpentry	Heat pumps	Other building installation	PV installers	Installer – windows and glazing	Others (drivers and operatives)
	Electricians	Photovoltaic	Painting and glazing (plus other finishing construction nec)	Scaffolding	Installer – insulation	
			Floor and wall covering	Lower heat source contractors	Electrical technician (level 3) - Heat engineering and renewable energy sources	
			Plastering	Window fitters	Construction technician (level 3) – construction and architecture	

[154] Construye 2030: BUILD UP Skills. The construction sector towards 2030 (Spain). Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/construye-2030
[155] BUS-REGRoUP: BUILD UP Skills – REbooting the GReek national platform and UPdating the national roadmap. Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/bus-regroup
[156] BUPS Poland: BUILD UP Skills II Poland. Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/bups-poland

					and water services	
	Construction workers		Roofing and roof construction Manufacture of metal building components Further processing of flat glass Manufacture of joinery products			
White-collar	Project activities	Engineers (design)		Construction manager	Electrical engineering, automation and communication equipment designers (level 4 and 5)	Site manager/ supervisor
	Management	Engineers (construction)		Architect	Construction of buildings and facilities designers	Project manager
	Foreman and related	Other higher education workers		Constructor - designer	HVAC designers	Architecture and construction / town planning
				Estimator/ surveyor	Architects-designers	Civil engineer
				Sanitary and electrical designers/ managers	Specialists licensed to carry out construction supervision:	Engineers – electrical, mechanical, structural, energy
				Geological designers Energy auditor/ certification	Certified energy auditors	

Source: Ecorys analysis

4.4. Sector skills trends

This section presents further qualitative assessment of how the skills needs in the sector may evolve across selected construction sector occupations. It focuses on skills associated with green, circular and digital skills as broad categories that are likely to represent the main areas of changing skills demand into the future. It does not systematically assess potential changes in core skills and competencies required for individual occupations, such as specific technical skills, standards or regulations, including relevant health and safety requirements. It also assumes that maintaining knowledge of techniques and materials is a core element of ongoing formal and informal professional and business development.

Construction roles and the associated skills requirements are expected to be highly affected by the green transition.[157] Construction manager roles, technical roles, as well as specialised construction roles have been identified as amongst the most rapidly growing roles in terms of their skills requirements and activities.[158] For example, Cedefop data[159] suggests that in 2024 3.4 % of online job adverts in the construction sector included some form of green skill, whilst 0.4% of skills listed on ESCO profiles were classified as green, which has increased to 4.8% and 0.6% for Q1 of 2025. This compares to 1.2% and 0.1% respectively for roles across the whole economy (all NACE activities).

Specifically for building and construction occupations (ISCO 71) 1.2% of adverts included green skills, and 0.3% of all skills were classified as green. Selected 'white-collar' construction roles also had similar levels, including architects, civil engineers, technicians, and construction managers. For these roles 1.9% of online adverts noted a green skill, and 0.2% of skills in ESCO occupation profiles were categorised as green. Examples of green skills included in online job adverts in 2024 included corporate social responsibility, environmental policy, environmental engineering, renewable heating systems, and circular economy.

Construction occupations remain with relatively low digital integration and are generally expected to be less susceptible to automation than other economic sectors. The same Cedefop data[160] suggests that in 2025 (Q1), 16% of skills in the construction sector occupations were categorised as digital, whilst 45% of listed skills in online job adverts included a digital skill of some sort. For specialist construction sector occupations (ISCO 71), in 2025 (Q1), digital skills made up 12% of the skills associated with occupations (ESCO), whilst 38% of online job adverts included digital skills. In both cases, there has been a decline in both metrics since 2021. In the case of specialist construction roles, 48% of adverts included digital skills, and 15% of all skills listed were digital. By comparison, for all roles, the share of adverts with a digital skill has declined from 74 to 61, and the share of digital skills has declined from 26% to 21%. Examples of the main ESCO skills identified include general computer literacy and ICT skills, and specialised digital skills, including the use of technical drawings, Computer-Aided Engineering (CAE) software, and control engineering.

There are indications that levels of innovation in construction, including green and digital innovations, may have accelerating impacts on skills needs in the sector in the future.[161] The relative importance of green technology-related patents in construction has been steadily increasing since 2018, reaching 20.9% in 2022. Patents related to advanced materials & nanotechnology and renewable energy are

[157] See for example https://sciencespo.hal.science/hal-03471569/file/2018-10-vona-environmental-regulation-and-green-skills.pdf and https://economicgraph.linkedin.com/content/dam/me/economicgraph/en-us/global-green-skills-report/green-skills-report-2023.pdf

[158] Czako, V (2022). Czako, V, Skills for the clean energy transition. (European Commission, Petten) JRC129676. Retrieved 19.11.25 from https://www.researchgate.net/profile/Veronika-Czako-2/publication/365870615_Skills_for_the_Clean_Energy_Transition/links/63875d6c78f94b73a0ba50c3/Skills-for-the-Clean-Energy-Transition.pdf . Broughton, A. et al (2024) Literature review on a measurable definition of green jobs and on the impact on jobs and skills in the green transition (Brussels, European Commission DG ENV). Retrieved on 19.11.25 from https://www.researchgate.net/publication/382365911_Literature_review_on_a_measurable_definition_of_green_jobs_and_on_the_impact_on_jobs_and_skills_in_the_green_transition

[159] Cedefop Greenness and green pervasiveness in occupations data available at https://www.cedefop.europa.eu/en/tools/skills-online-vacancies/greenness-and-green-pervasiveness-occupations

[160] Cedefop Digitalness and digital pervasiveness in occupations data available at https://www.cedefop.europa.eu/en/tools/skills-online-vacancies/digitalness-and-digital-pervasiveness-occupations. Data is based on online job adverts so may not be fully representative of the construction industry

[161] IDEA consult and Technopolis Group (Forthcoming) Monitoring industrial ecosystems CONSTRUCTION Analytical report – 2025 edition (Brussels, EISMEA). Available at from https://op.europa.eu/en/home

leading technologies. advanced materials & nanotechnology (9%), renewable energy (8%), and clean production (6%) are the three leading technologies according to patenting activities for the construction industrial ecosystems, and their shares have increased. Furthermore, 58% of construction companies believe that there is a tangible shift in consumer preferences and demand towards environmentally sustainable products/services.

Similarly, the share of digital patents continued to grow to 25.3%, in 2021, with a small decrease to 24.3% in 2022. 'Micro- and Nanoelectronics and photonics' is the leading patenting category and has increased since 2018 to 12% in 2022. Patenting activity in 'Advanced Manufacturing and Robotics' declined between 2021 and 2022. The 2025 report also suggests that there were accelerations in the adoption of certain digital technologies, including Cloud Computing, to support project management and BIM applications, and the integration of Artificial Intelligence (AI) into project planning and management activities. Early indications based on the reported survey suggest that adoption of AI has increased productivity and shows potential to decrease costs.

This was set alongside an increasing number of digital and green construction sector startups, and venue capital and private equity investments reported in the 2024 report.[162] Startups included:

- Software solutions (46%), including analytic software and Building Information Management.
- Advanced digital technologies (41%) such as Internet of Things systems and AI.
- Advanced manufacturing (13%), such as 3D printing and other additive manufacturing.

In addition, the expansion of modular and offsite construction techniques may also increase the penetration of digital tools into construction processes and techniques in the construction sector ecosystem.[163] The European Commission 2022 Single Market Report, drawing on EIB survey data, suggested investment by construction sector firms in digital and green transitions in Europe remained relatively low, but with plans for future investments.[164]

Analysis carried out by Eurofound of construction workers in occupations likely to be affected by the twin transitions further illustrated the potential impacts on occupations and skills.[165] Based on data from the 2021 European Working Conditions Survey (EWCS), the report estimated that 18 % of occupations in the sector will be new, while a further 27 % will require enhanced skills and 24 % will experience increased demand. Occupations identified in the analysis include BIM modellers and coordinators, application (hereafter, 'app') designers, home automation technicians, renewable energy managers, drone pilots (new and increased demand), energy engineers, 3D architects, surveyors, insulation engineers, prefabrication installers, ventilation system and solar panel installers, specialised plumbing technicians, recycling specialists and refurbishment planners.

Other specific occupations and skills requirements that have been noted include:

[162] IDEA consult and Technopolis Group (2024) Monitoring industrial ecosystems CONSTRUCTION Analytical report – 2025 edition (Brussels, EISMEA). Available at https://op.europa.eu/en/publication-detail/-/publication/8b507daf-3463-11f0-8a44-01aa75ed71a1/language-en

[163] Betram, N et al (2019) Modular construction: From projects to products (McKinsey & Company). Retrieved 19.11.25 from https://www.mckinsey.com/~/media/mckinsey/business%20functions/operations/our%20insights/modular%20construction%20from%20projects%20to%20products%20new/modular-construction-from-projects-to-products-full-report-new.pdf . World Economic Forum. How modular construction drives productivity, circularity and the convergence of industries. January 7 2025. Retrieved 19.11.25 from https://www.weforum.org/stories/2025/01/modular-construction-productivity-circularity/

[164] Commission staff working document: Annual Single Market Report 2022 Brussels, 22.2.2022 SWD(2022) 40 final. Retrieved 19.11.25 from https://ec.europa.eu/docsroom/documents/48877

[165] Eurofound (2025a), Building on growth potential: Preparing the construction sector for the twin transitions, Publications Office of the European Union, Luxembourg

- The European Heat Pump Association estimated in 2023 that employees in the industry, including manufacturing and installation, would need to increase from circa 117,000 to 500,000 by 2030. However, it is important to acknowledge that the market of heat pumps has not developed as expected, with a 22% drop in installations in 2024 compared to 2023 levels. 2022 is considered the peak level, followed with return to the previous numbers of installations.[166] In this context, Eurofound analysis suggested that an additional 70,000 installers will be needed to meet objectives for the use of this sustainable heating technology.[167] The increase in heat pump installation may principally draw on reskilling of installers of existing heating systems, such as gas boilers.
- The report 'Skills and quality jobs in construction in the era of the EGD and post-COVID recovery' (2023) highlighted the current requirements for Occupational Safety and Health (OSH) managers, labour inspectors and an integrated OSH system to support growth in construction from approximately 112,056 managers and a further 100,250 labour inspectors.

4.5. Occupation skills needs

The Construction Blueprint previously developed an in-depth appraisal of future skills needs and profiles for construction sector occupations. Outputs included a review of occupation profiles and professions and qualifications for modernisation, and a survey of companies on future construction sector skills needs.[168] These outputs further emphasised the importance of green and digital skills in the future construction sector. For example, the 2020 survey of 1715 respondents of construction sector companies provided an expert snapshot of current needs and future expectations. The main skill areas surveyed and highlighted through the survey were:

- Digital skills including use of Computer-Aided Design (CAD), other dedicated software, BIM, geolocation, drones, VR, etc.
- Energy efficiency, including insulation, air tightness, ventilation, heat pumps, photovoltaics, smart home and automation, geothermal, smart meters, aerothermal energy, biomass, wind energy,
- Circular economy, including project design, construction phase, building operation, demolition
- Transversal skills applied to the construction sector, including regulatory, organisation and supervision, teamworking and collaboration, and digital management systems.

More recently, the BUILD UP Skills national status quo reports have also made an appraisal of specific skills needs for occupations. For example, the Czech Republic BUILD UP Skills status quo analysis

[166] European Heat Pump Association (2025) European heat pump market report. Retrieved 19.11.25 from https://www.ehpa.org/wp-content/uploads/2025/07/EHPA-Market-Report-2025-executive-summary.pdf
[167] See Eurofound (2024), Decarbonisation of residential heating and cooling: The heat pump challenge, Eurofound research paper, Publications Office of the European Union, Luxembourg
[168] Construction Blueprint (2022) Identification of occupations and professional profiles to be updated: Report on the professions and qualifications to be subject of modernisation. Retrieved 19.11.25 from https://constructionblueprint.eu/wp-content/uploads/2022/02/R5.-Construction-Blueprint_-Professions-and-qualifications-to-be-subject-of-modernisation_V1-1.pdf
and National Reports on the modernization of occupational profiles https://constructionblueprint.eu/wp-content/uploads/2023/05/R6.2-National-reports-on-modernisation-of-profiles.pdf

(December 2023)[169] made an appraisal of the skills needed for different occupations in the context of the Renovation Wave, including, for example:

- Precision and standards: including bricklayers, concrete and ironwork, plaster boarders, drywall and timber structures and plumbers and installers.
- New materials and technologies (including digital information): plasterboards, drywall and timber structures, heating engineers, carpenters, bricklayers, low voltage electricians, and flooring.
- New specialisms: solar, equipment installers, HVAC systems in residential, and building envelopes.
- Processes and coordination (including prefabrication): Concrete and steel erectors, construction joiners.

BUILD UP Skills national status quo reports[170] further identify a range of new technologies and knowledge requirements associated with energy efficient renovations, including knowledge of technologies and associated design standards: e.g. passive standards, materials, BIM, prefabrication and modular, robotics, drones, associated regulations, life cycle assessment, regulations.

Table 13 below provides an overview of likely priority green and digital skills needs in priority occupations. It is based on a review of existing ESCO profiles to identify skills, competencies, and knowledge that may be affected by green and digital transitions, a review of the occupations identified by BUILD UP Skills projects and their identified future skills needs. It then groups and synthesises these skills requirements against selected occupations and groups to provide an overview of priority skills needs that may need further support through training and development agendas into the future.

In this context, the report ‘’Skills and quality jobs in construction in the era of the EGD and post covid recovery’ (2023) has already estimated that from the workers involved in renovations or building construction all will require some form of basic training or literacy on energy efficiency whilst between 35% and 45% of the building renovations sector will need specialised energy efficiency training.

Table 13: Overview of construction ‘blue-collar’ occupation skills

Occupations	Areas	Priority green and digital skills, knowledge, and competences needs
Bricklayers, stone masons, and concrete workers	Energy efficiency	• Preparation or application of proofing and insulation membranes • Knowledge of energy performance standards and requirements, including the use of plans and tolerances • Knowledge of energy-efficient and renewable energy sources and systems
	Circular and sustainable construction and installations	• Selection, estimation and inspection of materials, including low carbon of impact materials • Knowledge of environmental protocols and waste reduction, including effective sorting of waste

[169] BUILD UP Skills (BUS) initiative in CZ and SK - Rebooting the National qualification platforms and Roadmaps towards implementation of nearly Zero Energy Buildings and support for Renovation Wave. Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/doubledecker

[170] See for example Current state, practices and trends in the construction sector in Bulgaria Deliverable 3.4 of the BUILD UP Skills Bulgaria 2030 project. Project information and outputs available from https://build-up.ec.europa.eu/en/skills/projects/buildupskillsbg

	Digital	• Interpreting and using 2D and 3D digital plans and data • Use of digital measuring equipment
	Other	• Knowledge of all relevant technical standards and regulations, and health and safety standards and regulations • Soft skills, communication and collaborative working with design and other trades and building systems • Promote a safe and inclusive site or project
Carpenters and joiners	Energy efficiency	• Understanding of energy performance standards and design requirements, including plans and tolerances • Knowledge of energy-efficient and renewable energy sources and systems
	Circular and sustainable construction and installations	• Selection, estimation and inspection of materials, including sustainable materials • Knowledge of reuse, recycling and reduction of waste, including the suitability of materials
	Digital	• Interpreting and using 2D and 3D digital plans and data
	Other	• Knowledge of all relevant technical standards and regulations, and health and safety standards and regulations • Soft skills, communication and collaborative working with design and other trades and building systems • Promote a safe and inclusive site or project
Roofers, insulation workers and glazing	Energy efficiency	• Installation of high-efficiency thermal insulation and glazing systems, including proper application and handling of materials • Installation of solar panel mounting and other renewable energy systems • Knowledge of energy performance standards and design requirements, including plans and tolerances • Knowledge of energy-efficient and renewable energy sources and systems
	Circular and sustainable construction	• Advise on the selection, estimation and inspection of materials, including sustainable materials • Installation of sustainable materials, such as green roofing systems or insulation materials • Processing and storage of supplies and materials to protect performance and reduce spoilage • Knowledge of reuse, recycling and reduction of waste practices, including sorting of materials
	Digital	• Interpreting and using 2D and 3D digital plans and data • Use of digital measuring equipment • Use of roofing drones and other digital survey tools • Documentation of work and compliance

	Other	• Knowledge of all relevant technical standards and regulations, and health and safety standards and regulations • Soft skills, communication and collaborative working with design and other trades and building systems • Promote a safe and inclusive site or project
Plasterers and flooring	Energy efficiency	• Knowledge of the performance of materials and requirements • Knowledge of energy performance standards and design requirements, including plans and tolerances
	Circular and sustainable construction	• Knowledge of reuse, recycling and reduction of waste practices, including sorting of materials
	Digital	• Interpreting and using 2D and 3D digital plans and data
	Other	• All relevant technical standards • Health and safety standards and regulations • Soft skills, communication and collaborative working with design and other trades and building systems • Promote a safe and inclusive site or project
HVAC and plumbers	Energy efficiency	• Knowledge of energy efficiency systems and standards, and the energy performance of buildings • Installation of renewable and energy-efficient systems, including solar water heater, insulation • Knowledge of electrical wiring plans • Knowledge of HVAC systems, parts, and thermodynamics
	Circular and sustainable construction and installation	• Effective project management and collaboration
	Digital	• Knowledge and installation of digital control systems • Interpreting and using 2D and 3D digital plans and data • Energy modelling, simulation, and optimisation of system performance • Perform and record digital testing and compliance documents • Promote a safe and inclusive site or project
	Other	• Knowledge of all relevant technical standards and regulations • Knowledge of health and safety standards and regulations • Soft skills, communication and collaborative working with design and other trades and building systems • Promote a safe and inclusive site or project
Electrician	Energy efficiency	• Knowledge of energy efficiency systems and standards, and the energy performance of buildings

		• Installation of photovoltaic and other renewable energy systems • Perform and record digital testing and digital compliance documentation
	Circular and sustainable construction and installation	• Knowledge of reuse, recycling and reduction of waste practices, including sorting of materials
	Digital	• Installation of monitoring and control systems, including automation technology • Interpreting and using 2D and 3D digital plans and data, including digital electrical wiring diagrams • Perform and record digital testing and digital compliance documentation
	Other	• Knowledge of all relevant technical standards and regulations • Knowledge of health and safety standards and regulations • Soft skills, communication and collaborative working with design and other trades and building systems • Promote a safe and inclusive site or project
Labourers	Energy efficiency	• Preparation, construction and installation of relevant materials in line with designs
	Circular and sustainable construction and installation	• Knowledge of reuse, recycling and reduction of waste practices, including sorting of materials
	Digital	• N/A
	Other	• Knowledge of health and safety standards and regulations • Promote a safe and inclusive site or project

Source: Ecorys analysis

In addition to the more detailed overview for 'blue-collar' roles above, a more general overview of priority green and digital transition skills associated with 'white-collar' roles identified in BUILD UP Skills and by the Construction Blueprint is outlined in Table 14 below.

Table 14: Overview of 'white-collar' construction occupation skills

Occupations	Areas	Priority green and digital skills, knowledge, and competences
White-collar roles (Construction managers and supervisors, civil engineers,	Energy efficiency	• Ensure compliance with building performance design and standards • Knowledge of requirements and processes to acquire building certifications • Knowledge of energy-efficient building design techniques and technologies

architects, **engineers**)		• Knowledge of energy-efficient materials and their performance as part of building systems • Knowledge of energy-efficient and renewable heating, cooling, and ventilation technologies
	Circular and sustainable construction	• Knowledge of material and building lifecycle assessments and use of waste-free and low-waste technologies • Effective calculation of material needs and reducing waste • Ensure compliance with environmental standards • Selection of local construction materials and sustainable transportation • Selection of systems and methods that minimise the use of resources • Make sustainable judgements on design and construction solutions • Knowledge of prefabricated components, their technical characteristics and performance • Ensure integrity of supply chains
	Digital	• Develop, implement and update CAD and BIM models and collaborative platforms • Develop and use 2D and 3D modelling, digital survey, and data tools • Identify construction materials and systems from plans, BIM, and CAD designs, and identify risks • Documentation of building construction, including materials and systems, and compliance • Integration of digital systems for performance monitoring in buildings and infrastructure
	Other	• Ensure compliance with relevant technical standards and regulations • Ensure compliance with relevant health and safety standards and regulations • Soft skills, communication and collaborative working with design and other trades and building systems • Promote a safe and inclusive site or project • Stay updated with building code modifications, overall legislation, incentives and financial solutions available

Source: Ecorys analysis

5. Conclusions

The analysis presented in this report has outlined key trends in the construction workforce, including the continued growth of employment in the sector. Specific themes that have been highlighted include:

- The significant impact of COVID-19 on overall patterns of employment and the subsequent recovery, but early signs of slowing in growth in employment in the sector.
- The continued significance of construction sector employment for craft and related trades and workers with secondary and vocational qualifications.
- The increased share in 'white-collar' occupations within the construction sector, as well as from the composition of the combined construction sector.
- The continued growth in older groups in the workforce with longer careers, in line with European trends.
- Some indications of possible growth in the youngest age group in the context of improvements in 'blue-collar' remuneration.
- A recent plateauing in the share of women working in construction, despite an increased share of the female workforce in management and professional occupations.
- Continued significance of migrant/mobility workers across the sector, but some uncertainty about the true extent of the workforce and the role in filling labour market gaps.
- The ongoing prevalence of micro and small enterprises with potential structural effects on the scope for investment in workplace cVET, learning and skills development.
- A reducing number and share of graduates from construction-related qualifications across tertiary levels.
- Continued potential for high levels of undeclared work and associated underestimates in terms of actual volume of employment and underrepresented workforce.

The estimates for future employment in the sector illustrate the potential for significant growth in the construction workforce. The scenarios illustrate the potential impact of public and private investment to meet green and housing policy objectives on the size of the construction workforce. The increase in the size of the workforce, allied to ongoing replacement needs from retirement and leavers from the sector, implies a large volume of new workers will be needed to meet demand over the next decade and beyond. The sensitivity and potential scale of this demand further highlight the potential for bottlenecks in relation to the supply of workers and skills for the construction sector.

There is also likely to be ongoing shifts in the types of skills in demand. This includes increased demand for 'white-collar' roles as well as skills associated with the installation of energy-efficient heating systems and materials. This is expected to include demand for relevant skills for new entrants into the sector, including from graduates from tertiary and higher education, as well as ongoing needs for re- and upskilling through cVET. Priority skills are likely to include those associated with circular and waste reduction practices, energy efficient systems and materials, fabrication and process innovations, as well as digital innovations and data management.

Shortages in skills and workforce risk constraining efforts to meet green and affordable housing and infrastructure objectives, improve productivity in construction, and the economic competitiveness of Europe. Moving forward, the analysis presented in this report has also highlighted factors that are likely to affect scenarios in terms of overall demand. In addition to potential policy shocks the inherent uncertainty of future trends and potential factors that are likely to shape longer-term workforce and skills trends. These include:

- **Economic growth and investment**, including the level of investment in the Renovation Wave, as well as infrastructure investment by the European Union, allied to the fiscal and economic climate and associated private sector investment in building construction and renovations.
- **Responses to societal needs**, including affordable housing, assisted living and health care facilities in the context of an ageing population, as well as the need for adaptation of housing and buildings for vulnerable populations in the context of climate change.
- **The persistence of shortages and presence of bottlenecks,** including in specific occupations and the ability of the sector to attract both new workers, young people and women into 'blue-collar' roles. Securing 'white-collar' roles is also allied to the safe retention of older workers in the labour force.
- **The extent to which upskilling and reskilling measures can support the ongoing skills needs** of the sector and workers. This includes identification of needs, capacity to support training with relevant curricula and outcomes, including flexible access and financial support for workers, and recognition of qualifications.
- **Emergence of innovations**, including standards associated with building performance, techniques such as pre-fabrication, energy-efficient and sustainable materials, and technologies, particularly digital systems.

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Annex B: Employment estimates overview

The baseline figure for construction sector employment is 16,819,400 million in 2024.

Table 15: 2030 combined construction sector employment estimates overview

Employment	Minimum Scenario	Medium Scenario	Maximum Scenario
Direct Jobs[171]	15,700,000	20,500,000	27,500,000
Total change (2024-2030)	-1,200,000	3,600,000	10,700,000
Percentage change (2024-2030)	-7%	20%	63%
Women in construction sector (15.9%)	2,488,932	3,252,967	4,371,237
Average annual growth in the workforce (2024 to 2030)	-230,000 (-1.4%)	730,000 (3.8%)	2,130,000 (9.3%)
Total job leavers	6,500,000	7,400,000	8,600,000
Total workers to be trained	5,300,000	11,000,000	19,300,000

Table 16: 2050 combined construction sector employment simulations overview

Construction employment	Baseline scenario (with implied change from 2024 employment)	Green investment scenario (with implied change from 2024 employment)	Potential percentage difference between scenarios
Median projected employment	19.3 million (15%)	28.4 million (69%)	47%
Lower bound (5th percentile)	13.3 million (-21%)	21 million (25%)	58%
Upper bound (95th percentile)	27.9 million (66%)	38.8 million (131%)	39%

[171] Rounded to the nearest 100,000 jobs.

Annex C: Occupations identified by BUILD UP Skills status quo reports (detailed)

This table presents a detailed comparison of occupations identified in a selection of the BUILD UP Skills status quo reports. For details of projects funded through the 2021 & 2022 calls, see https://build-up.ec.europa.eu/en/skills/skills-projects?f%5B0%5D=programme%3Alifecet2030. The reports use a range of terminologies to describe the likely occupations that will be needed to support energy efficiency and renovation wave objectives. In this table, these occupations have been approximated to the main ISCO classification structure.

	Used Terminology							
	ISCCO Job Codes	**Bulgaria**	**Croatia**	**France**	**Ireland**	**Poland**	**Romania**	**Spain**
White-collar	Level 3 1323 Construction Managers			Site managers (executives) and site foreman/ managers (non-executives)	Project Manager	Construction Manager		Production and Operations Managers
	Level 4 2142 Civil Engineers/Construction Engineer	Engineer in construction of buildings and facilities.	Civil engineers qualifications	Building and civil engineering draughtmen	Civil and structural engineers	Construction (designer) and Construction Technical and Commercial Adviser.		
	Level 4 2144 Mechanical Engineers		Mechanical engineeri		Mechanical engineer			

		ng qualificati ons					
Level 4 2149 Engineering Professionals Not Elsewhere Classified				Energy engineer			
Level 4 2151 Electrical Engineers	Registered designers in 'electrical engineering, automation, and communication equipment'; specialists with limited designed legal capacity 'electrical engineering, automation, and communication equipment'; and for heating, air conditioning, and ventilation.	Electrical engineeri ng qualificati ons		Electrical engineer	Electrical designers/m anagers, and technical and commercial electrical advisors.		
Level 3 216 Architects, Planners, Surveyors and Designers			Architect s		Geological designers.		
Level 4 2161 Building Architects	Construction Technician (construction and architecture and water designers) and Architect designers.			Architectur e and Constructi on	Architect		

	Level 4 2164 Town and Traffic Planners				Town Planner			
	Level 3 312 Mining, Manufacturing and Construction Supervisors	Licenses to carry out construction supervision		Site supervisors	Site manager supervisor			Supervisors in mining, engineering, manufacturing, and construction industries.
Blue-collar	Level 4 7112 Bricklayers and Related Workers				Bricklayers			
	Level 4 7113 Stonemasons, Stone Cutters, Splitters, and Carvers			Masons				
	Level 4 7114 Concrete Placers, Concrete Finishers, and Related Workers	Concrete workers (including concrete blacksmiths and precast concrete installers).		Concrete Builder				
	Level 4 7115 Carpenters and Joiners		Carpentry qualifications	Carpenter wood and metal	Carpentry and Joiners	Carpenters	Construction Carpenter	
	Level 3 712 Building finishers and Related Trades Workers							Construction and installation finishers (expect electricians), painters, and related workers.

	Level 4 7121 Roofers	Construction - Builder - Roofing	Installation/Replacement of Roof Qualification	Roofers		Roofers		
	Level 4 7122 Floor Layers and Tile Setters	Construction - Builder- Interior Cladding and flooring & Exterior Cladding and flooring.		Tilers (including floor and carpet layer)			Parquet, linoleum, mosaic, tiling, and similar workers	
	Level 4 7123 Plasterers			Plasterers	Brick Layers and Plasterers (not separated)		Gypsum workers and drywall specialists	
	Level 4 7124 Insulation Workers	Construction - Builder-installer (insulation in construction),	Wall Insulation qualifications	Insulation workers			Insulator/ETICS Installer	
	Level 4 7125 Glaziers	Building Installer (windows and glazing)				Window Fitters	Glazer	
	Level 4 7126 Plumbers and Pipe Fitters			Plumbers	Plumbers	Sanitary designers and workers	Plumbing and gas plumber + water supply/sewer	

	Level 4 7127 Heating Ventilation Air Conditioning And Refrigeration Service Engineer			Heating engineers		Lower heat source contractors.	Central heating and gas/thermal heating installation engineering workers	
	Level 4 7131 Painters and Related Workers			Skilled building painters and finishers	Painters and directors		Painter	
	Level 4 2165 Cartographers and Surveyors				Quantity Surveyors	Estimators		
	Level 4 7214 Metal Construction Installer					Scaffolders		
	Level 3 721 Sheet and Structural Metal Workers, Moulders and Welders, and Related Workers							Welders, sheet metal workers, structural steelworkers, blacksmiths, toolmakers, and related trades
	Level 4 7222 Toolmakers and Related Workers						Locksmiths	
	Level 4 7411 Building and Related Electricians	Electricians-electrical Installations and electric power; technicians of energy equipment and		Building Electricians	Electricians	Electricians, including PV installers.	Electrician/ Electrician Installer/Electronics Installer	Electrical and electrotechnical workers

		installations (heat engineering and renewable energy sources)						
	Level 4 8311 Locomotive Engine Drivers							Locomotive drivers, operators of agricultural machinery, and mobile heavy equipment.
	Level 3 931 Mining and Construction Labourers				General construction labourers	General construction workers	Skilled worker Pavers and diggers	Construction and mining workers
	Level 4 9312 Civil Engineering Labourers							
	Level 1 8 Plant and Machine Operators, and Assemblers			Construction and public sector machine operators				