In a nutshell

In 2019, Germany’s GDP reached EUR 3.2 trillion, representing an increase of 0.6% as compared to the previous year.

In 2019, the German economic growth slowed down for the second consecutive year, primarily due to weak export performance and muted manufacturing activity.

In parallel, the number of enterprises in the broad construction sector increased by 32.0%, from 536,874 in 2010 to 708,688 in 2019. This growth was largely driven by the narrow construction sub-sector, which registered the highest increment in the number of enterprises (+58.5%), over the 2010-2019 period.

Similarly, the volume index of production in the broad construction sector increased by 13.1% between 2015 and 2019, primarily driven by a 19.9% and 12.2% increase in the volume index of production in the construction of civil engineering and construction of buildings over the same period, respectively.

Likewise, the total turnover of the broad construction sector totaled to EUR 579.7 billion in 2018, registering a 53.6% growth above the 2010 levels (EUR 377.3 billion). It further increased to EUR 600.7 billion in 2019\(^1\), representing a growth of 59.2% since 2010. With regards to sub-sectors, all registered similar growth – the architectural and engineering activities (+90.1%), the narrow construction (+86.9%), the real estate activities (+24.0%) and the manufacturing (+17.8%); over the same reference period.

At the same time, the gross operating rate of the broad construction sector\(^2\), an indicator of the sector’s profitability, stood at 21.7% in 2018, being a 0.9 percentage point below the 2010 level (22.6%).

With regards to employment, in 2019, there were 4,336,271 persons employed in the broad construction sector in Germany. This represented a 47.6% rise in the number of persons employed from the 2010 levels (2,938,001 persons). This was largely driven by increase in the number of persons employed in the architectural and engineering activities sub-sector (+62.6%), followed by the narrow construction (+59.7%) over the 2010-2019 period. The real estate activities and the manufacturing sub-sectors also experienced an increase of 25.4% and 6.2% respectively, over the same period.

The German government has initiated several measures aimed at the development of the country’s housing market. It has allocated EUR 5.0 billion under its housing policies towards the construction of 100,000 rental units in the next four years. The government has also allocated EUR 8.0 billion as housing subsidy, to be used over the 2018-2024 period. In 2020, a new tax incentive
Country Fact Sheet Germany

law for privately financed new rental apartments has also been introduced along with other relevant measures such as the extension of the rental price brake by five years, re-activation of fallow lands for the construction of new rental housing and increased incentives for switching to climate friendly heating systems.

The German housing market registered a significant drop in sales due to economic restrictions and nationwide lockdowns announced to combat the COVID-19 pandemic. Even as per the recent estimates, the German government is unlikely to meet its previously declared ambitious target of delivering 1.5 million new housing units by the end of 2021.

Nonetheless, the resilience of the German housing market amid the pandemic has attracted Chinese investors as a safe haven for investment in 2020. This is expected to create new opportunities for the German construction sector in the coming years.

With regards to civil engineering, the German government has already announced a EUR 86.0 billion investment plan in the national rail infrastructure, as part of the total funding of EUR 269.6 billion under the 2030 Federal Transport Infrastructure Plan. Additionally, from 2021, the German government plans to raise EUR 1.0 billion of federal funding per year to expand local public transport infrastructure. This is expected to increase to EUR 2.0 billion per year by 2025. Furthermore, the government intends to invest an additional EUR 900.0 million, between 2020 and 2023, to expand the cycling infrastructure within the country.

Presently, the German construction sector continues to face challenges on two major issues, with the first being labour shortage. It is considered to be a major roadblock in the sector, in comparison with other business sectors. With the country’s working age population expected to decline in the future, these labour shortage issues are likely to deteriorate further in the coming years. In order to tackle this, the German government has implemented Skilled workers strategy (Fachkräftestrategie), which fosters skilled labour immigration from third-world countries. Moreover, the Skilled Labour Immigration Act, effective from 1st March 2020, also facilitates non-EU immigration.

The second issue hindering the German construction sector is late payments. For instance, in 2019, the construction sector took the longest time to pay their customers as compared with other sectors. The average payment duration in the construction sector reached up to 35 days from the date of invoicing, in contrast to the 19-26 day period prevalent in other sectors.

Overall, the German construction sector has a positive outlook in the medium- and long-term. The construction sector has remained resilient throughout the pandemic. Going forward, residential and public sector construction is expected to be the primary growth driver.
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Key figures

Construction market

The number of enterprises in the broad construction sector in Germany totalled 708,688 in 2019\(^3\) (Figure 1), representing a 32.0% increase compared to the 2010 level (536,874). This was mainly driven by the growth registered in the narrow construction (+58.5%) and the architectural and engineering activities sub-sectors (+41.3%), between 2010 and 2019. Contrarily, the real estate activities and the manufacturing sub-sectors reported a decline of 4.0% and 1.9% during the same period. In 2019, the narrow construction sub-sector accounted for 53.4% of the total enterprises, followed by the real estate activities (23.6%), the architectural and engineering activities (19.0%) and the manufacturing (3.9%) sub-sectors.

The volume index of production of the broad construction sector increased by 13.1% between 2015 and 2019 (Figure 2). Likewise, index of production in the construction of buildings and the construction of civil engineering increased by 12.2% and 19.9% respectively over the same period.

The total value added at factor cost\(^4\) of the broad construction sector amounted to EUR 274.4 billion in 2019\(^5\), representing an increase of 59.4% since 2010 (EUR 172.2 billion). The narrow construction sub-sector accounted for 47.3% (EUR 129.9 billion) of the total value added in 2019, followed by the real estate activities (26.4%, i.e. EUR 72.4 billion), the architectural and engineering activities (17.3%, i.e. EUR 47.4 billion) and the manufacturing (9.0%, i.e. EUR 24.8 billion) sub-sectors.
The share of the gross value added (GVA) of the broad construction sector in the GDP stood at 16.2% in 2018, below the 2010 level (16.3%). Further, the share of GVA of the real estate activities sub-sector in the GDP stood at 9.5% (below the 2019 EU-27 average of 9.7%) in 2019, followed by the narrow construction sub-sector, which stood at 4.8%, (below the 2019 EU-27 average of 5.0%) (Figure 3).

Germany counts 38 NUTS-2 statistical regions. In 2017, Oberbayern, Stuttgart and Düsseldorf accounted for the largest shares of gross value added in the narrow construction sub-sector. These amounted to EUR 9.2 billion (6.7% of the total), EUR 8.5 billion (6.2% of the total) and EUR 7.0 billion (5.1% of the total), respectively. Similarly, in the real estate activities sub-sector, Oberbayern, Düsseldorf and Darmstadt are the top contributors in terms of share of gross value added, accounting for EUR 23.4 billion, EUR 19.4 billion and EUR 17.8 billion, respectively.

Productivity

The apparent labour productivity in the broad construction sector has been experiencing an increasing trend, from EUR 58,600 in 2010 to EUR 66,057.3 in 2017 (+12.7%), well above the EU-27 average of EUR 50,079 in the same year. Further in 2018, it decreased to EUR 63,801 representing an overall boost of 8.9% since 2010. Amongst the sub-sectors, apparent labour productivity in the narrow construction sub-sector experienced the strongest increase (+21.2%), going from EUR 41,100 in 2010 to EUR 49,800 in 2018. This was followed by the manufacturing sub-sector, which increased from EUR 48,227.1 in 2010 to EUR 57,533.0 in 2018 (+19.3%).

The architectural and engineering activities sub-sector also increased from EUR 56,200 in 2010 to EUR 64,500 in 2018 (+14.8%). Lastly, the real estate activities sub-sector exhibited a decline from 135,500 in 2010 to 131,000 in 2018 (-3.3%).

Furthermore, in 2019, the apparent labour productivity in all four sub-sectors declined marginally from the previous year, though having increased since 2010. In particular, the apparent labour productivity in the narrow construction sub-sector reached EUR 49,611 in 2019, representing 20.7% increase since 2010. The manufacturing sub-sector followed next, where the labour productivity reached EUR 57,523 in 2019, exhibiting 19.3% growth since 2010. The architectural and engineering activities sub-sector also increased by 14.7% since 2010, reaching EUR 64,475 in 2019. Contrarily, the real estate activities sub-sector declined by 3.3% since 2010, reaching EUR 131,000 in 2019 (Figure 4).

The labour productivity in Germany declined by 0.3% in 2019, in comparison to previous year, and this decline was more pronounced in the country than in other EU Member States. This decline is attributable to weakening growth of investments, lack of modern digital infrastructure in rural and semi-rural areas, unfavourable demographic developments, shortages of skilled labour, slow paced advancement in technology such as e-government, excess regulation and low competition in business services.

The source for these data is Eurostat, 2020.
Turnover and profitability

The total turnover of the broad construction sector amounted to EUR 579.7 billion in 2018, registering a 53.6% increase as compared to 2010 levels (EUR 377.3 billion). It further increased to EUR 600.7 billion in 2019, representing an increase of 59.2% since 2010. This growth was driven by increases in all the four sub-sectors, namely – the architectural and engineering activities (+90.1%), the narrow construction (+86.9%), the real estate activities (+24.0%) and the manufacturing (+17.8%) sub-sectors over the same period. In 2019, the largest share of the turnover came from the narrow construction sub-sector, which accounted for 53.2% (i.e. EUR 319.3 billion) of the total. It was followed by the real estate activities (20.9%, i.e. EUR 125.3 billion), the architectural and engineering activities (14.0%, i.e. EUR 83.9 billion) and the manufacturing (12.0%, i.e. EUR 72.2 billion) sub-sectors.

In parallel, the gross operating surplus of the broad construction sector increased by 47.4% between 2010 and 2018, from EUR 85.2 billion to EUR 125.5 billion. This was largely driven by the increase in gross operating surplus of the narrow construction (+154.6%), the architectural and engineering activities (+48.2%), the manufacturing (+41.5%) and the real estate activities (+12.3%) sub-sectors over the same period.

At the same time, the gross operating rate of the broad construction sector, which gives an indication of the sector’s profitability, stood at 23.1% in 2017, well above the EU-27 average (16.6%). Further in 2018, it decreased to 21.7%, reaching even below the 2010 level (22.6%). Amongst the sub-sectors, the real estate activities sub-sector was the most profitable, with the gross operating rate reaching 46.5% in 2018. This was followed by the architectural and engineering activities (21.4%), the narrow construction (14.4%) and the manufacturing (10.2%) sub-sectors.

Similarly, the construction cost index increased by 10.1% between 2015 and 2019. This was mainly due to 13.6% increase in the index for labour cost in construction and 8.4% increase in the index for input prices for materials.

Employment

In 2019, there were 4,336,271 persons employed in the German broad construction sector, 47.6% more than the 2010 levels (2,938,001 persons). This was driven by a significant increase in number of persons employed in the architectural and engineering activities sub-sector (62.6%), followed by the narrow construction (59.7%), the real estate activities (25.4%) and the manufacturing (6.2%) sub-sectors, over the 2010-2019 period. In 2019, the narrow construction sub-sector employed 60.4% of the total workforce in the broad construction sector (i.e. 2,617,653 persons), followed by the architectural and engineering activities (16.9%, i.e. 734,514 persons), the real estate activities (12.7%, i.e. 552,499 persons) and the manufacturing (10.0%, i.e. 431,604 persons) sub-sectors (Figure 6).
As for employment by specific occupation, the manufacturing sub-sector experienced the highest increase in demand for ‘service and sales workers’ and ‘professionals’ by 43.8% and 30.4% over the 2010-2019 period. In contrast, the demand for ‘craft and related trades workers’ and ‘plant and machine operators and assemblers’ decreased by 6.9% and 6.1% over the same period, respectively. Furthermore, in the narrow construction sub-sector, demand for ‘service and sales workers’ and ‘technicians and associate professionals’ increased by 736.5% and 198.7%, over the 2010-2019 period respectively. Conversely, the demand for ‘craft and related trades workers’ decreased by 13.6%, over the same period. Lastly, in the real estate activities sub-sector, demand for ‘craft and related trades workers’ and ‘professionals’ increased by 47.5% and 37.4% over the 2010-2019 period respectively. In contrast, demand for ‘elementary occupations’ and ‘clerical support workers’ decreased by 81.0% and 31.2% over the same period, respectively.

The number of self-employed workers in the narrow construction sub-sector in Germany decreased by 3.7% over the 2010-2019 period. This also represented 12.3% of all the self-employed workers in the general economy in 2019 (0.9 percentage points (pp) above 2010). Similarly, the real estate activities sub-sector witnessed 25.5% decline in the number of self-employed workers over the 2010-2019 period. This represented 1.1% of the total self-employed workers in the general economy in 2019 (0.2 pp below 2010).

Over the 2010-2019 period, full-time employment in the narrow construction and manufacturing sub-sectors increased by 11.3% and 4.2% respectively. Whereas in the real estate activities sub-sector, it decreased by 15.9% over the same period. Similarly, the part-time employment in the narrow construction and manufacturing sub-sectors increased by 27.4% and 17.8%, over the 2010-2019 period, respectively. The real estate activities sub-sector witnessed a decline in the same by 24.4% over the same period.

With regards to employment as per regions, Oberbayern employed the largest share of persons in the narrow construction sub-sector amounting to 142,670 in 2017, followed by Düsseldorf (131,170 persons) and Stuttgart (122,630 persons). These regions also reported a growth in number of persons employed by 15.4%, 5.3% and 13.0% from 2010 levels, respectively. Similarly, the real estate activities sub-sector recorded the highest employment for Berlin (42,440 persons), Düsseldorf (36,470 persons) and Oberbayern (32,550 persons) in 2017. However, all these regions reported a decline in number of persons employed by 2.5%, 0.5% and 0.6% from 2010 levels, respectively.
Macroeconomic indicators

Economic development

In terms of GDP, the German economy in 2019 increased at a slower pace in comparison with 2018 and 2017. This is due to weakening export growth as a result of the weaknesses of manufacturing activities. In 2019, the country’s GDP increased by 16.6%, from EUR 2.8 trillion in 2010 to EUR 3.2 trillion in 2019. This also represents a growth of 0.6%, from 2018, which is lower than the growth registered in 2018 and 2017 (1.5% and 2.5%, respectively). The potential GDP in 2019 was EUR 3.2 trillion, resulting in a positive output gap of 1.0%, which indicates that the economic output is above the economy’s full capacity for output. The annual growth Inflation rate reached 1.4% in 2019, from 1.9% in 2018. This is attributable to a strong decline in energy prices.

Demography and employment

In 2019, the total population in Germany stood at 83.0 million people. It is projected to increase to 83.5 million people by 2030 (+0.5%), and then decrease to 82.6 million people by 2050 (-0.4%). In parallel, the net migration rate increased from 130,166 in 2010 to 308,905 in 2019. The total number of immigrants also increased from 404,055 in 2010 to 893,886 in 2018 (+121.2%).

In 2019, the working age population accounted for 64.9% of the total population, and is expected to decrease in coming years, reaching 60.3% in 2030 and 58.0% in 2050. Moreover, the share of the ageing population (65+ years) stood at 21.5% of the total population in 2019. It is expected to increase to 25.4% of the total population in 2030 and 28.0% of the total population in 2050. In turn, this may generate an increased demand for hospitals and elderly care infrastructure. This also puts further pressures on the labour supply in the construction sector (see Chapter 4 on Skills shortage).

The unemployment rate (25-64 years) in Germany stood at 2.9% in 2019, well below the 2010 level (6.7%) and the EU-27 average (6.0%). Similarly, the youth unemployment rate (below 25 years) stood at 5.8% in 2019, well below the 2010 level of 9.8% and the EU-27 average of 15.1%.

The decreasing trend of unemployment is expected to improve further, partly driven by government measures such as Participation Opportunities Act (Teilhabechancengesetz) and Qualifications Opportunities Act (Qualifizierungschancengesetz).

Under the Participation Opportunities Act (implemented in January 2019), when a long-term unemployed person is hired, the state pays 75.0% of their wage in the first year and 50% in the second year. Moreover, the Qualification Opportunities Act (implemented since January 2019), aims to strengthen the further training of those already employed in order to make them fit for the new demands on the labour market.

Public finance

In 2019, the general government expenditure reached 45.4%, below the 2010 level (48.1%) and the EU-27 average (46.7%). Moreover, the general government deficit in 2019 reached -1.4%, lower than 2010 level (-4.4%) and higher the EU-27 average (-0.6%). Lastly, the general government gross debt reached 59.8% in 2019, much below than 2010 level (82.4%) and EU-27 average (77.8%).
Entrepreneurship and access to finance

According to the World Bank Doing Business 2020 report, Germany ranked 125th out of 190 countries in ease of starting a business in 2019. This is a decline in comparison with previous year’s ranking (113th).\(^{20}\)

According to the Global Competitiveness Report 2019, Germany ranked 72nd in cost of starting a business and 47th in time (days) to start a business, out of 141 economies.\(^{21}\)

As per the Small Businesses Act (SBA) Fact Sheet 2019, Germany’s performance was below the EU-28 average in entrepreneurship. The country ranked below the EU-28 average in most of the SBA principles, with ‘Entrepreneurial intentions’ being the lowest scoring principle. In contrast, Germany scored above the EU-28 average in five indicators, with ‘High job creation expectation rate’ being the highest scoring indicator.\(^{23}\)

Germany focuses on promoting entrepreneurship by implementing several measures. In 2018 and the first quarter of 2019, some relevant measures were implemented including:

- **GO! Start-Up Campaign (Gründungsoffensive GO! Gut für Dich. Gut für Deutschland):** Implemented in November 2018, it aims to promote business start-ups, strengthen entrepreneurship culture in Germany and encourage people to identify opportunities to start a business and put their own ideas into practice;

- **‘Young Entrepreneurs in Science’ workshop series:** Implemented in August 2018. This measure aims to help PhD students develop business ideas by introducing them to practice-oriented methods and tools in various areas such as design thinking and other creativity techniques;

- **‘Gruenderplattform.de’ founders’ platform:** Established in March 2018, this platform provides support for founders on all aspects of successfully setting up a business.\(^ {24} \)

In terms of access to finance, Germany’s performance overall has remained in line with the EU-28 average. It has scored above the EU-28 average in most of the SBA indicators, with ‘Total amount of time taken to get paid’ being the highest scoring principle. The country has also scored below the EU-28 average in three SBA indicators, with ‘Cost of borrowing small loans relative to large loans’ being the lowest scoring indicators.\(^{26}\)

Loans to domestic non-financial corporations in Germany reached EUR 955.5 billion in 2019, representing a 21.4% rise from 2010 levels.

As per the Global Competitiveness Report 2019, the financial system of Germany ranked 25th out of 141 countries. This is a deterioration from previous year’s ranking (21st). In particular, it ranked best (7th) in financing of SMEs and venture capital availability. Further, it ranked 22nd in insurance premium, 40th in domestic credit to private sector and 41st in market capitalisation.\(^ {27} \)

In 2018 and the first quarter of 2019, Germany took significant action towards expanding access to finance by implementing four measures. The most recent being the ‘Venture Tech Growth Financing’ programme was implemented in December 2018 by Kreditanstalt für Wiederaufbau (KfW). It provides EUR 50.0 million of venture debt capital per year to growing and innovative technology companies. During the funding period, the fund, along with private investors, will offer an additional financing for tech start-ups in their growth phase of at least EUR 500.0 million.\(^ {28} \)
3

Key economic drivers of the construction sector

Business confidence

Over the 2010-2019 period, the consumer confidence indicator has been fluctuating, reaching -2.1 in 2019 in comparison to the 2010 level (-4.6). This is also above the EU-27 average (-6.2), however below 2018 level (1.1). The industry confidence indicator decreased from 0.4 in 2010 to -8.8 in 2019. This is lower than both the 2018 level (10.8) and EU-27 average (-4.8). Lastly, the construction confidence indicator experienced an increase over the 2010-2019 period, going from -20.3 to 16.5. This is also higher than EU-27 average of 5.1, but lower than the 2018 level (17.8).

However, following the relaxation of economic restrictions, the confidence levels recovered in June 2020, reaching 99.6\textsuperscript{10,31}. It kept increasing till September 2020, reaching 99.8. In October 2020, the confidence among German consumers had again started declining as there were possibilities of the second wave of lockdown and toughening of restrictions due to a rise in infection figures. It dropped to 99.6 in October 2020, and further to dropped to 99.3 in November 2020\textsuperscript{12,33}.

Domestic sales

The ranking of the five most domestically sold product groups in 2019 has changed significantly since 2010. ‘Doors, windows and their frames’ (group 251210), which ranked first in 2010, has been replaced by ‘Other structures and parts of structures’ (group 251123). ‘Ready-mixed concrete’ (group 236310), ranking second in 2010, has been replaced by ‘Prefabricated structural components’ (group 236112). Similarly, ‘Windows, French windows and their frames’ (group 162311), ranking third in 2010, has been replaced by ‘Ready-mixed concrete’ (group 236310). ‘Portland cement, aluminous cement’ (group 235112) which ranked fourth in 2010, has been replaced by ‘Windows, French windows and their frames’ (group 162311). Lastly, ‘Prefabricated buildings of metal’ (group 251110) which ranked fifth in 2010, has been replaced by ‘Portland cement, aluminous cement’ (group 235112). Germany’s top five most domestically sold product groups in 2019 constituted 50.2% of all construction product domestic sales in 2019.

In parallel, the investment ratio has generally increased since 2013, reaching 21.1% in 2019, as compared to 19.6% in 2010. Investment per worker, on the other hand, decreased by 17.6%, from EUR 91.890 in 2010 to EUR 75,761 in 2018\textsuperscript{19}.

The consumer confidence levels in Germany had been negatively impacted by the disruptions caused due to the global pandemic COVID-19 in the first half of 2020. During the year 2020, the consumer confidence index continued declining until it reached 98.9 in May.

Construction confidence indicator in Germany

\begin{center}
\begin{tikzpicture}
\fill[green!20] (0,0) circle (1.5cm);
\fill[red!20] (3,0) circle (1.5cm);
\node at (0,0) {16.5};
\node at (3,0) {-20.3};
\node at (1.5,0) {2010};
\node at (4.5,0) {2019};
\end{tikzpicture}
\end{center}
Table 1: Five most domestically sold construction products in Germany and in the EU in 2019

<table>
<thead>
<tr>
<th>#</th>
<th>Product</th>
<th>Germany Value (EUR m)</th>
<th>Share in construction product domestic sales (%)</th>
<th>EU-27</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Other structures (group 251123)</td>
<td>6,006.4</td>
<td>18.1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Prefabricated structural components (group 236112)</td>
<td>3,408.78</td>
<td>10.2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Ready-mixed concrete (group 236310)</td>
<td>3,097.8</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Windows, French windows and their frames (group 162311)</td>
<td>2,118.8</td>
<td>6.4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Portland cement, aluminous cement (group 235112)</td>
<td>2,069.4</td>
<td>6.2</td>
<td></td>
</tr>
</tbody>
</table>


Table 2: Five most exported construction products in Germany and in the EU in 2019

<table>
<thead>
<tr>
<th>#</th>
<th>Product</th>
<th>Germany Value (EUR m)</th>
<th>Share in construction product export sales (%)</th>
<th>EU-27</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Other structures (group 251123)</td>
<td>2,472.7</td>
<td>21.1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Fibreboard of wood (group 162115)</td>
<td>1,619.3</td>
<td>13.8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Doors, windows, etc. (group 251210)</td>
<td>841.0</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Particle board (group 162112)</td>
<td>494.0</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Windows, French windows and their frames (group 162311)</td>
<td>468.0</td>
<td>4.0</td>
<td></td>
</tr>
</tbody>
</table>


Export of construction-related products and services

The ranking of the top five most exported construction product groups has changed significantly between 2010 and 2019. ‘Doors, windows and their frames’ (group 251210) which ranked first in 2010, has been replaced by ‘Other structures and parts of structures’ (group 251123). Further, ‘Portland cement, aluminous cement’ (group 235112), which ranked second in 2010, has been replaced by ‘Fibreboard of wood’ (group 162115). Similarly, ‘Builders' joinery and carpentry’ (group 162319), ranking third in 2010, has been replaced by ‘Doors, windows and their frames’ (group 251210). The 2010 ranking (fourth) for ‘Windows, French windows and their frames’ (group 162311) remains unchanged in 2019. Lastly, ‘Plaster products for construction purposes’ (group 236210), which ranked fifth in 2010, has been replaced by Portland cement, aluminous cement’ (group 235112). Germany’s top five most exported construction products groups in 2019 constituted 51.1% of the total exported construction products groups.

In terms of cross-border provision of construction services, Germany exported EUR 2.0 billion worldwide in 2018, 1.3% below the 2014 level. Specifically, the exports made to the EU-27 Member States and countries outside the EU-27 in 2018 amounted to EUR 1.0 billion and EUR 963.0 million respectively. The share of exports of the construction services to the total exports in 2018 was 52.2%. On the other hand, Germany imported EUR 1.6 billion worth of construction services in 2018 from the foreign countries. This is 3.2% below the 2014 level. Specifically, the imports made from the EU-27 Member States and countries outside the EU-27 in 2018 amounted to EUR 1.2 billion and EUR 394.0 million respectively. The share of imports of the construction services to the total imports in 2018 was 74.7%.

Germany achieved a trade surplus of EUR 456.0 million in 2018, marking an increase of 5.6% from 2014.

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Germany achieved a trade surplus of EUR 456.0 million in 2018, marking an increase of 5.6% from 2014.
Access to finance in the construction sector

Due to the global pandemic COVID-19, the disruptions in the general economic outlook has negatively affected the access to finance for SMEs in Germany. In fact, the rising macroeconomic uncertainty has influenced the availability of external finance for SMEs.

According to the 2020 Survey on the Access to Finance of Enterprises (SAFE) report, around 44.0% of small and medium enterprises (SMEs) in Germany reported of bank loans being relevant, below the EU-27 average (48.0%). Around 15.0% of the SMEs reported of using bank loans recently (between April 2020 and September 2020), below the EU-27 average (18.0%). During the same period, 26.0% of SMEs in Germany applied for a bank loan, well below the EU-27 average of 35.0%. Around 4.0% of SMEs in Germany did not apply for bank loans fearing rejection, at par with the EU-27 average. Around 41.0% of SMEs did not apply for bank loans because of sufficient internal funds, higher than the EU-27 average (35.0%).

Moreover, the availability of bank loans during April to September 2020 for SMEs in Germany has also changed. Around 16.0% of SMEs opined that the availability of bank loans has improved for the period, below the EU-27 average (19.0%). On the contrary, around 14.0% of SMEs mentioned that it has deteriorated, in line with the EU-27 average (14.0%). However, around 66.0% of SMEs believed that the condition of availability of bank loans remains unchanged, above the EU-27 average (58.0%).

The requirement of bank loans between April and September 2020 increased for around 24.0% of SMEs in Germany, below the EU-27 average (31.0%). Over the same period, the requirement of bank loans decreased for around 16.0% of SMEs, above the EU-27 average (11.0%). Around 59.0% of SMEs also reported that their requirement for bank loans remained unchanged over the same period, above the EU-27 average (57.0%).

Credit extended to the German construction sector has been growing consistently since 2013. In 2019, it reached EUR 77.1 billion, representing 24.9% increase since 2010 (EUR 61.7 billion).

As per the European Investment Bank (EIB) Investment Survey 2020, bank loans continue to make up the highest share of external finance in construction sector in Germany, followed by leasing. However, the majority of the German firms in the construction sector rely on internal sources of finance for investment purposes, in comparison with external sources. A greater share of German firms operating in the construction sector preferred to rely exclusively on internal sources to finance investment, after services sector. As such, the share of ‘financially constrained’ firms in the construction sector is lower than the firms operating in the services and manufacturing sector in Germany – about 5.0%.

Access to housing

The number of households in Germany has continuously increased since 2010, reaching 40.9million of units in 2019. This represents an 5.9% increase as compared to the 2010 level of 38,610 units. The share of population living in intermediate urbanised area reached from 36.1% in 2010 to 41.0% in 2019, representing an increase of 4.9 pp.

Since 2010, mean equivalised net income in Germany has also increased from EUR 21,470 to EUR 25,882 in 2018, being significantly higher than EU-27 average of EUR 19,078 in 2018. It further increased to EUR 26,105 in 2019, which represents 21.6% increase from 2010 levels.
Moreover, lending to households for home purchases picked up, with total outstanding residential loans growing by 25.5%, from EUR 1.2 million in 2010 to EUR 1.4 million in 201847. This increase in residential loans is partly supported by the declining rates on mortgages. In fact, interest rates on mortgages (for over five years maturity) has been consistently declining from 4.7% in 2010 to 2.3% in 2019 (Figure 7).

Figure 7: Mortgage rates for loans for over five years original maturity (%)

![Figure 7](https://example.com/mortgage_rates.png)


The increasing population living in intermediate urbanised areas coupled with increasing mean equivalised net income has boosted demand for housing in Germany. These factors, together with decreasing mortgage rates in the country, has boosted the uptake of residential loans. As a result, housing prices have increased since 2015. In particular, the house price index for total dwellings has increased by 28.7% over the 2015-2019 period. This is driven by 22.9% and 29.8% increase in house price index for new dwellings and existing dwellings (Figure 8).

Figure 8: House prices index in Germany between 2010 and 2019 (2015=100)

![Figure 8](https://example.com/house_prices.png)


According to Deutsche Bank, house prices for existing homes in bigger German cities have witnessed a growth of 123.7% over the period 2009-2019. The lowest increase was 97.0% in Düsseldorf, while Munich saw the highest jump of 178.0%48.

Amid the global pandemic COVID-19, the housing market in Germany has been severely affected by a drop in sales. However, high demand and high prices have continued showing an upward trend. This highlights the constrained supply of homes in the country. The German government aims to build 1.5 million new housing units by the end of 2021. However, it is not on track to meet this target. As per Deutsche Bank, the present nationwide imbalance of supply and demand in the country is unlikely to be alleviated by the creation of new homes. According to the Federal Statistical Office (Destatis), house prices in Germany have continued to rise throughout the COVID-19 crisis, faster than expected – both in cities and rural areas. In particular, house prices rose 6.6% in the second quarter of 2020 as compared to the same period previous year49. The Deutsche Bank predicts that prices will continue to rise at a similar rate until at least 202250.

The resilience of the German housing market amid the disruptions caused by the global pandemic, has brought Germany on the Chinese property investors’ radar. Chinese property investors are looking at Germany as a destination to make “pandemic-proof” investments for the future. One of the reasons why Chinese buyers are prioritising to invest in Germany is its potential to offer high returns from commercial properties and buy to let properties. Additionally, Germany’s housing market has coped with the pandemic better than other European countries, making it the most preferred for foreign investments51.

With regards to the housing supply in 2019, the total number of homes completed in Germany increased by 2.0% from 2018, reaching 293,000 units. This is well below the official government target of building 375,000 new homes per year52. Moreover, the number of building permits in 2019
in the German housing market stood at 350,000, representing an increase of 0.9% from the number of permits issued in 2018 (346,810). Out of this, permits for single dwelling houses reached 112,200 in 2019, from 110,638 in 2018 (+1.4%) and permits for collective dwelling reached 182,800 in 2019, from 180,137 in 2018 (+1.5%)\textsuperscript{53}.

The German housing market continues to be characterised by a low rate of home ownership and a preference for rental housing. In 2019, 51.1% of the building stock was held by homeowners (down from 53.2% in 2010 and 51.5% in 2018). On the other hand, tenants comprised of 48.9% in 2019 (up from 46.8% in 2010 and 48.5% in 2018). The indexed values of actual rentals for housing has also increased by 6.1% between 2015 and 2019. Only 25.1% of people earning below 60.0% median equivalised income own their home in 2019, while this figure reaches 55.7% to for people earning above 60.0% of the median equivalised income. This shows that the level of income is a key determinant to home ownership.

The housing quality in Germany is relatively high. The housing cost overburden rate\textsuperscript{54} for Germany in 2019 stood at 13.9%, higher than the EU-27 average (9.4%), but below the 2010 level (14.5%)\textsuperscript{55}. The severe housing deprivation rate\textsuperscript{56} in 2019 stood at 2.1%, at par with the 2010 level. However, it is below the EU-27 average (4.0%)\textsuperscript{57}. Finally, the overcrowding rate\textsuperscript{58} in 2019 stood at 7.8%, above the 2010 level (7.1%). However, it lies much below the EU-27 average (17.2%)\textsuperscript{59}.

Infrastructure

According to the Global Competitiveness Report 2019, Germany ranked 8\textsuperscript{th} in infrastructure, scoring higher than the average of advanced economies\textsuperscript{60}.

In terms of infrastructure, Germany ranked well in railroad density (7\textsuperscript{th}), airport connectivity (7\textsuperscript{th}), liner shipping connectivity (7\textsuperscript{th}) and road connectivity (11\textsuperscript{th}). It has also been ranked 16\textsuperscript{th} under efficiency of train services and 18\textsuperscript{th} under efficiency of seaport services. The quality of its road infrastructure ranked at the 22\textsuperscript{nd} place, comparative to most economies worldwide. However, this is down from the 19\textsuperscript{th} rank of the previous year. In the efficiency of air transport services, Germany ranked 28\textsuperscript{th} out of 141 economies.

The COVID-19 pandemic negatively affected the economy, which compelled German officials (and European officials at a broader level) to propose a number of drastic rescue packages. Amongst those rescue packages, on May 2020, the German government announced an economic stimulus package – Investment Future Mobility, amounting to EUR 28.0 billion. The package aims at boosting investments in digital infrastructure and rail transport\textsuperscript{61}.

As part of the investment package, EUR 3.0 billion is planned to go to the federal digital infrastructure fund, while another EUR 5.0 billion would be invested to expand access to 5G networks. The package shall also support railway network through investments totalling EUR 2.6 billion. The state-owned rail company, Deutsche Bahn, would also receive EUR 5.5 billion to increase equity capital over the next two years due to a loss of revenue during the health crisis. Furthermore, EUR 2.5 billion shall be set aside for road construction, EUR 1.9 billion for alternative and synthetic fuels, EUR 170.0 million towards financial assistance for bus companies. An additional EUR 1.2 billion will be allocated for the improvement of waterways\textsuperscript{62}.  

![Boxplot Overcrowding rate in 2019](image_url)
4

Key issues and barriers in the construction sector

Company failure

Over the 2010-2017 period, the German broad construction sector has witnessed a declining trend in business demography.

The downward trend in business demography is particularly pronounced in the real estate activities sub-sector, where company births dropped by 45.9%, from 21,875 in 2010 to 11,827 in 2017. It was followed by the architectural and engineering activities sub-sector, where company births dropped from 11,235 in 2010 to 7,358 in 2017 (-34.5%). Lastly, the narrow construction sub-sector experienced a 19.0% drop, from 28,660 in 2010 to 23,201 in 2017.

Similarly, company deaths in the real estate activities sub-sector decreased by 52.2%, from 22,033 in 2010 to 10,523 in 2017, being the highest among sub-sectors. This was followed by the architectural and engineering activities sub-sector wherein the number of company deaths declined from 12,307 in 2010 to 10,499 in 2017 (-14.7%). Lastly, the narrow construction sub-sector experienced the smallest drop from 26,937 in 2010 to 25,997 in 2017 (-3.5%).

Conversely, the impact of COVID-19 pandemic was partly mitigated by government support measures, translating in a limited number of insolvencies of firms in Germany. In the first half of 2020, around 9,006 corporate insolvencies were declared in Germany, 6.2% lower than the same period last year. This is partly due to a rule designed to keep firms afloat in the pandemic. However, specific to the construction sector in Germany, there were more than 1,000 insolvencies during the first half of 2020.

In March 2020, in order to combat the impact of the pandemic, the government helped financially troubled companies by allowing them to delay filing bankruptcy. This was later extended until April 2021.

There were several other economic policy measures announced by the German government including a EUR 122.3 billion aid package, comprising of EUR 55.0 billion for directly combating the pandemic and EUR 50.0 billion in immediate assistance for supporting microenterprises. An immediate assistance worth EUR 50.0 billion had also been announced for own-account workers and small companies. As per this measure, one-off payments of up to EUR 9,000 for companies with up to five employees (full-time equivalents) or EUR 15,000 for companies with up to ten employees (full-time equivalents) had been decided.

Trade credit

According to the 2020 SAFE report, around 11.0% of SMEs in Germany reported trade credit to be relevant, well below the EU-27 average of 28.0%.

Furthermore, as per the 2020 SAFE report, around 6.0% of the SMEs in Germany reported of using trade credit between April 2020 and September 2020, below the EU-27 average of 14.0%. During the same period, around 24.0% of SMEs in Germany applied for trade credit, lower than the EU-27 average of 31.0%. Around 6.0% of German SMEs did not apply due to possibility of rejection and 37.0% of SMEs did not apply because of sufficient internal funds, higher than the EU-27 average of 33.0%.
Amongst the firms which applied for trade credit in Germany, around 72.0% of SMEs received everything they applied for, above the EU-27 average of 67.0%. A smaller share of German SMEs (4.0%) received above 75.0% of what they applied for in trade credit, much lower than the EU-27 average of 11.0%. Around 7.0% of SMEs in Germany received below 75.0% of what they applied for, lower than the EU-27 average of 10.0%. Trade credit applications for around 5.0% of German SMEs were rejected.77

Regarding the availability of trade credit during April 2020 and September 2020, around 11.0% of SMEs reported that the conditions have improved, lower than the EU-27 average of 13.0%. However, around 17.0% of German SMEs also reported that the availability of trade credit had deteriorated, higher than the EU-27 average of 15.0%. For around 62.0% of German SMEs, the availability of trade credit remained unchanged during the same period, lower than the EU-27 average of 65.0%.78

According to Atradius Payment Practices Barometer, in 2019, around 59.3% of sales were made on credit in the German economy (compared to an average of 60.4% in Western Europe). This represented a sudden increase as compared to 24.7% of credit sales recorded in Germany for 2018.79

<table>
<thead>
<tr>
<th>Proportion of total B2B sales made on credit</th>
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<td><strong>Germany 2018</strong></td>
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### Late payment

According to the SAFE report 2020, around 35.0% of SMEs in Germany were paid late, higher than the previous year (34.0%) but still lower than the EU-27 average (44.0%).80

Around 7.0% of the German SMEs were regularly paid late (between April 2020 and September 2020), below the EU-27 average (13.0%).

However, more than half of the SMEs (64.0%) in Germany did not witness late payments between the same period, above the EU-27 average (55.0%)81. Specifically, around 63.9% of payments were made on time by June 2020.82

In 2019, late payments in Germany improved slightly in comparison with 2018. The businesses in Germany turned overdue invoices into cash significantly earlier in 2019 (on average 36 days) than previous year (on average 39 days). Around 72.7% of invoices in 2019 were paid on time, compared to 61.5% in the previous year. In order to tackle the liquidity constraints arising out of late payments, around 31.0% of German businesses had to take specific measures. One example is the German VOB-B, which provides the possibility to agree on interim payments within a payment delay of 21 days (an even shorter delay than foreseen for the final invoice). These deadlines are only applicable to contracts between entrepreneurs and to contracts with public authorities’ involvement. For contracts with consumers these deadlines are not compulsory. The possibility of interim payments (Abschlagszahlungen) is widely used and helped to ameliorate the situation.

In 2019, the German construction sector tended the longest payment terms to the customers, averaging up to 35 days from invoicing. Whereas, the average payment terms for other sectors in the German economy ranged from 26 days in the transport sector to 19 days in both the metals and agri-food sectors.85

### Time and cost of obtaining building permits and licenses

According to the Doing Business 2020 report, Germany ranked 30th out of 190 economies, in ‘Dealing with Construction Permits’. This is a decline from previous year’s ranking (24th).86

Completing the formalities to build a warehouse requires nine administrative procedures (Table 3), well below the OECD high-income average of 12.7; and takes 126 days (below the 152.3 OECD high-income average). The estimated cost is approximately 1.1% of the warehouse value, lower than the OECD high-income average of 1.5%.87
Conversely, the number of tertiary students in engineering and engineering trades dropped from 53,165 in 2010 to 46,039 in 2018 (-13.4%). Considerable shortages of skilled labour have been reported by most of the sectors in Germany, and this acts as an impediment to growth of the country’s economy. Though the share of firms in Germany reporting labour shortages as a factor hindering production has fallen from 27.0% in the second quarter of 2018, to 18.0% in the third quarter of 2019, it remains sizeable⁹⁰. The present situation of the shortage of skilled workers in Germany is further expected to fall due to demographic changes. As of January 2020, around 1.2 million jobs positions were unfilled⁹¹.

According to EIB Investment Survey 2020, in comparison with other barriers, availability of skilled staff is considered to be the biggest long-term barrier in the German construction sector and it is also considered to be the biggest long-term barrier in comparison with other business sectors⁹².

In order to address the challenges of skill shortages in Germany and declining working-age population (10.2 million by 2060), the government is implementing a comprehensive Skilled worker strategy (Fachkräftestrategie). This includes fostering skilled labour immigration from non-EU countries, in addition to relying on the potential of domestic and European skilled workers. The government is encouraging immigration laws, which intends to open access to the country’s labour market for skilled workers from countries outside the European Union (EU)⁹³. Moreover, sectorial associations invest in awareness raising campaigns to attract young people for apprenticeships in the construction sector⁹⁴,⁹⁵,⁹⁶.

### Skills shortage

The number of job vacancies in the narrow construction sub-sector increased by 172.3%, reaching 141,316 in 2019, from 51,892 in 2010. Similarly, job vacancies in the real estate activities sub-sector increased by 45.3% over the same period, reaching 7,579 in 2019, from 5,216 in 2010. These trends reveal large skills shortages in the narrow construction sub-sector, and to a lesser extent in the real estate activities sub-sector.

Moreover, adult participation rate in education and training in the narrow construction sub-sector decreased, from 9.4% in 2010 to 9.2% in 2019. In the real estate activities sub-sector, adult participation in training increased from 11.0% in 2010 to 11.6% in 2019.

The number of tertiary students in engineering, manufacturing and construction has been increasing continuously since 2010. Particularly, in 2018, it stood at 120,828, representing an increase of 62.5%, from the 2010 level (74,371). Out of these, the number of students in architecture and building represented the highest growth over the same period, going from 16,301 in 2010 to 23,550 in 2018 (+44.5%). This was followed by the number of students in manufacturing and processing, which grew from 4,905 in 2010 to 7,094 in 2018 (+42.9%). Conversely, the number of tertiary students in engineering and engineering trades dropped from 53,165 in 2010 to 46,039 in 2018 (-13.4%).

### Sector and sub-sector specific issues

#### Material efficiency and waste management

The construction and demolition waste (CDW) constitute one of the heaviest and most voluminous waste streams in the entire EU region. CDW mainly consists of several materials, including concrete, bricks, gypsum, wood, glass, metals, plastic, solvents, asbestos and excavated soil, many of which can be recycled. Specifically, in 2018⁹⁷, the CDW totalled 225.2 million tonnes. This represents a rise of 17.9% and 2.1% from 2010 (191.0 million tonnes) and 2016 (220.5 million tonnes) levels. Out of these, construction and demolition waste (CDW) constitute one of the heaviest and most voluminous waste streams in the entire EU region. CDW mainly consists of several materials, including concrete, bricks, gypsum, wood, glass, metals, plastic, solvents, asbestos and excavated soil, many of which can be recycled. Specifically, in 2018⁹⁷, the CDW totalled 225.2 million tonnes. This represents a rise of 17.9% and 2.1% from 2010 (191.0 million tonnes) and 2016 (220.5 million tonnes) levels. Out of these, construction and demolition waste (CDW) constitute one of the heaviest and most voluminous waste streams in the entire EU region. CDW mainly consists of several materials, including concrete, bricks, gypsum, wood, glass, metals, plastic, solvents, asbestos and excavated soil, many of which can be recycled. Specifically, in 2018⁹⁷, the CDW totalled 225.2 million tonnes. This represents a rise of 17.9% and 2.1% from 2010 (191.0 million tonnes) and 2016 (220.5 million tonnes) levels.
of the total CDW generated in 2018, around 9.1 million tonnes of waste were classified as hazardous waste, comprising 4.0% of the total; and 216.1 million tonnes of waste was categorised under non-hazardous waste, making up 96.0% of the total.98

According to the report published by Federal Ministry for the Environment, Nature Conservation and Nuclear Safety on July 2020, the waste management infrastructure in Germany is comprised of 15,500 facilities, all of which achieve high recycling rates. The highest recycling rate is for the CDW (almost 90.0%), followed by production and commercial waste (around 70.0%) and municipal waste (67.0%). In 2017, around 32.0% of mineral waste recovered comprised of CDW.99

Climate and energy

Germany aims to reduce greenhouse gas emissions by 55.0%, till 2030 (compared to 1990 levels). In order to achieve this target, the government agreed on a 2030 Climate Package that is composed of a proposal for a federal law on climate protection and a 2030 climate protection programme. This programme contains a list of sectoral policies aimed at achieving Germany’s 2030 greenhouse gas emission reduction target. The law apportions the overall emission reduction targets into sectoral emission budgets between key sectors of the economy, inclusive of the buildings sector. With regards to emissions from the buildings sector, Germany has planned to increase tax support aimed at refitting heating systems in 2019. To smoothen the exchange of old heating oil burners, new heating systems will get a subsidy of 40.0% of the cost. At the same time, after 2026 it will not be allowed to fit a new oil heating system (as long as an alternative exists).100

Emissions of greenhouse gases (carbon dioxide, methane and nitrous oxides) from activities in the narrow construction and real estate sub-sectors amounted to 11.8 million tonnes and 0.5 million tonnes in 2018, respectively. While, the narrow construction sub-sector experienced a 29.0% increase in the emission of greenhouse gases, the real estate activities sub-sector reported a 52.6% decline in the emissions as compared to 2010.
Innovation in the construction sector

Innovation performance

According to the 2020 European Innovation Scoreboard, Germany is classified as a Strong Innovator.102

The strongest innovation dimensions of the German innovation system include Firm investments, Innovators and Linkages. The country also demonstrated strong performance on public-private co-publications, R&D expenditure in the business sector, enterprises providing ICT training and public R&D expenditures.103

Conversely, innovation dimensions in which Germany’s performance was relatively weak included attractive research systems, human resources and an innovation-friendly environment. The country also scored low on indicators such as foreign doctorate students, population with tertiary education, lifelong learning, and venture capital expenditures.104

Over the 2010-2018 period, Germany’s R&D intensity increased from 2.7% of GDP in 2010 to 3.1% of GDP in 2018, being 3rd highest in the EU. The country has also set a new national R&D intensity target of 3.5% by 2025, as included in its High-Tech Strategy (BMBF, 2018).106

In 2018, the Business Enterprise R&D Expenditure (BERD) in the German narrow construction sub-sector amounted to EUR 82.1 million, representing a 7.3% growth compared to EUR 76.5 million in 2010. In parallel, the BERD in the professional scientific and technical activities as well as the real estate activities sub-sectors increased by 84.1% and 200.0% over the 2010-2018 period, totalling EUR 2.5 billion and EUR 1.5 million in 2018, respectively.

The total number of R&D personnel (full-time equivalents – FTE) has been increasing across all sub-sectors. In the narrow construction sub-sector, the total R&D personnel FTE amounted to 1,116 in 2018, registering a 36.3% increase as compared to 2010. Similarly, the number of FTE in the professional and technical activities sub-sector has more than doubled over 2010-2018, reaching 27,142 in 2018. This was 127.1% higher than the 2010 levels of 11,950. Likewise, the total R&D personnel in the real estate activities sub-sector amounted to 26 FTEs, a 136.4% jump as compared to 11 FTEs in 2010.
The number of patent applications in the German broad construction sector have shown a fluctuating trend. In 2019, they stood at 1,090, registering a decline of 9.7% as compared to the 2010 level.

As per the 2019 EU Industrial R&D Investment Scoreboard, six German companies in the construction and materials, five companies in the real estate investment & services, and six in the household goods & home construction sectors are currently ranked among the top 1,000 in terms of R&D spending.\(^{110}\)

According to the KfW SME Innovation Report 2019, the German construction sector has one of the lowest innovation rates among other sectors in the country. In fact, the construction sector innovator rate recorded the sharpest decline of 78.0% over the 2002/2004 to 2016/2018 period.\(^{111}\)

As per the KfW SME Innovation Report 2019, the aggregate innovation expenditure by the construction sector stood at EUR 0.3 billion in 2018, well below EUR 0.5 billion in 2013.\(^{112}\) Indeed, only 5.0% of the Germany’s innovative SMEs belong to the construction sector over the 2016-2018 period.\(^{113}\)

Furthermore, an agency has been set up to promote disruptive innovation and is scheduled to start operations soon. The German Parliament has also introduced a new law with tax incentive for R&D effective from 2020 onwards, allowing businesses to claim a tax credit worth 25.0% of the eligible expenses (personnel costs of research staff or 60.0% of the fees for subcontracting). This incentive is available to all companies regardless of their size. However, the base is capped at EUR 2.0 million, translating into a maximum tax credit of EUR 500,000 per company per year, thus mostly beneficial for SMEs.\(^{114}\)

Eco-innovation and digitalisation

As per to the 2019 Eco-Innovation Scoreboard (Eco-IS), Germany ranked 6\(^{th}\) with a score of 123, well above as compared to the EU-28 average of 100.\(^{115}\)

As per the report, Germany’s eco-innovation performance declined from 3\(^{rd}\) rank in 2018 to 6\(^{th}\) rank in 2019. This was primarily due to weaknesses in eco-innovation activities and environmental outcomes offsetting strong performance in eco-innovation inputs as well as socio-economic and eco-innovative outputs.\(^{117}\)

Germany is one of the leading EU Member States in the field of eco-innovation including waste management, recycling and environmental technologies. Recently, the country has put an increased focus on digitalisation and a digital agenda. Germany’s strong exporting environmental technology sector, high numbers in patent development, high environmental and safety standards, skilled employees, efficient production chains and a strong industrial sector provide a good basis for driving a circular economy and eco-innovation in the country.\(^{118}\)

Nonetheless, there are still some barriers in the mobility sector, in addition to the reluctance towards environmental regulation and economic instrumentation. Overcapacities in waste-to-energy facilities and inadequate incentives for waste prevention are also prevalent issues. Presently, Germany does not have a dedicated Eco-innovation Action Plan (Eco-AP), although it has an eco-innovation policy. Recently, the country launched a new R&D programme to explore its circular economy potential – Building and mineral cycles (ReMin) (2020-2024). Additionally, the Digital Agenda of the Federal Environment Ministry (2020) also addresses some of the digitalisation and environmental protection issues.\(^{119}\)

According to the European Commission Digital Economy and Society Index (DESI) 2020, Germany ranked 12\(^{th}\) out of EU-28 Member States with a 56.1 score, above the EU-28 average score of 52.6.\(^{120}\)

As per the Index, Germany performed well in majority of DESI dimensions, except in digital public services wherein it ranked 21\(^{st}\) out of all EU Member States. In fact, Germany ranked 26\(^{th}\) in terms of usage of e-government services, given that only 49.0% of internet users go online to access such services. In order to improve this situation, the German government has undertaken several measures including the implementation of the Online Access Act.\(^{122}\)

Furthermore, the digitalisation of the construction sector stimulates innovation. The Federal Ministry of Transport and Digital Infrastructure (BMVI)
supports the use and uptake of Building Information Management (BIM) for the whole supply chain of planning, constructions and operations. Besides sponsoring pilot-projects, a national step plan for the BIM implementation was presented in 2015, known as the Road Map for Digital Design and Construction\textsuperscript{123}, acting as a roadmap for leveraging BIM as a standard planning tool for all federal infrastructure projects and is scheduled to be adopted by end-2020.

According to a survey by the Fraunhofer Institute for Industrial Engineering, in 2018, about one-third of German construction businesses with projects worth more than EUR 25.0 million were using BIM\textsuperscript{124}.

In contrast, smaller companies find it difficult to leverage the digital planning system owing to high software costs\textsuperscript{125}. Additionally, an industrial alliance called “planen und bauen 4.0 GmbH” also supports the digitisation of the construction sector\textsuperscript{126}.

According to the EIB Investment Survey 2020, only 35.0\% of the firms in the German construction sector were likely to had implemented any digital technologies, either fully or partially, within their business. Additionally, about 22.0\% of the firms in the broad sector had implemented internet of things, followed by 19.0\% in case of drones, 11.0\% in case of augmented or virtual reality and only 10.0\% in case of 3-D printing technology\textsuperscript{127}.

Over the 2018-2019 period, the German government launched the following measures, that indirectly promoted innovation and digitalisation within the construction sector\textsuperscript{128}:

- Expansion of competence centres under the ‘Mittelstand 4.0’ initiative, supporting the digitalisation of SMEs by providing information, knowledge and examples of best practice via its competence centres. Three new competence centres were established while seven existing centres operations were extended by two years.

- Adoption of employment training programmes by BA and BMAS (82 SGB III Förderung beschäftigter Arbeitnehmerinnen und Arbeitnehmer im Rahmen der Arbeitsförderung) in January 2019, to help employers adapt to the structural changes due to the use of technology in the workplace and the digitalisation of labour. It offered full or partial financial support for employers undertaking professional training.

Another programme by the German government - ‘the Go-Digital programme’ promotes consulting and implementation services for SMEs in digitised business processes, digital market development and IT security\textsuperscript{129}.

In March 2017, the Federal Ministry for Economic Affairs and Energy (BMWi), in partnership with more than 40 leading companies and associations, launched the Smart Living Initiative. This initiative aims to leverage the current trend of digitalisation and promote development of smart homes in a bid to further digitise living environments. The key objectives are to provide a legal framework, present a roadmap for the transition to a smart living society, establish quality standards, and provide impetus to targeted innovation in this space. The National Office Smart Living was set up in April 2017 to coordinate the activities on behalf of BMWi\textsuperscript{130}.
National and regional regulatory framework

Policy schemes

The Ministry for Economic Affairs and Energy, the Federal Ministry for Environment, Nature Conservation Building and Nuclear Safety and the Federal Ministry of Transport and Digital Industry are the key players shaping policies affecting the construction sector at the country level.

Germany has an ambitious goal of reducing its energy usage by almost half until 2050. This includes heating requirements of the building stock (see Section TO 3 – Resource efficiency/Sustainable construction). The federal government has dedicated EUR 17.0 billion over the 2015-2020 period to foster energy efficiency measures for the German economy. Investments in the energy sector is expected to reach about EUR 15.0 billion annually, including EUR 9.0-10.0 billion invested in new renewable energy capacity over the 2014-2024 period. However, the government estimates suggest that Germany lagged behind in reaching its energy saving targets for 2020.

In terms of housing policies, the first stage of the 2006 German federal reforms (Föderalismusreform), transferred the entire responsibility of implementation of social housing programmes to the federal states, the Länder. Thus, policies vary considerably in focus and size across German federal states. Apart from this, the Länder also lead different local policy activities, like vocational training or regional financing schemes that have an impact on the construction sector. In 2019, the German government introduced the Article 104d of the Basic Law (Gesetz zur Änderung des Grundgesetzes) allowing the federal government to provide direct, ring-fenced financial assistance to the Länder for the construction of social housing from 2020 onwards.

The German government has allocated EUR 1.0 billion of program funds under the Basic Law to be used over the 2020-2024 period to provide financial assistance for social housing.

Additionally, the federal states have promised to strengthen their funding programs, in particular for living space with long-term relationships. With the German government as well as the federal states and municipalities funding a total of EUR 5.0 billion, almost 100,000 social housing units are expected to be created in the near future.

Starting from 2020, funding mechanisms such as increasing the Länder’s share of VAT revenues and providing higher supplementary grants to financially strapped Länder are being employed by the federal government to support the Länder. A total of EUR 5.0 billion was made available by the Federation for the construction of social housing in the Spring of 2020. Furthermore, the central government has also implemented various measures aimed at alleviating housing affordability supporting the housing supply. The German government is implementing the recommendations of the building land commission (Baulandkommission) to mobilise more residential building land for constructing more affordable housing and creating additional living space.

The German government has allocated EUR 8.0 billion to housing subsidy, to be used over the 2018-2024 period for the construction of social housing units.
In 2019, the German government introduced a new tax incentive law for privately financed new rental apartments, in addition to the regular straight-line depreciation. A special depreciation of five per cent per year for new rental apartments has been allowed, subject to a maximum eligible assessment base of EUR 2,000 per square meter of living space, in the year of acquisition or manufacture and in the following three years. However, there are certain prerequisites. They are the upper construction cost limit of EUR 3,000 per square meter of living space, complied with the building application made after 31st August 2018 but before 1st January 2022 and the beneficiary rental apartments in the year of acquisition or manufacture and in the following nine years must continue to serve the purpose of living outside the home. Moreover, the special depreciation can be availed only until the assessment period 2026.

Similarly, the German government has taken various initiatives to promote and advance the construction of affordable social housing. These include:

- Extension of the rental price brake by five years along with a retroactive reclaim option in the event of a violation of rent brake for a period of 30 months
- Reduction of the ancillary acquisition costs by limiting the brokerage costs to a maximum of 50.0% of the commission
- Introduction of more attractive housing premium policies
- Re-activation of fallow lands to be used for the construction of new rental housing
- Increased incentives for switching to climate-friendly heating systems along with energy-efficient building renovations.

Correspondingly, housing cooperatives play an important role in providing social housing and affordable rent. Such cooperatives are eligible for funding from the EUR 1.5 billion Federal Compensation Fund for Social Housing. In 2018, the federal government gathered stakeholders for a Housing Summit (Wohngipfel). The government announced a new package of measures to strengthen housing affordability, aimed at supporting the building of 1.5 million new dwelling units. The package includes provisions for securing land for building, lowering of construction costs and tackling skill shortages in the construction sector.

The key measures were classified into three broad categories: stimulus for investment in building houses; affordable housing; and cutting costs and tackling skill shortage. Social housing is a key component of this programme with a total funding of EUR 5.0 billion during 2018-2021. The effort will enable an additional 100,000 units of social housing by 2021.

In September 2018, the German government introduced a new home ownership related to a child grant scheme (Baukindergeld), aimed at families with children and single parents. The scheme provides the single parent a total grant of EUR 12,000 per child in ten equal instalments of EUR 1,200 per year. In order to be eligible for the grant, the annual household income should not exceed EUR 90,000 for family with one child. This annual income requirement increases by an additional EUR 15,000 per another child. Moreover, the children should be under 18 years old and the purchase contract should be dated on or after 1st January 2018. A sum of EUR 570.0 million was allocated for this in the 2019 federal budget, with an approximate provision of EUR 3.8 billion in the period up to 2023.

Under its federal budget, the German government has allocated EUR 9.9 billion for supporting families in the area of housing over the 2018-2020 period.

Furthermore, a new tenant protection law (Mieterschutzgesetz) came into force in January 2019. It aims to address the housing crisis in urban areas, where young families and single parent families face worsening affordability. The law provides more protection for tenants in rented housing and changes in the rental price brake (Mietpreisbremse). From January 2020 onwards, only 8.0% (instead of the previous 11.0%) of the modernisation costs can be allocated to the annual rent.

Nonetheless, the government needs to be alert to the needs of the construction sector. The child grant scheme (Baukindergeld) is scheduled to expire by the end of March 2021, which could have a negative impact on housing market prices. Similarly, the special accelerated depreciation allowance for investments in rental properties will be ending by the end of December 2021, further impacting the
supply in the housing market. However, a government extension is still possible. Furthermore, a decision as to whether the Berlin rent cap is constitutional is also pending. Any ruling on the topic will have far-reaching impacts on Germany’s future housing policies.

### Building regulations

The responsibility for public construction law in Germany is also divided between the central government and the federal states. Zoning law (Bauplanungsrecht) falls under federal law. It determines the purpose for which a property may be used and whether a building project fits into its surroundings. The federal states are responsible for building regulations (Bauordnungsrecht), which determines how buildings may be designed and constructed in order to meet planning law requirements. With respect to zoning regulations, they are governed by the relevant statutory laws at the federal (Länder) as well as the regional and local development plans (Flächennutzungsplan, Bebauungsplan). The applicable codes for zoning and strategic planning are— Federal Planning Act (Raumordnungsgesetz); Zoning codes of the German states (Landesplanungsgesetze); Federal Building Code (Baugesetzbuch); and the Federal Land Use Planning Ordinance (Baunutzungsverordnung). The Musterbauordnung (Model Building Code) at Federal level offers a prototype for each state to issue its own building regulation. In order to obtain a building permit (Baugenehmigung), the project must comply with planning and building regulations, as well as with all other relevant regulations. For instance, the Energy Performance Certificate (EnEV-Ausweis) is mandatory to obtain a building permit, according to the Energieeinspargesetz and Energieeinsparverordnung (Energy Saving Act and Energy Saving Ordinance). Notably, EnEV has been updated replaced in November 2020 by the GEG.

The legal framework can be complemented by federal contracting rules, such as the Standard Rules of Contracting and Execution of Construction Works (Vergabe und Vertragsordnung für Bauleistungen). These are compulsory for the procurement of public works but are also frequently used in private construction projects. Furthermore, contractual provisions also define the liability relationship between parties in a construction project.

The rights of consumers purchasing a property from a developer are protected by the Makler- und Bautragerverordnung (MaBV) law. It defines, the maximum proportion of the purchase price to be paid by the customer during the development stages of the property. If life is put in danger through failure to observe acknowledged rules during design, supervision or execution of works, the German Penal Code (Strafgesetzbuch, StGB) may apply.

Each state issues a list of acknowledged technical rules for works (Liste der technische Baubestimmungen). This list refers to the standards of the German Institute for Standardisation (Deutsches Institut für Normung, DIN) for the planning, design and building of construction works and their parts. DIBt (Deutsches Institut für Bautechnik) is responsible for the development of the list on behalf of the Länder. Therewith, the German DIN standards have official status and are mandatory for building projects and to produce building products, building elements and construction systems.

### Insurance and liability related regulations

The legal and regulatory rules are defined partly at the federal level and to a large degree by the individual Länder.

The Civil Code (BGB – Bürgerliches Gesetzbuch) sets out the main provisions with regard to liability in tort (such as injuries inflicted to third parties, breach of statutory provisions and liability for damages caused by agents or sub-contractors) and liability of construction parties (such as architects, engineers, and building contractors) for construction defects.

The regular limitation period set in the Civil Code is three years, but a limitation period of two years is defined for construction related to manufacturing, maintenance or alteration of a moveable asset. Moreover, a limitation period of five years applies for construction related to works resulting in the manufacturing, maintenance or alteration of a building.
In 2018, the Construction Contract Law as part of the Civil Code came into effect. The new law included significant changes improving the rights of building owners and developers, for example by entitling them to a comprehensive description of the construction works to be undertaken prior to a conclusion of the contract, as well as a fixed timeframe for completion of the works, which can become the basis for damage claims in case of delays. The law also introduced a cancellation period of 14 days for contracts not validated by a notary, as well as termination provisions in case of bankruptcy of the contractor. Customers can also withhold 10.0% of the payments as a last instalment as guarantee for satisfactory completion of turnkey projects. The law also includes provisions advantageous to construction firms, such as the definition of an acceptance test, after which the customer cannot claim defects in the performed works. Additionally, construction sector chambers with experts specialising in construction law should also be available in future in order to decide on open questions quickly and competently. The new law has been welcomed by industry associations.

In terms of insurances, the contractor can obtain the liability insurance (Haftpflicht-versicherung), or the all risks insurance (Bauleistungs-versicherung) for works-in-progress. The risk insurance includes coverage for damage and theft. The advance building insurance (Gebäudeversicherung) also covers natural disasters.
Current status and national strategies to meet Construction 2020 objectives

TO 1 – Investment conditions and volumes

Total investments by the broad construction sector\textsuperscript{161} increased substantially over the past years (Figure 10). Notably, investments by the narrow construction and the real estate activities sub-sectors increased by 69.4\% and 27.6\% between 2010 and 2019, respectively. In absolute terms, investments by the real estate activities sub-sector stood at EUR 188.2 billion in 2019, while investments by the narrow construction sub-sector stood at EUR 7.9 billion. Likewise, investments in intellectual property by the narrow construction and the real estate activities sub-sectors also followed an upward trend, increasing by 7.2\% and by 44.0\% over the 2010-2019 period, respectively\textsuperscript{162}.

Figure 10: Investment by the German broad construction industry between 2010 and 2019 (EUR m)

Investments by the narrow construction sub-sector between 2010 and 2019

\textbf{69.4\%}

Total investments in the broad construction sector\textsuperscript{163} increased by 11.4\% between 2015 and 2019 (Figure 11). In particular, investments in dwellings experienced a 13.2\% growth over 2015-2019 period. Similarly, investments in non-residential constructions and civil engineering also increased by 8.7\% between 2015 and 2019. In absolute terms, investments in the broad construction sector totalled EUR 344.3 billion in 2018\textsuperscript{164}, out of which EUR 209.9 billion were invested in dwellings and EUR 134.4 billion were allocated to non-residential constructions and civil engineering\textsuperscript{165}.

Figure 11: Investment in the German broad construction sector between 2010 and 2019 (2015=100)

The share of total inland\textsuperscript{166} infrastructure investment in the GDP reached 0.7\% in 2018\textsuperscript{167}, same as the 2010 level. Investment in rail and road infrastructure increased by 61.4\% and 27.6\% over the 2010-2018\textsuperscript{168} period, totalling EUR 6.1 billion and EUR 15.6 billion in 2018, respectively. In contrast, investment in air, inland waterways and sea infrastructure decreased by 7.4\%, 17.3\% and 54.9\% over the 2010-2018 period, totalling EUR 1.4 billion, EUR 910.0 million and EUR 435.0 million in 2018, respectively.
Regarding transport infrastructures, the 2030 Federal Transport Infrastructure Plan (Bundesverkehrswegeplan - BVWP) sets the strategy for transport investments in Germany, highlighting the importance assigned by the federal government and the EU to mobility and infrastructural investments in Germany\textsuperscript{169}. The key aspects of BVWP are structural maintenance of existing infrastructure networks and removal of bottlenecks at important transport hubs. A total funding of EUR 269.6 billion until 2030 has been planned, out of which EUR 141.6 billion will be invested in maintenance of existing infrastructure. Around EUR 98.3 billion has been earmarked for the upgrading and new infrastructure construction. Of the total planned funding of EUR 269.6 billion, 49.0% or EUR 132.8 billion has been earmarked for investments in federal trunk roads, 42.0% (EUR 112.3 billion) for investment in railway network and the remaining 9.0% (EUR 24.5 billion) for improvements of waterways\textsuperscript{170}.

In 2019, the German government undertook planned investment expenditure to the tune of EUR 8.0 billion in federal trunk roads, EUR 5.6 billion in federal railways and EUR 1.0 billion in federal waterways. Similarly, in 2020, the country plans to invest EUR 7.8 billion in federal trunk roads, EUR 6.6 billion in federal railways as well as EUR 0.8 billion in federal waterways\textsuperscript{171}.

As of 2021, the German government plans to raise EUR 1.0 billion of federal funding per year for expanding track-based local public transport infrastructure. This is expected to increase to EUR 2.0 billion per year by 2025\textsuperscript{172}.

Over the 2020-2031 period, the German federal funding for local public transport is planned to be increased by an additional EUR 5.2 billion. Moreover, the government will also provide an additional EUR 900.0 million between 2020 and 2023 for expanding the cycling infrastructure within the country and financing additional pilot projects\textsuperscript{173}.

With regards to affordable housing, the German government has allocated EUR 8.0 billion for social housing subsidies over the 2018-2024 period. In fact, in 2019, the country invested EUR 246.0 million in energy-efficient building renovations and plans to further increase this amount to EUR 365.0 million in 2020.

In recent years, Germany has announced various important construction and infrastructure projects. For instance, in July 2019, the German government, in partnership with the national railway operator, Deutsche Bahn, agreed to invest EUR 86.0 billion in the German railway network maintenance and improvement until 2030. This funding will be used to overhaul existing network of tracks, railway stations and signal system. Additionally, around 2,000 bridges will be renovated until 2030, with a view to reduce delays and disruptions\textsuperscript{174}. Another example, the construction of the Fehmarn belt underwater tunnel between Germany and Denmark, involves an investment of EUR 7.0 billion and is expected to boost the sector’s growth in the coming years\textsuperscript{175}. Moreover, as part of the Trans-European road network (TEN-T), Germany estimates an investment need of EUR 115.0 billion between 2021 and 2030 for the German sections of the TEN-T core and comprehensive network\textsuperscript{176}.

The EIB has financed a number of infrastructure projects in Germany including the Verkehrsbetriebe Hamburg-Holstein’s (VHH) Hamburg E-mobility Programme, launched in September 2019, under the Clean Urban Transport Programme Loan Germany. The project, amounting to EUR 142.0 million with a proposed EIB financing of EUR 60.0 million, aims at the electrification of Hamburg’s fleet of public busses between 2019 and 2023\textsuperscript{177}.

In 2019, the EIB Group invested almost EUR 1.3 billion in infrastructure\textsuperscript{178}.

Likewise, Germany also benefitted from investments from the European Fund for Strategic Investments (EFSI). As of September 2020, the total financing under EFSI amounted to EUR 9.0 billion and is set to trigger additional investments of EUR 38.0 billion. Under the infrastructure and innovation window, 97 projects have been approved, amounting to EUR 7.5 billion and are set
to trigger EUR 30.3 billion in total investments. Under the SMEs window, 32 agreements have been approved, involving a total financing of EUR 1.4 billion, and are set to trigger investments of up to EUR 7.8 billion.

Renovation spending by households amounted to EUR 13.6 billion in 2019, representing a 33.4% increase as compared to 2010. However, the spending as a share of total household disposable income remained stable at 0.6%.

Households renovation spending between 2010 and 2019

33.4%

TO 2 – Skills

Germany has one of the highest employment rates for recent vocational education and training (VET) graduates in the EU. It stood at 92.7% in 2019, well above the EU-27 average of 80.9%.

The German government adopted several measures to promote the adoption of VET. In January 2020, the government announced a new law to align dual VET with future requirements in five areas by introducing a minimum training wage for apprentices, emphasising equivalence to academic qualifications by introducing new terms for advanced vocational training programmes, expanding part-time vocational training to new target groups, facilitating recognition of prior VET learning and reducing administrative burdens.

The German government adopted the Skilled Immigration Act in March 2020, granting applicants with a recognised full vocational or higher general education qualification the possibility to live and work in Germany. Furthermore, the new version of the law on advanced training programmes to become a master craftsman or technician was also approved.

In response to the COVID-19 pandemic, in April 2020, the Federal Cabinet adopted the Law on the promotion of continuing vocational training during times of structural changes and further development of funding of vocational training assistance. Furthermore, the government has developed labour market support instruments such as facilitating access to short-time work benefits and employee qualification.

Correspondingly, Germany’s overall participation in adult learning stood at 8.2% in 2019, above the EU-27 average of 10.8%. Adult participation in education and training in the narrow construction sub-sector stood at 9.2% in 2019, marginally higher as compared to the EU-27 average of 8.7%. In contrast, adult participation in education and training in real estate activities stood at 11.6% for 2019, below the EU-27 average of 16.4%.

Adopted in 2019, the national skills strategy (Nationale Weiterbildungsstrategie) combines federal and regional programmes and is expected to improve transparency together with accessibility, with better recognition of informal skills and guidance to low-skilled workers to formal (as well as partial) qualifications. Other recent reform initiatives include the ‘Qualifications Opportunities Act’ (Qualifizierungschancengesetz), providing improved access to and financial support for further education of employees whose jobs are at risk of being replaced by new technologies.
Skills shortage is one of the biggest problems for the German construction sector. To tackle this, the central government, in partnership with regions (Länder), has launched the second phase of the Quality Initiative, 2019-2023. This includes 48 different projects in 59 establishments. The key focus of the initiative will be in the fields of machine technology and electrical engineering, among others. Additionally, in order to modernise the VET curriculum to current labour market requirements, the Federal Ministry of Education and Research (BMBF) launched the Vocational Training Pact in 2018. With a focus on digitalisation, automation and advanced technology learning, the Federal Cabinet, in 2019, updated the Vocational Training Act (Berufsbildungsgesetz). The update introduced three continuing vocational education and training (C-VET) levels with harmonised terms of C-VET occupations. In June 2019, the German parliament passed the Skilled Labour Immigration Act, effective from 1st March 2020. The new rule permits qualified workers from non-EU countries to work in Germany and is expected to bring an additional 25,000 skilled workers each year. The rules also allow the candidates to take up further training and education in Germany, in cases where the professional qualifications are partially recognised. Furthermore, the immigration law does not restrict entry of skilled workers to any pre-defined list of “shortage occupations”. As such, certain occupations suffering from labour shortage, including craftsmen and other skilled workers in the construction sector, electrical and other engineers, also benefit from this Act.

**TO 3 – Resource efficiency / Sustainable construction**

Under the National Energy Efficiency Action Plan (NEEAP), in case of primary energy consumption, Germany has an indicative national reduction target of 20.0% by 2020, 30.0% by 2030 and 50.0% by 2050, in comparison to 2008. However, as per the government estimates, Germany has reduced its primary energy consumption by only 10.9% between 2008 and 2019. The government recently adopted the Climate Package (including the Climate Protection Program 2030 and the Federal Climate Protection Act of 2019). The country achieved its emissions reduction targets for 2020, which is partly explained by the impact of the COVID-19 crisis, and notably the decline in economic activities.

Since the political push to decarbonise the economy (Energiewende), Germany has made substantial efforts to make its building stock more energy efficient. Given that buildings make up about 35.0% of total energy consumption, they have important energy savings potential. Notably, through the “2050 Energy Concept”, the federal government has paved the way to the transformation of the country’s energy supply and utilisation. The Concept foresees, among other targets, the reduction of the primary energy demand of buildings by 80.0% by 2050, compared to 2008.

In December 2019, the German government launched an initiative ‘Energy Efficiency Strategy 2050’ aimed at achieving its 2030 targets through fostering energy efficiency investments across different sectors.

The legal requirements for energy conservation in Germany are laid out in the Energy Conservation law. The most important standards governing energy efficiency in buildings are set out in the Energy Conservation Act (EnEG), the Energy Conservation Ordinance (EnEV), now replaced by the GEG in November 2020, and the Renewable Energies Heat Act (EEWärmeG). Additionally, the Heating Cost Ordinance governs the allocation of costs for heating and hot water production in centrally supplied buildings with two or more units.

In October 2019, the German government passed a draft of the new Building Energy Act (Gebäudeenergiegesetz - GEG) merging and simplifying the Energy Saving Act, Energy Saving Ordinance and Renewable Energies Heat Act. Under the GEG, the European requirements for the total energy efficiency of buildings have been implemented. Additionally, the regulations of the lowest energy building have also been integrated into a unified energy saving law. Nonetheless, the current energy requirements for new buildings and renovations continue to apply and will not be tightened. In fact, the ‘neighbourhood approach’ is introduced under the Act.

The German government also offered additional incentives to promote building renovations. For instance, the German government has created an exchange bonus scheme wherein it covers 40.0% (in
case of installation of a gas hybrid heater) to 45.0% (in case of installation of a regenerative heat generator) of renovations cost of a new, efficient heating system. Moreover, no new oil heating system will be allowed to be fitted in buildings after 2026 under the 2030 Climate Package (as long as an alternative exists)\(^{194}\).

Another example, if owners install new windows and/or insulate the roofs and outer walls of an owner-occupied residential property, they will be eligible to claim a tax incentive of 20.0% of the investment costs up to a maximum deductible amount of EUR 40,000 per beneficiary property. This tax incentive will be spread over three years, resulting in reduced tax liability for a large number of building owners\(^{195}\).

In September 2018, the Ministry for Economic Affairs (BMWi) adopted the 7th Energy Research Programme defining the energy research policies until 2022, at a total budget of EUR 6.4 billion\(^{196}\). The programme, part of the Ministry’s “Research network – Energy in Buildings and Districts” programme, aims at streamlining the research efforts in the energy optimised building domain. It stresses the importance of innovation and technological developments geared towards transforming the energy systems. There are four key research focus areas of the 7th Energy Research Programme, as follows:

- Energy efficiency in buildings, industry and commerce as well as in transport sector;
- Alternative energy sources exploring various sources, such as wind, geothermal, solar, biofuel, hydro, marine as well as conventional thermal plants;
- Integration of energy systems, such as power grids, storages, sector coupling, and hydrogen technologies;
- Energy transition research, such as CO\(_2\) circular economy, digitalisation, and resource efficiency so as to optimise the energy usage.

The programme focuses on applying energy efficiency and use renewable sources in industry and commerce, buildings and neighbourhoods, and in the transport sector\(^{197}\).

Likewise, the Market Incentive Programme (MAP) with a yearly budget of EUR 300 million, offers grants and low-interest loans to private individuals, companies and municipalities to invest in sustainable heating and cooling technologies powered by renewable energy. Additionally, companies converting to a renewable energy system with a nominal output of more than 100 kilowatts are eligible for grant funding. The grants can be provided in the form of subsidies of up to 30.0% of total investment costs for a solar collector system. For heat pumps and biomass plants, the grant funding can range between EUR 50,000 to EUR 100,000 depending on the level of innovation of the system\(^{198}\). The MAP programme was revised in January 2018 to enable applicants to apply for funding even before the commencement of work. Moreover, equipment funding was also included within the purview of MAP\(^{199}\).

Furthermore, there has been continued support from the EIB for development of energy efficient buildings in Germany. For example, in January 2020, the state housing company, Gewobag, received a EUR 240.0 million loan from the EIB to build 2,000 new residential units in Berlin by 2023. The units will be compliant with existing energy efficiency standards, and hence contribute towards the dual goal of mitigating Berlin’s housing shortage as well as contribute towards the organisation’s climate change objectives\(^{200}\).

### TO 4 – Single Market

According to the 2020 EU Single Market Scoreboard, overall, Germany performed slightly better as compared to the EU-28\(^{201}\) average\(^{202}\).

In relation to 2020 EU Single Market Scoreboard metrics, Germany’s performance was average in the transposition of law metrics. In parallel, Germany performed well above the EU-28\(^{203}\) average in Internal Market Information System (IMI), e-Certis, EURES and Your Europe metrics – EU’s single digital gateway aimed at providing access to information, procedures, assistance and problem-solving services. However, the country performed poorly in terms of Infringements, EU Pilot and SOLVIT metrics\(^{204}\).

In terms of Public Procurement, Germany’s performance was average in general, with the country scoring unsatisfactory rating in six, satisfactory rating in four and average rating in two out of twelve criteria\(^{205}\).
As per the 2019 SBA Fact Sheet, the country performed broadly in line with the EU-28 average, notably in terms of SMEs with intra-EU exports and imports of goods, intra-EU online exporters, easy market access for new and growing firms as well as average transposition delay for overdue directives. Nonetheless, Germany needs to improve its performance under some metrics such as number of pending infringement proceedings, number of single market directives not yet transposed and public contracts secured abroad by SMEs.

Despite having a strong institutional and legal anti-corruption framework, Germany carries a moderate level of fraud and corruption risk in the construction and public procurement sectors. Specifically, in terms of land administration, corruption is reportedly prevalent in large-scale construction projects owing to close ties between local authorities and large companies. Around a third of Germans considered corruption to be prevalent in issuing building permits.

With respect to the use of Eurocodes, Germany has published all Eurocode Parts as National Standards with the exception of EN 1990-A1 (Annex 2). The Regulation MLTB 03/2014 mandates 39 Eurocodes Parts for structural design. Other National Standards are used in parallel with EN 1991-4 (DIN FB 140), EN 1995-1-1 (DIN 1052-10), and with EN 1997-1 (DIN 1054). The National Standards complement the Eurocodes Parts. Some Eurocode Parts are restricted according to the Regulation MLTB 03/2014. There is no obligation to make use of Eurocodes in public procurement.

TO 5 – International competitiveness

According to the 2019 Global Competitiveness Index, Germany ranked 7th out of 141 economies in its performance.

In terms of trade openness, out of 141 economies, Germany ranked 1st with regards to border clearance efficiency, 7th with respect to trade barriers and 31st in relation to prevalence of non-tariff barriers, while 113th when it comes to complexity of tariffs.

With regards to the internationalisation of construction SMEs, the export value of all construction-related projects in Germany stood at EUR 11.8 billion in 2019, representing a 7.7% increase as compared to the 2010 level of EUR 11.0 billion. Germany’s share of exports of all construction-related products in 2019 stood at 33.4% of the total production value, higher than the 31.3% in 2018 as well as the EU-27 average of 11.4% for the same reference period.

Exports value of all construction-related products between 2010 and 2019

In the context of inward FATS (Foreign Affiliates Statistics), value added at factor cost in the narrow construction sub-sector increased by 139.0% between 2010 and 2017. Similarly, turnover in the narrow construction sub-sector increased by 72.7% over the 2010-2017 period. Likewise, turnover in the real estate activities sub-sector, increased by 45.7% between 2010 and 2017. In contrast, turnover in the German narrow construction sub-sector, in terms of outward FATS, decreased by 77.0% over the 2010-2017 period. On the other hand, turnover in the real estate activities sub-sector increased by 1.5% over the same reference period.

Contrary to the large size of the German construction sector and the overall competitiveness of German engineering, only one company ranked within the top 100 Global construction firms in 2019 by sales. This was comparable to other European countries including Belgium, Switzerland, Italy, Finland, Norway, etc. but well behind countries such as the UK, Spain, Sweden, France and Greece. The latter countries had 11, 6, 4, 3 and 3 companies, respectively within the 2019 ranking. Given its renowned engineering expertise, the German construction sector has been increasingly successful in securing international contracts, particularly related to infrastructure and civil engineering projects. On the other hand, several issues have reportedly been limiting opportunities for German construction businesses wishing to operate across the EU, particularly linked to public procurement.

The German government has initiated several measures to promote and strengthen public procurement processes including better use of e-procurement, a dedicated web portal for sustainable public procurement as well as a lifecycle costing calculation tool from the German Environment Agency.
Since October 2018, the use of e-procurement has also been made mandatory for all public procurement procedures above the EU threshold. Nonetheless, a more coordinated and strategic approach is required.

Germany performed well above the EU-282018 average. As per the 2019 SBA Fact Sheet, Germany performed well above the EU average in seven indicators, particularly in extra-EU exports and imports of goods, extra-EU online exporters and formalities – automation. With regards to the remaining two indicators, the country performed below the EU average, especially in terms of advance rulings and formalities – procedures221.

Over the 2018-2019 period, the country introduced the following measures to promote internationalisation of German businesses220:

- Implementation of the New German Accelerator in Singapore (GASEA) by the Federal Ministry for Economic Affairs and Energy in March 2018. GASEA offers customised mentoring and extensive networking opportunities, strategic advice, free office space and tactical support to 20 German start-ups each year to enable them to scale up in ASEAN and southeast Asia.
- Improved conditions for the granting of export credit guarantees (Exportkreditgarantien — ‘Hermes cover’) by the Federal Inter-ministerial Committee on Export Credit Guarantees in July 2018 and February 2019.
- Expansion of the market entry programme (Markterschließungsprogramm) by the Federal Ministry for Economic Affairs and Energy in 2019, aimed at supporting SMEs entering or positioning themselves in new foreign markets.

All the above-mentioned initiatives are expected to indirectly boost the internationalisation of German construction companies in new foreign markets.
Over the 2020-2022 period, the German GDP is forecasted to decrease by 2.0%, primarily due to weak export performance, lower fixed capital formation and subdued domestic demand.

The German GDP is forecasted to initially decrease by 6.5% in 2020 and then increase by 5.9% in 2021, totalling EUR 3.2 trillion in 2021.

Likewise, the volume index of production in the broad construction sector is estimated to decline by 1.7 index points (ip) in 2020, mainly due to a 5.0 ip decline in the construction civil engineering sub-sector in 2020. In contrast, the volume index of production in the broad construction sector is expected to increase by 3.9 ip in 2021, mostly driven by a 4.0 ip rise in both the construction of buildings as well as civil engineering sub-sectors.

Moreover, the total value added of the broad construction sector is expected to drop by 12.8% in 2020 before increasing by 8.5% in 2021. Likewise, the turnover of the broad construction sector is estimated to decline by 13.4% in 2020 and then increase by 8.7% in 2021.

Similarly, the number of persons employed in the broad construction sector is also expected to decrease by 13.8% to 3,736,065 in 2020 and later increase by 10.4%, reaching 4,124,851 in 2021. Most of this decline over the 2020-2022 period is anticipated to come from the manufacturing (-9.7%), the real estate activities (-9.2%) and the construction (-6.9%) sub-sectors, partially offsetting an 8.5% increase in the architectural and engineering activities sub-sector.

The German government is already undertaking several initiatives to promote its housing market. It has allocated EUR 5.0 billion under its housing policies towards the construction of 100,000 rental units in the next four years. The government has also allocated EUR 8.0 billion as housing subsidy, to be used over the 2018-2024 period. Additionally, a new tax incentive law for privately financed new rental apartments was introduced, in addition to the regular straight-line depreciation. Other noteworthy measures include extension of the rental price brake by five years, re-activation of fallow lands to be used for the construction of new rental housing and increased incentives for switching to climate friendly heating systems.

With regards to civil engineering, from 2021, the German government plans to raise EUR 1.0 billion of federal funding per year for expanding track-based local public transport infrastructure. This is expected to increase to EUR 2.0 billion per year by 2025. Additionally, the government intends to invest an additional EUR 900.0 million between 2020 and 2023, to expand the cycling infrastructure within the country.

Overall, the German construction sector is forecasted to witness a sharp deceleration in 2020, followed by market correction from 2021 onwards. The construction sector has remained resilient throughout the pandemic. Going forward, the residential and public sector construction are expected to drive the sectoral growth while investment in commercial construction is likely to decline.
Please note that this 2019 data is a nowcast - please refer to the methodology notes for further details.
The gross operating rate is the ratio of Gross Operating Surplus to Turnover, and is an indicator of profitability.
Please note that this 2019 data is a nowcast - please refer to the methodology notes for further details.
Please note that the share of each sub-sector in the value added of the broad construction sector should not be compared to the shares of the Gross Value Added in the GDP, since the GDP also includes taxes and excludes subsidies.
Please note that this 2019 data is a nowcast - please refer to the methodology notes for further details.
Apparent labour productivity refers to the Gross Value Added per person employed.
Please note that this 2019 data is a nowcast - please refer to the methodology notes for further details.
Data unavailable for 2019.
The gross operating rate is the ratio of Gross Operating Surplus to Turnover, and is an indicator of profitability.
Data unavailable for 2019.
Please note that this 2019 data is a nowcast - please refer to the methodology notes for further details.
No data available for subsequent years.
Ibidem.
Ibidem.
Teilhabechancengesetz, https://www.bmas.de/DE/Service/Gesetze/teilhabechancengesetz.html
World Bank Group, Doing Business 2019, Economy Profile for Germany, https://www.doingbusiness.org/content/dam/doingBusiness/country/g/germany/DEU.pdf
As the EU-27 average data was not available, the EU-28 average was used for comparative purpose
Ibidem.
As the EU-27 average data was not available, the EU-28 average was used for comparative purpose
Ibidem.
Data not available for 2019.
According to Eurostat, construction services comprises Construction Abroad (code 250) and Construction in the Compiling Economy (code 251). They do not include architectural services, or engineering services.
Data not available for 2019.
Data not available prior 2014.
The housing cost overburden rate is the percentage of the population living in households where the total housing costs represent more than 40% of disposable income.

Housing cost overburden rate, [source](https://ec.europa.eu/eurostat/databrowser/view/tespm140/default/table?lang=en)

Eurostat, Severe housing deprivation rate is defined as the percentage of population living in the dwelling which is considered as overcrowded, also exhibiting at least one of the housing deprivation measures. Housing deprivation is a measure of poor amenities and is calculated by referring to those households with a leaking roof, no bath/shower and no indoor toilet, or a dwelling considered too small.

Severe housing deprivation rate, [source](https://ec.europa.eu/eurostat/databrowser/view/ilc_mdh06aDV_657/default/table?lang=en)

The overcrowding rate is defined as the percentage of the population living in overcrowded households.

Overcrowding rate, [source](https://ec.europa.eu/eurostat/databrowser/view/tespm170/default/table?lang=en)


Data not available prior 2014.


Ibidem.

Finance constrained firms include: those dissatisfied with the amount of finance obtained (received less), firms that sought external finance but did not receive it (rejected) and those who did not seek external finance because they thought borrowing costs would be too high (too expensive) or they would be turned down (discouraged).

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Data not available for 2019.

The German housing-market exception, [source](https://www.ft.com/content/cb004fce-5787-48c9-bc5d-3c27e890a76c)

House prices in Germany rose even faster than expected during corona crisis, [source](https://www.iamexpat.de/housing/real-estate-news/house-prices-germany-rise-even-faster-expected-during-corona-crisis)

The German housing-market exception, [source](https://www.ft.com/content/cb004fce-5787-48c9-bc5d-3c27e890a76c)

Chinese property investors are eyeing German real estate again, [source](https://list.juwai.com/news/2020/10/chinese-property-investors-eyeing-german-real-estate-again)

Number of residential building permits increases in Germany: data, [source](http://www.xinhuanet.com/english/2020-07/15/c_139214753.htm)

Number of building permits in residential construction, [source](https://fiec-statistical-report.eu/germany)

The housing cost overburden rate is the percentage of the population living in households where the total housing costs represent more than 40% of disposable income.

Housing cost overburden rate, [source](https://ec.europa.eu/eurostat/databrowser/view/tespm140/default/table?lang=en)

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Severe housing deprivation rate, [source](https://ec.europa.eu/eurostat/databrowser/view/ilc_mdh06aDV_657/default/table?lang=en)

The overcrowding rate is defined as the percentage of the population living in an overcrowded household.

Overcrowding rate, [source](https://ec.europa.eu/eurostat/databrowser/view/tespm170/default/table?lang=en)


Ibidem.

Data for subsequent years unavailable.

Data for subsequent years unavailable.

Data for subsequent years unavailable.

Data for subsequent years unavailable.

Data for subsequent years unavailable.

Data for subsequent years unavailable.

Ibidem.

Zombies or just sleeping? German insolvencies fall despite pandemic, [source](https://in.reuters.com/article/us-germany-economy-insolvencies/zombies-or-just-sleeping-german-insolvencies-fall-despite-pandemic-idINKBN26115M)

Insolvency law, More legal certainty in times of crisis, [source](https://www.bundesregierung.de/breg-de/themen/ coronavirus/insolvenzauflagegesetz-1781394)


Ibidem.

Ibidem.

Western Europe comprises of the countries – Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Spain, Sweden, Switzerland and United Kingdom


DNB_Payment_Study_2020, [source](https://www.dnb.co.uk/content/dam/english/business-trends/DNB_Payment_Study_2020.pdf)

Germany: increase in late payments worries businesses, [source](https://group.atradius.com/publications/payment-practice-barometer-germany-2019.html)

German VOB-B, Dejure.com, [source](https://dejure.org/gesetze/VOB-B/16.html)

Germany: increase in late payments worries businesses,
European Construction Sector Observatory

The warehouse in this example is defined as a structure for general storage activities, with two stories, above ground and with total constructed area of approx. 1,300 square meters. The ground, on which the warehouse is built is owned by the company that will use it and valued at 50 times income per capita. There are architectural and technical plans prepared for the warehouse, which are also taken into account and counted as procedures if their preparation requires obtaining further documentation or getting prior approvals from external agencies. Finally, in this example the warehouse takes 30 weeks to construct, excl. all delays due to administrative and regulatory requirements.


Skilled personnel welcome, https://www.bmvi.de/SharedDocs/EN/publications/road-design-safety-education-skills.html?__blob=publicationFile


Imagekampagne: Das Handwerk, https://www.zdh.de/service/imagekampagne-handwerk/71=0


Pilot project Berufsstart Bau, https://www.zdb.de/berufsbildung

Data not available for 2019.


Data not available for 2019.


Ibidem.

Ibidem.

Data unavailable for subsequent years.


Data unavailable for subsequent years.

A full-time equivalent (FTE) is a unit to measure employed persons in a way that makes them comparable, although they may work a different number of hours per week. The unit is obtained by comparing an employee’s average number of hours worked to the average number of hours of a full-time worker. A full-time person is therefore counted as one FTE, while a part-time worker gets a score in proportion to the hours worked.

Data for subsequent years unavailable.


Data unavailable for prior years.


As the EU-27 average data was not available, the EU-28 average was used for comparative purpose.


As the EU-27 average data was not available, the EU-28 average was used for comparative purpose.

Digital Economy and Society Index 2020, Germany.


Digital Economy and Society Index 2020, Germany.


Planen bauen 4.0, http://planen-bauen40.de/


Agora Energiewende, Understanding the Energiewende - FAQ on the ongoing transition of the German power system, October 2015, https://www.agora-energiewende.de/fileadmin/Projekte/2015/Understanding_the_EW/Agora_Understanding_the_Energiewende.pdf

Mitsubishi Electric, German Energy Act For Buildings (GEG) Still A\end{Verbatim}
This includes total investment by the narrow construction and real estate sub-sectors, defined as gross fixed capital formation, i.e. acquisitions minus disposal, of total fixed assets (e.g. machinery and equipment, vehicles, dwellings and other buildings).

Data on investments in machinery and equipment, vehicles, dwellings and other buildings was not available.

This includes total investment (i.e. gross fixed capital formation) in dwellings and non-residential construction and civil engineering by investors in the general economy (e.g. industry, financial and non-financial services, households, agricultural sector, etc.).

Data for subsequent years unavailable.

The indicator gross fixed capital formation in non-residential and civil engineering refers to the Eurostat indicator «Other buildings and structures. According to the OECD, inland infrastructure includes road, rail, inland waterways, maritime ports and airports and takes account of all sources of financing.

No data available for subsequent years.

No data available for subsequent years.


Ibidem.


As the EU-27 average data was not available, the EU-28 average was used for comparative purpose.


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Inward FATS describe the overall activity of foreign affiliates resident in the compiling country. A foreign affiliate within the terms of inward FATS is an enterprise resident in the compiling country over which an institutional unit not resident in the compiling country has control.

Data for subsequent years unavailable.

Outward FATS describe the activity of foreign affiliates abroad controlled by the compiling country. Foreign affiliate within the terms of outward FATS is an enterprise not resident in the compiling country over which an institutional unit resident in the compiling country has control.

Data for subsequent years unavailable.


As the EU-27 average data was not available, the EU-28 average was used for comparative purpose.
